Attachment

Establishment of Greenhouse Gas Emissions Reduction Target and Scenario Analysis of Climate-Related Risks and Opportunities

Mitsubishi Materials Corporation

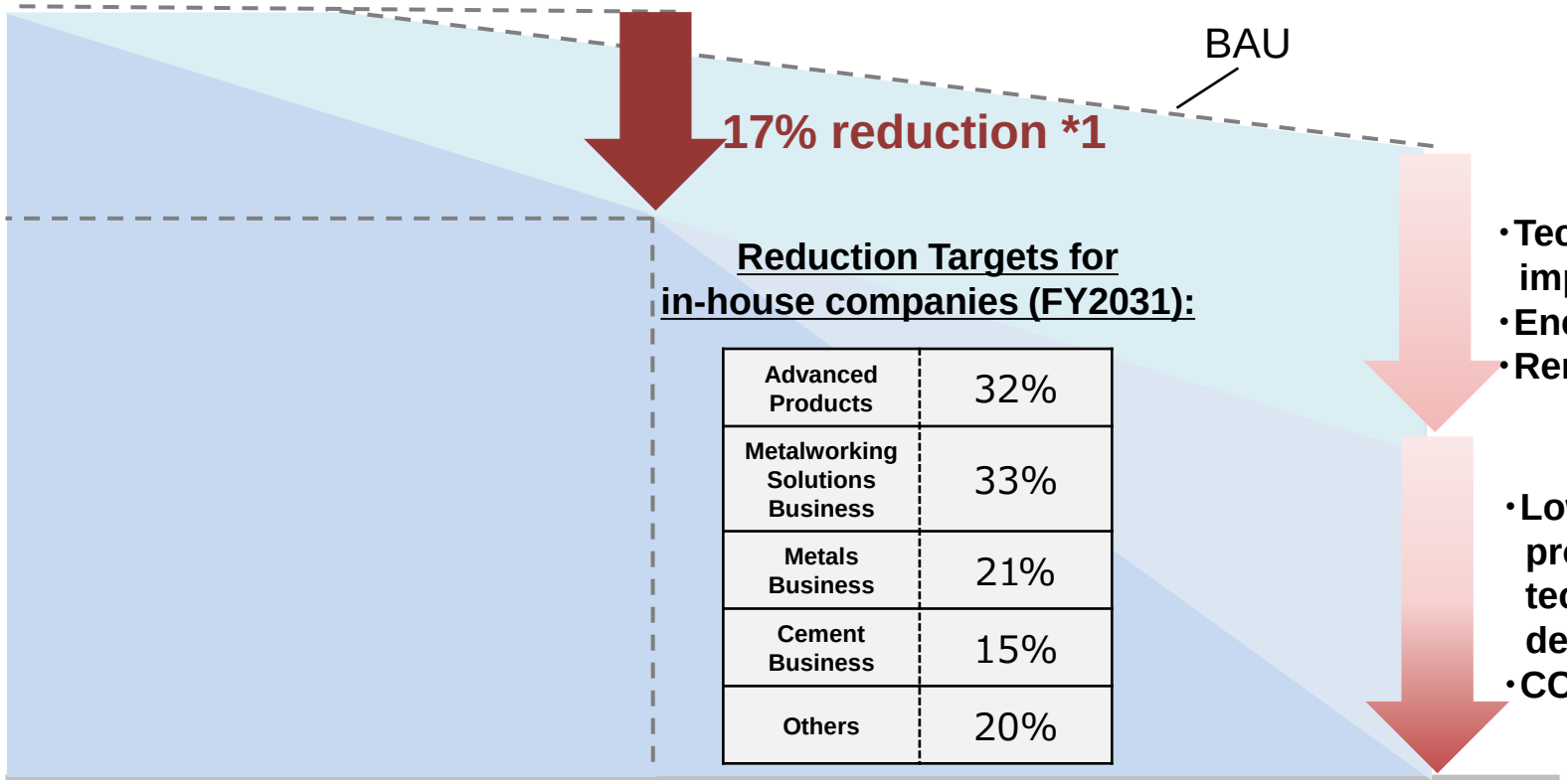
Mitsubishi Materials Corporation (the Company) has set reduction targets to achieve carbon neutrality and reduce the Group's greenhouse gas (GHG) emissions to virtually zero by FY2051. Along with this, based on the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), we conducted scenario analyses of the impact of climate-related risks and opportunities on our business and financial performance.

GHG emissions reduction target and the scenario analysis results are described in the following pages.

Greenhouse Gas Emissions Reduction Target

Greenhouse Gas (GHG) Emissions Reduction Target

- Reduce GHG emissions of the MMC Group by 17% by FY2031 (compared to FY2014)
- Reduce emissions by 30% or more in the Advanced Products and the Metalworking Solutions Business, whose energy emissions are the most significant
- Use renewable energy sources for over 20% of the Group's total electricity consumption by FY2031.
- Aim to become carbon-neutral company by the end of FY2051



Reduction Targets for in-house companies (FY2031):

