



Taiheiyo Cement Sustainability Briefing 2024

March 27, 2025

TAIHEIYO CEMENT CORPORATION

- **Sustainability Management of the Taiheiyo Cement Group**
- **Strategies and Prospects for Important Themes**
 - **Circular Economies/Carbon Neutrality**



I. Sustainability Management of the Taiheiyo Cement Group

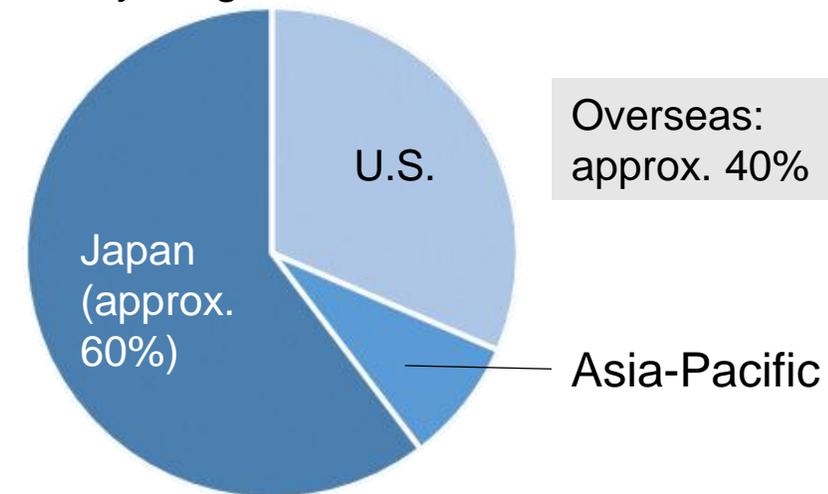
I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

– 1. Taiheiyo Cement Group

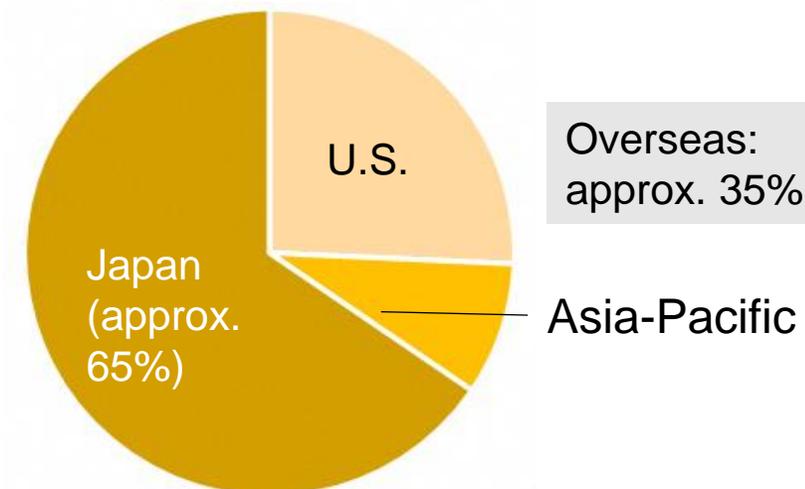
[Company Outline]

Company name	TAIHEIYO CEMENT CORPORATION
President	Yoshifumi Taura
Established	May 1881
Share capital	86.2 billion yen
Net sales	Consolidated: 886.3 billion yen Non-consolidated: 335.9 billion yen (fiscal year ended March 31, 2024)
Employees	Non-consolidated: 1,821 Consolidated: 12,540 (as of March 31, 2024; not including seconded employees)
Production plants	Japan: 9, United States: 4, Vietnam: 1, Philippines: 1, Papua New Guinea: 1 (including Group companies)
Business outline	Cement business, mineral resources business, environmental business, construction materials business, other business

Net Sales by Region



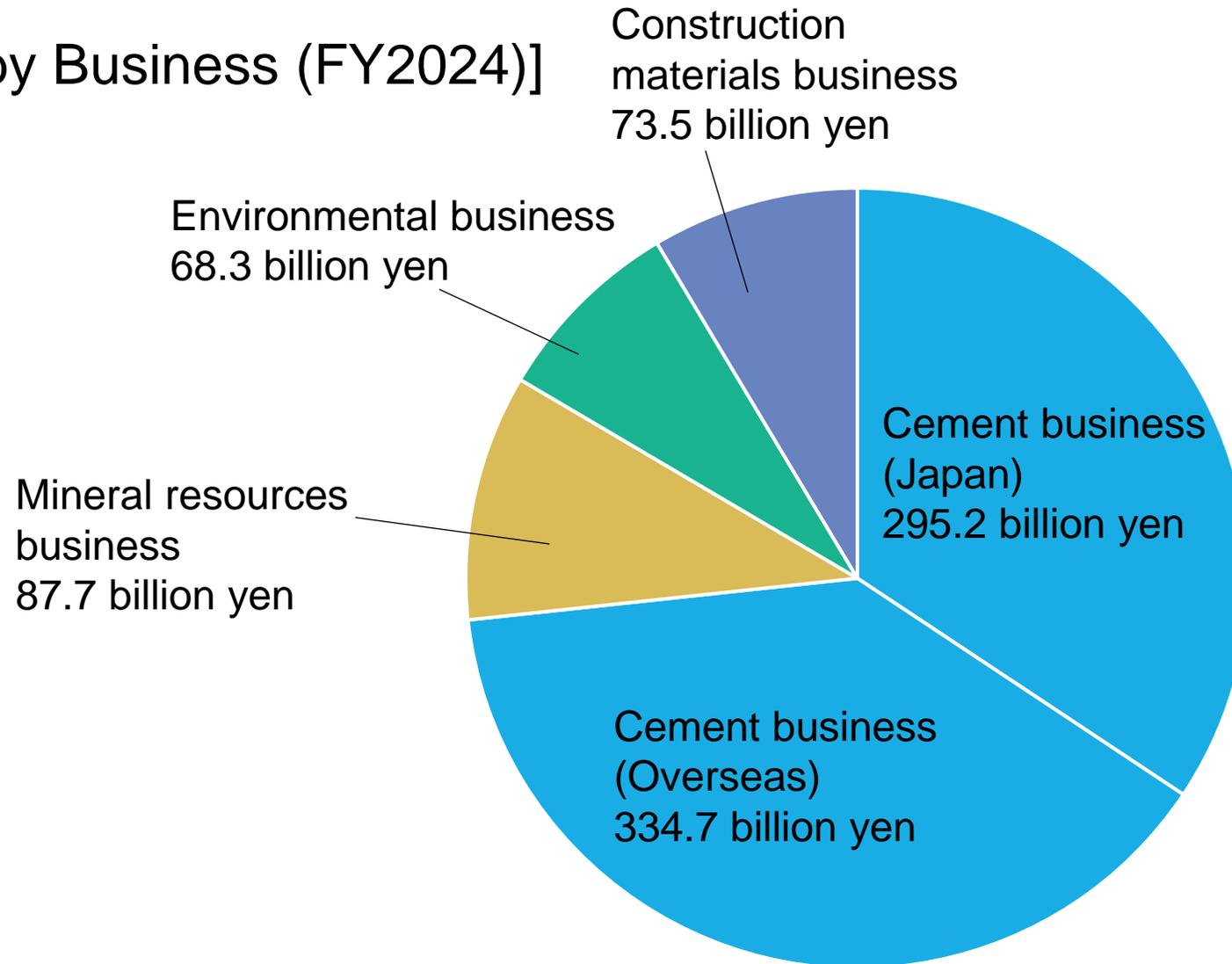
Number of Employees by Region



I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

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