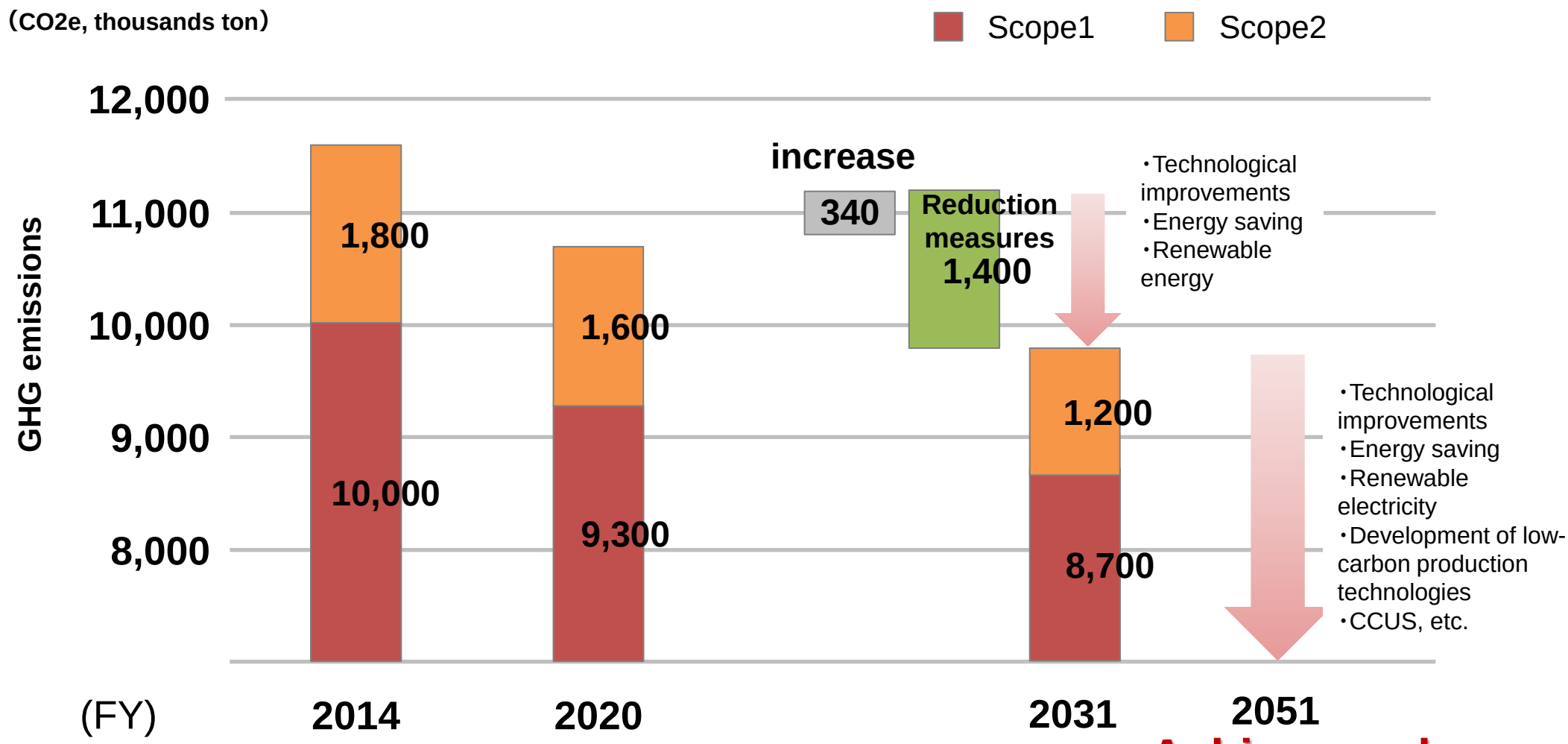
Advanced Products	32%
Metalworking Solutions Business	33%
Metals Business	21%
Cement Business	15%
Others	20%

Achieve carbon neutrality

※1 Scope1＋Scope2
※2 Transition to a production process that utilizes hydrogen/electric energy

・Scope1：Direct GHG emissions by business operators
・Scope2：Indirect emissions resulting from the use of electricity, heat, and steam supplied by other companies

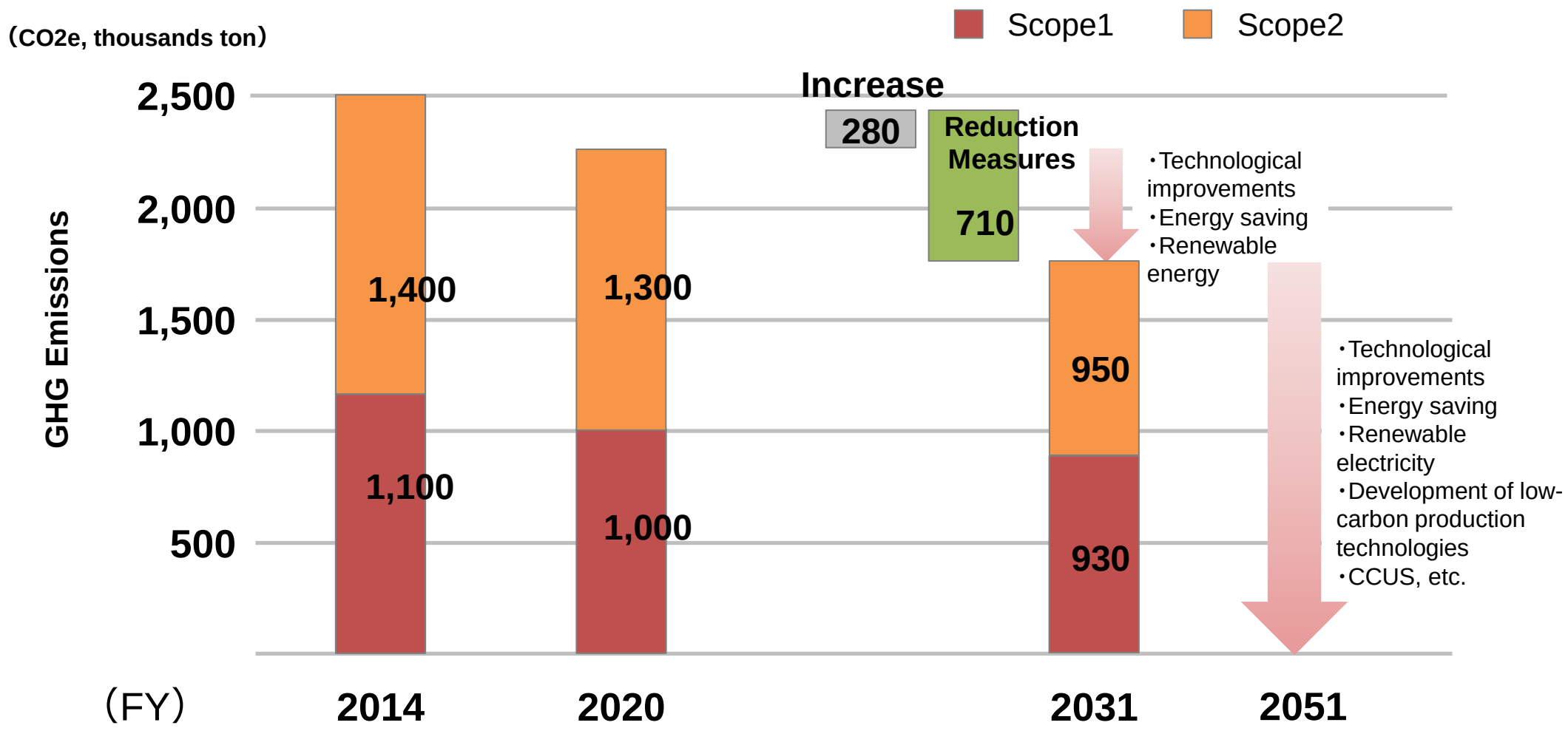
Reduction Plans for the FY2031 Target (MMC Group)



Achieve carbon neutrality

・Scope1：Direct GHG emissions by business operators
・Scope2：Indirect emissions resulting from the use of electricity, heat, and steam supplied by other companies

Reduction Plans for the FY2031 Target (excl. Cement Business)



Achieve carbon neutrality

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Scenario Analysis of Climate-Related Risks and Opportunities

Identification Process for Risks, Opportunities, and Countermeasures

■ **Identify climate-related scenarios, analyze their impacts on the businesses, and discuss measures to reduce risks and increase opportunities.**

Identify risks and opportunities

Identify business-related climate change risks and opportunities, including transition risks and opportunities and physical risks.

Identify key risk and opportunity factors

Among the identified risk and opportunity factors, those of higher importance are selected by considering their impacts on business, their relevance to business strategies, and the degree of interest from stakeholders.

Analyze their impacts on businesses

Analyze the magnitude of the impacts of such risks and opportunities on businesses
Analysis and evaluation are based on two scenarios, one in which the temperature rises by 2℃, and the other by 4℃

【References】

International Energy Agency (IEA), Sustainable Development Scenario (SDS), 2℃ Scenario (2DS)
Intergovernmental Panel on Climate Change (IPCC): Shared Socioeconomic Pathways (SSP)
Representative Concentration Pathways (RCP), etc.

Consider countermeasures, benchmarks, and targets

Discuss countermeasures to reduce risks and obtain opportunities
Establish a GHG emission reduction target as a monitoring benchmark

Scenario Analysis - Assumed Global Situation in 2030-2050

■ Assumed global situation in the analysis

2°C scenario (sustainable society)	4°C scenario (no measures taken)
● Develop ambitious policies and environmental technology innovations to limit the average temperature increase to less than 2°C by the end of the century and realize sustainable development ● Envision the following global social changes affecting business in a transition to a decarbonized society **【Assumed global situation】** ・Global carbon pricing and price increases ・Progress in the transition from fossil fuel to renewables ・Progress in modal shift and EV shift ・Increase in demand for a use of public transportation and car sharing ・User's preference for carbon-free products ・Shift to a recycling-oriented society and improvement of waste recycling rate ・Establishment and commercialization of technologies for CO_2 capture, storage, and effective utilization	● Although each country implements policies to achieve its own goals under the Paris Agreement, the average temperature rises by 4°C by the end of this century due to insufficient cooperation of each country, environmental technology development, and energy shift. ● Assume the world described below where measures to mitigate climate change are unsuccessful and global warming worsens **【Assumed global situation】** ・Increase independence on fossil fuel and energy cost rise ・Remarkable economic growth in emerging and developing countries ・Slower shift to low emission mobility ・More severe wind and water disasters and an increase in disaster waste ・Aggravated water stress and heat stress

Scenario Analysis - Themes of Analysis

Theme of analysis	Issues to be analyzed	Target of analysis
1. Changes in direct burden of carbon tax	• Assessing the costs required to promote GHG reduction efforts towards below 2°C scenario • Evaluate the capital expenditure for reduction based on a cost difference between cases where GHG reduction targets are achieving and those where they are not	All businesses
2. Changes in water disaster risks at business locations	• Assessing the financial impact of risk of flood caused by river flooding or storm surge at the Company's business locations	All businesses
3. Changes in demand for the Company's products due to shift to Evs	• Assessing change in demand for the Company's electronic materials corresponding to change in demand for EVs toward below 2°C scenario	Advanced Products
4. Changes in demand for the Company's products related to modal shift, EV shift and lightweight transport machinery	• Assessing demand and market growth potential of products related to the Metalworking Solutions Business based on the forecast for decarbonization of transport sector and use of traffic and transportation in the 2°C scenario and 4°C scenario	Metalworking Solutions Business
5. Changes in demand for E-Scrap recycling associated with shift to a recycling-oriented society	• Assessing the potential of demand and market growth of the E-Scrap recycling based on forecast of the quantity of E-Scrap generated	Metals Business
6. Changes in cost resulted from carbon pricing policies	• Assessing indirect impact of carbon tax burden on upstream companies affecting the Company's operating cost	Cement Business
7. Changes in demand for acceptance and disposal of disaster waste	• Assessing changes in demand for acceptance and disposal based on the changes in the amount of disaster waste generation due to climate change	Cement Business
8. Change in demand relating to home appliance recycling	• Assessing demand and market growth potential of home appliance recycling business under the 2°C scenario associated with wider use of CFC substitutes and temperature rise	Environment and Energy Business
9. Change in demand for use of renewable energy	• Assessing demand and market growth potential of the renewable energy business under the 2°C scenario due to high impact changes in external environment	Environment and Energy Business

Scenario Analysis – Summary of Results

Analysis results in detail are in the following pages.

Risk factors **Opportunity factors**

(Descriptions in parentheses and the arrows indicate the assessed impact for each business)

	Advanced Products	Metalworking Solutions Business	Metals Business	Cement Business	Environment & Energy Business
2℃ Scenario	Increase in EV unit sales (Opportunity: Large) ↗	Sudden change in the metalworking products market due to modal shift, etc. (Risk: Medium) ↘	Increase in demand for the E-scrap recycling (Opportunity: Medium) ↗	Introduction and enforcement of the carbon tax (Procurement, Sales) (Risk: Medium) ↘	Further penetration of and demand for renewable energy (Opportunity: Large) ↗ Demand for energy-saving home appliance replacements (Opportunity: Large) ↗
2℃ Scenario	【All businesses】 Introduction and enforcement of the carbon taxation (operating costs) (Risk: Medium) ↘				
4℃ Scenario				Increase in demand for flood disaster waste disposal (Opportunity: Small) →	
4℃ Scenario	【All businesses】 Increase in water-related risks, such as floods, tidal waves, and droughts (Risk: Large) ↘				

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1. Change in Direct Burden of Carbon Tax (All Businesses)

■ Risk factor：Introduction and strengthening of carbon price taxation (Operating costs)

Expected global situation and its impacts on businesses

Production cost increase due to the introduction and strengthening of the carbon price system

- Increased energy cost due to the strengthening of taxation on GHG emissions and rising electric power price
- Increased costs associated with the procurement of renewable energy certificates as well as trading of emission rights
- Compared with FY2020, the total energy cost will increase 1.59 fold in FY2031 and 1.63 fold in FY2051.

Impact Analysis

The carbon price will be a factor of the Company's cost increase. Whereas the carbon price will impact on society as a whole, **if it can not reflect in the Company's product prices, it will represent a risk that will in lower earnings**

Evaluation of business impact

Risk: Medium

Future strategies and measures

- Discuss introducing low-temperature burning technology in cement production and technology for capturing CO_2 emitted from plants. And closely monitor the feasibility and cost aspects of innovative technology such as CCUS.
- Promote energy-saving and advance discussion on the possibility of transitioning to electrification and the fuel conversion in plants
- 17% reduction (vs. FY2014) of GHG emission volume by FY2031
- Promote the introduction of renewable energy to reduce electricity-derived emission

2. Change in Water Disaster Risks at Business Locations (All Businesses)

■ Risk factor: Higher water-related risks such as flood, storm surge and drought

Expected global situation and its impacts on businesses

Increase in losses due to more frequent disasters globally

- Increased losses such as property damage or loss from closure due to more frequent disasters
- Property damage at locations with a high risk of river flooding will increase approx. 1.1 fold in FY2051 and 4 fold in FY2086 domestically, and 2.8 fold in FY2051 and 25 fold in FY2086 globally (Thailand), each compared with the current figures

Impact Analysis

Increased damage due to disasters could drive up the Company's cost. If the global temperature keeps rising **and the world moves toward the 4°C scenario, there could be a serious risk to operation and supply chain depending on the location.**

Evaluation of business impact

Risk: Large

Future strategies and measures

- Assess short-term risks using Aqueduct, which is a water risk assessment tool developed by the World Resources Institute (WRI), identify specific water risk situations of each business office through regular hearing, and continuously address locations with high risk
- Obtain updated prediction information from IPCC or other sources regarding mid to long-term risks and promote proper measures assessing water disaster risks to the Company and its supply chain.

3.Changes in demand for the Company's products due to shift to EVs (Advanced Products)

■ Opportunity factors：Increasing EV unit sales

Expected global situation and its impacts on businesses

Rapidly increasing demand in EV-related products due to decarbonization

- Overall unit sales of automobiles would increase toward FY2031. The demand for terminals and connectors for automobiles in FY2031 would increase about 1.6 fold compared with FY2020, and expand to about 2.1 fold in FY2051.
- The sales figure for EV units in FY2031 to be approximately 22 fold the figure from FY2020.

Impact Analysis

EV-unit sales are expected to increase dramatically, and **the demand for the Company's Copper & copper alloy and Electronic materials & component products are expected to increase significantly**. Using this **opportunity expand sales** by capturing demand by strengthening the production system for related products.

Evaluation of business impact

Opportunity : Large

Future strategies and measures

- Aim to increase sales volume of copper materials for new HVs and EVs 1.3 fold or more by FY2031 relative to FY2020, and to increase sales of next-generation automobiles and eco-friendly products 3 fold or more compared to FY2020
- Contribute to the transition to a decarbonized society by investing in facilities and developing products to build a supply system that can meet the rapidly growing demand for EV products

4. Changes in demand for the Company's products related to Modal Shift, EV Shift and Lightweight Transport Machinery (Metalworking Solutions Business)

150th Anniversary

■ Risk factor: Sudden changes of processed product market associated with modal shift or other factors

Expected global situation and its impacts on businesses

Decreased demand for cutting tools for engine due to growth of EV share

- Significant increase in EV unit sales and increased use of lightweight materials
- Declining sales of cutting tools for engine and transmission due to an expected decline in production of engine vehicles (76%-96% in FY2031 vs. FY2020)

Impact Analysis

This could **be an opportunity to boost sales by reviewing product mix and meeting growing demand** as the demand for hard-cutting tools is expected to grow along with expansion of markets related to electrification and weight reduction. Meanwhile, **there is a risk of a decline in sales of cutting tools for engine-powered vehicles**, which is the current core product.

Evaluation of business impact

Risk: Medium

Future strategies and measures

- Develop and provide products that meet the demands of the 2°C scenario, such as EV battery-related products and tools for hard-cutting materials, and contribute to the shift to a decarbonized society
- Monitor the trend of EV shift as the trend in demand in automotive product markets may vary depending on a power source of vehicles. Also develop new markets that will replace the automotive industry

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5. Change in Demand for E-Scrap Recycling associated with Shift to Recycling-Oriented Society (Metals Business)

■ Opportunity: Growing demand for E-Scrap recycling

Expected global situation and its impacts on businesses

Growing demand for recycling of wasted electronic devices as a result of global economic growth

- E-Scrap derived from end-of-life vehicles will increase due to factors such as an increase of global vehicle sales (1.1 times of the FY2020 level in FY2031), an increase in the ratio of EVs in autobobiles, and the growth in GDP.
- Demand for base metals and precious metals will likely inclrease further as demand for electronic devices increases due to the progress of digitalization.

Impact Analysis

The quantity Global E-Scrap generated in FY2030 is expected to increase 142% of FY2020 level. This will likely **be an opportunity to boost our profits** as **the Company enhances its recycling capabilities** to process more E-Scrap.

Evaluation of business impact

Opportunity : Medium

Future strategies and measures

- We will consider the expansion of the processing capacity of E-Scrap and the upgrading of technology for the pretreatment, and will focus on the E-Scrap recycling to contribute to the construction of a recycling-oriented society.
- As PGM※ content in electronic board is expected to decline and EV sales in Japan are expected to increase in the future, we will closely monitor the business environment for base metals and precious metals.

※PGM：Platinum group metals

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6. Change in Cost resulting from Carbon Pricing Policies (Cement Business)

■ Risk factor: Introduction and strengthening of carbon price tax system (procurement and sales)

Expected global situation and its impacts on businesses

Increase in procurement cost of raw materials and cement transport cost as a result of introduction and strengthening of carbon pricing system

- Rise in our expenses as upstream suppliers pass on the carbon price to our Company
- Rise in transport cost of cementitious raw materials due to changes in energy cost, and other factors
- Our competitive position weakened by imports from countries with low carbon prices(until adjustment measures are taken)

Impact Analysis

Introduction and strengthening of carbon price will drive up our Company's cost. Meanwhile, since this affects the entire industry, our Company should steadily work on measures to achieve GHG reduction target and reduce carbon price costs in order to maintain competitiveness in our products.

Evaluation of business impact

Risk: Medium

Future strategies and measures

- Comprehensively consider measures to reduce risks in procuring raw materials, such as saving energy or converting thermal energy in manufacturing processes
- Work on reducing CO_2 emissions from a freight owner's standpoint, by reviewing transportation processes (including means of transportation and channels for procurement)
- Pay attention to policy trends in both inbound and overseas regarding the Carbon Border Adjustment Mechanism and respond as an industry

7. Change in Demand for Acceptance and Disposal of Disaster Waste (Cement Business)

■ Opportunity: Increased demand for disposal of disaster waste due to water disasters

Expected global situation and its impacts on businesses

More water disasters associated with climate change such as flood, landslide or storm surge.

- Increased rainfall and flood levels will cause the broadening of areas prone to water disaster, and deeper flood depths.
- Frequency of floods in Japan will approximately be quadrupled in the 4°C scenario and doubled in the 2°C scenario.
- As water disasters occur more frequently, the amount of disaster waste also increases.

Impact Analysis

Impact on business is minor given the regionality of water disasters, the amount of disaster waste, and how inconsistent waste is produced. Meanwhile, as the threat of water disasters is expected to rise, **the cement industry's significance and opportunities for contributing to society will increase, as the cement industry accepts and disposes of disaster waste.**

Evaluation of business impact

Opportunity : Small

Future strategies and measures

- Continue to play a social role in response to requests for disaster waste disposal
- Work on development of dechlorination technology to expand our ability to dispose of high-chlorine waste※
- Contribute to reduction of CO_2 emissions by expanding our range of reusable kinds of waste, as well as continuously reusing more substitutes for thermal energy waste
- Maintain and continue stable supply of products that meet the needs for public projects regarding disaster prevention and disaster mitigation based on the government policy (resilience enhancement)

※ High chlorine creates problems in the manufacturing process, such as blockages in the preheater of raw cement materials, and also affects the quality.

8. Change in Demand related to Home Appliance Recycling (Environment & Energy Business)

■ Opportunity: Growing demand for home appliance recycling

Expected global situation and its impacts on businesses

More frequent replacement to energy-saving home appliances due to global warming and higher energy cost

- Fast deterioration of air conditioners due to heavy use and increased number of air conditioners per household
- More frequent replacement due to low carbon regulations and higher energy cost (more wasted home appliances)
- Rise in collection rate of home appliances due to stricter recycling regulations

Impact Analysis

Expect home appliances waste to increase due to temperature rise, change in households, stricter carbon and recycling regulations. **This will increase the number of home appliances that the Company handles, resulting in an opportunity to boost its sales.**
(209% increase in FY2051 vs. FY2020)

Evaluation of business impact

Opportunity : Large

Future strategies and measures

- Work on automation of facilities to handle more home appliance recycling and improvement of process to increase value of collected items, and seek to expand business
- Pay attention to market trends taking into account the market, such as the growing size of the air conditioner and flat panel TV markets, where the amount of processing is expected to increase significantly
- Pay attention to overseas markets while creating new recycling businesses such as a lithium-ion battery or solar panel recycling

9. Changes in Demand for Use of Renewable Energy (Environment & Energy Business)

■ Opportunity: Wider use of and growing demand for renewables

Expected global situation and its impacts on businesses

Mid- to long- term expansion of the renewable energy market towards Net Zero Carbon Society

- Environmental value varies from 1.3 yen to 4.0 yen /kWh depending on the degree of renewable energy penetration and demand/supply balance.
- With lower costs resulting from technological development, the preferential system for purchasing renewable energies is expected to be scaled back and the unit price of electricity sold is expected to decline. But sales will likely increase due to the massive spread of renewable energies.

Impact Analysis

While the unit price of electricity sales and the price of non-fossil certificates will fluctuate due to the progress of environmental policies and technologies, **the demand for renewable energy itself will expand, providing an opportunity for the Company to expand its renewable energy business.**
(286% increase in electricity output volume in FY2051 vs. FY2020)

Evaluation of business impact

Opportunity : Large

Future strategies and measures

- Focus on researching and developing new geothermal and hydroelectric power sources, including overseas development, as well as increasing output from existing power plants, in order to increase the total renewable energy production volume to 533GWh by FY2031
- Closely monitor the trends in solar and wind power generation, including technological development, adoption rate, and the unit price of electricity sold, and work on reducing power generation cost

Renewable Energy Business

■ Develop geothermal, hydroelectric, and solar power plants throughout Japan

Aim to be a leading company in Japan by expanding business through stable operation and new developments of geothermal power plants, etc.

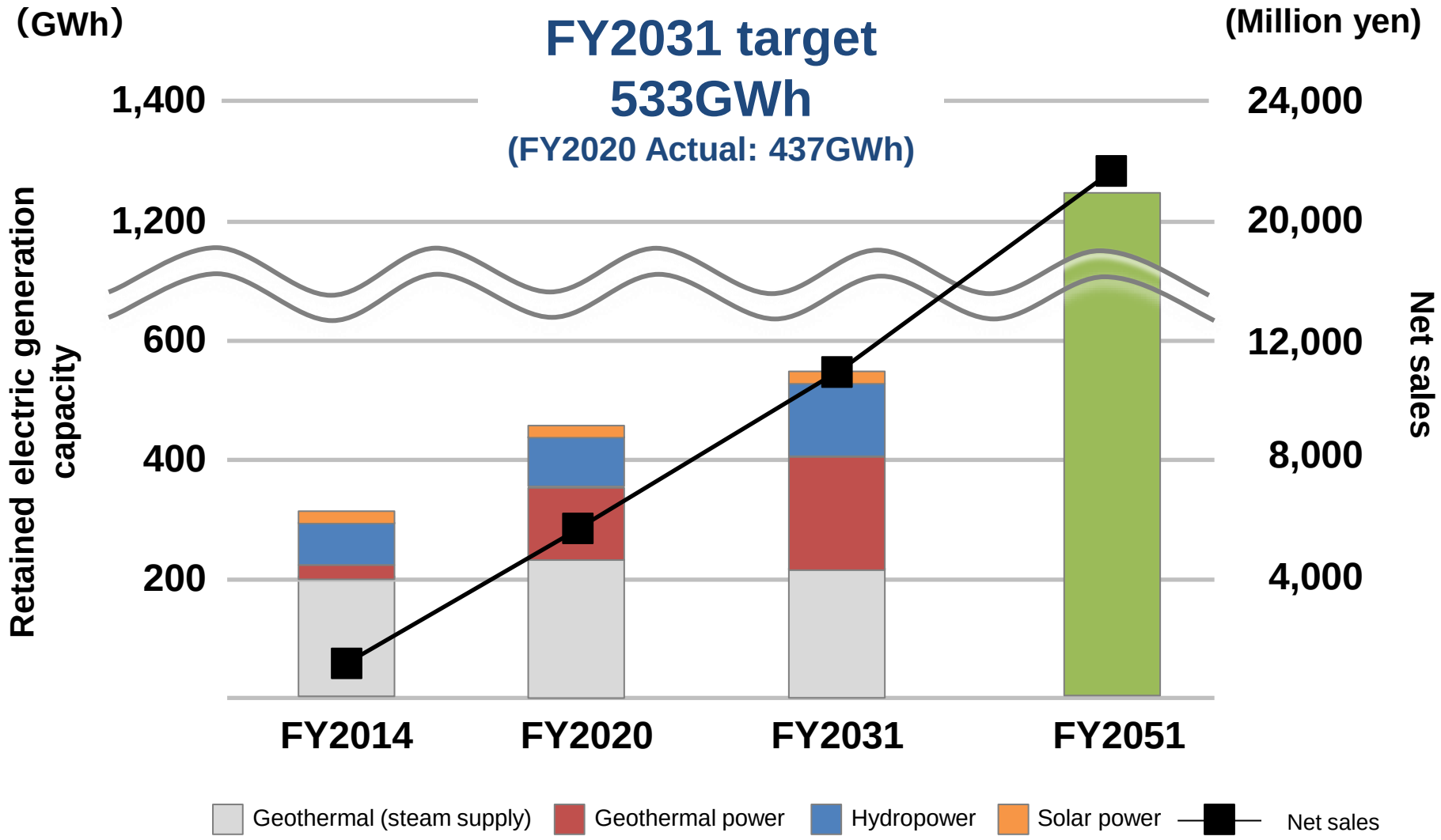
Wasabizawa Geothermal Power Plant
(Akita Prefecture)
Operating body: Yuzawa Geothermal Power Corporation
Started operations in May 2019
Output: 46,199kW

Irigama Solar Power Plant
(Miyagi Prefecture)
Operating body: LM Sun Power Co., Ltd.
Started operations in January 2015
Output: 6,930kW

Appi Geothermal Power Plant
(Iwate Prefecture, construction in progress)
Operating body: Appi Geothermal Energy Corporation
Start of operations expected for April 2024
Output: 14,900kW

Komatagawa new hydroelectric power plant
(Akita Prefecture, construction in progress)
Operating body: Mitsubishi Materials Corporation
Completion of construction for December 2022
Output: 10,326kW

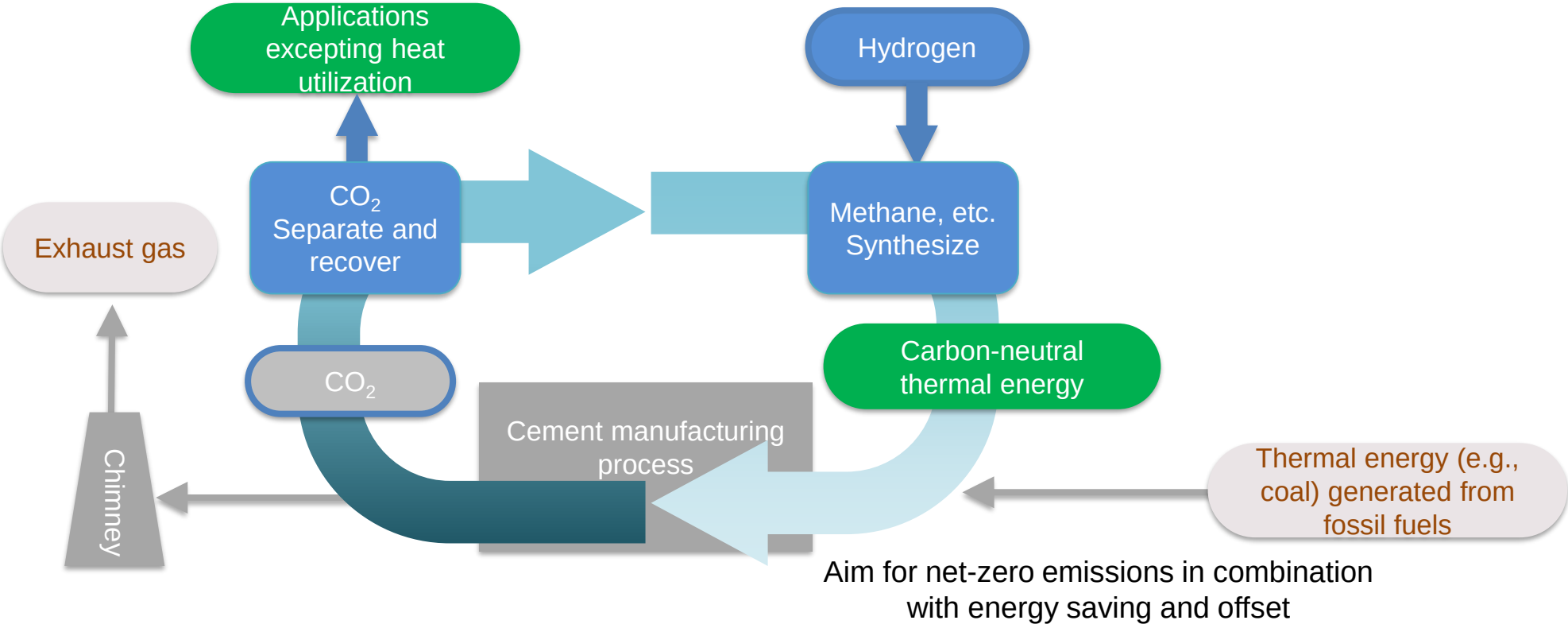
Renewable Energy Generation Targets and Results



*Steam supply to geothermal power plants (steam sales converted by electric energy volume)

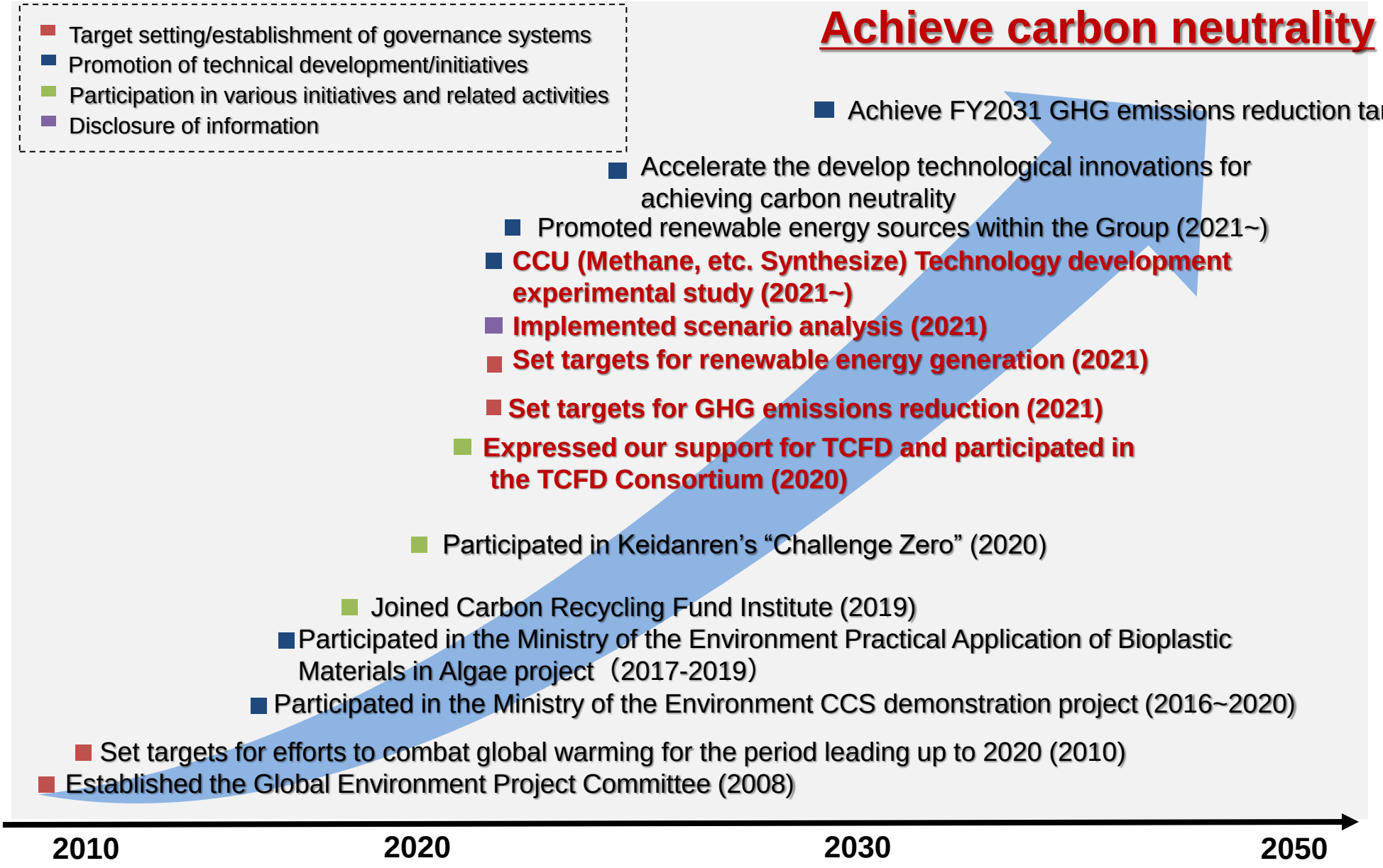
Technology development: Recovery and utilization of CO_2 emitted from our plants

- **Get started experimental study on the recovery and utilization (heat utilization) of CO_2 emitted from our plants**
  - Separate and recover CO_2 at our cement plants and utilize it as carbon-neutral thermal energy
  - Generate more carbon-neutral thermal energy and aim for net-zero emissions in combination with energy saving and offset



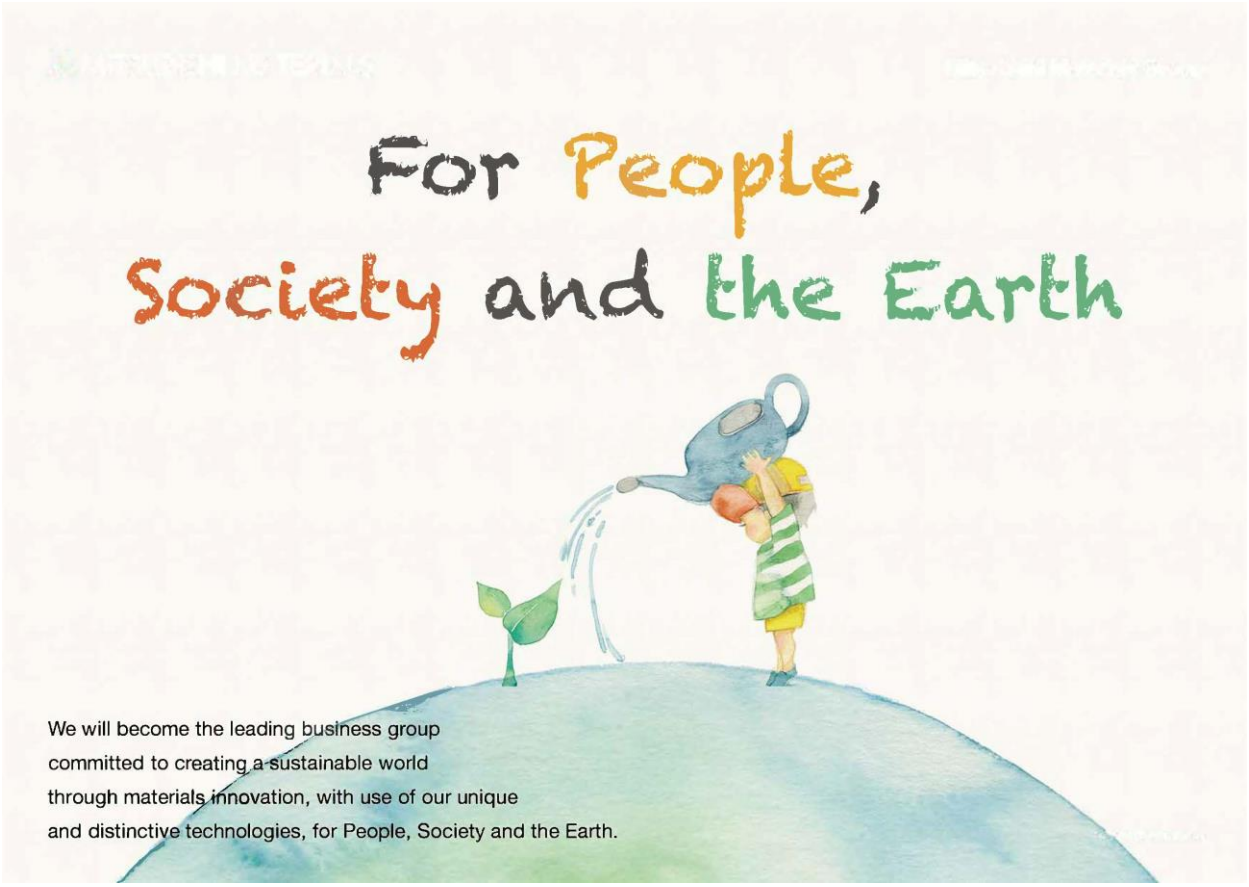
Conceptual design of carbon recycle from our plants

Primary Initiatives and Perspectives for Climate Change



TCFD: Task Force on Climate-related Financial Disclosures GHG: Greenhouse Gas
CCS: Carbon dioxide Capture and Storage CCUS: Carbon dioxide Capture Utilization and Storage

For people, Society and the Earth



We contribute to build a decarbonized society by ensuring to consider the reduction of environmental impact in manufacturing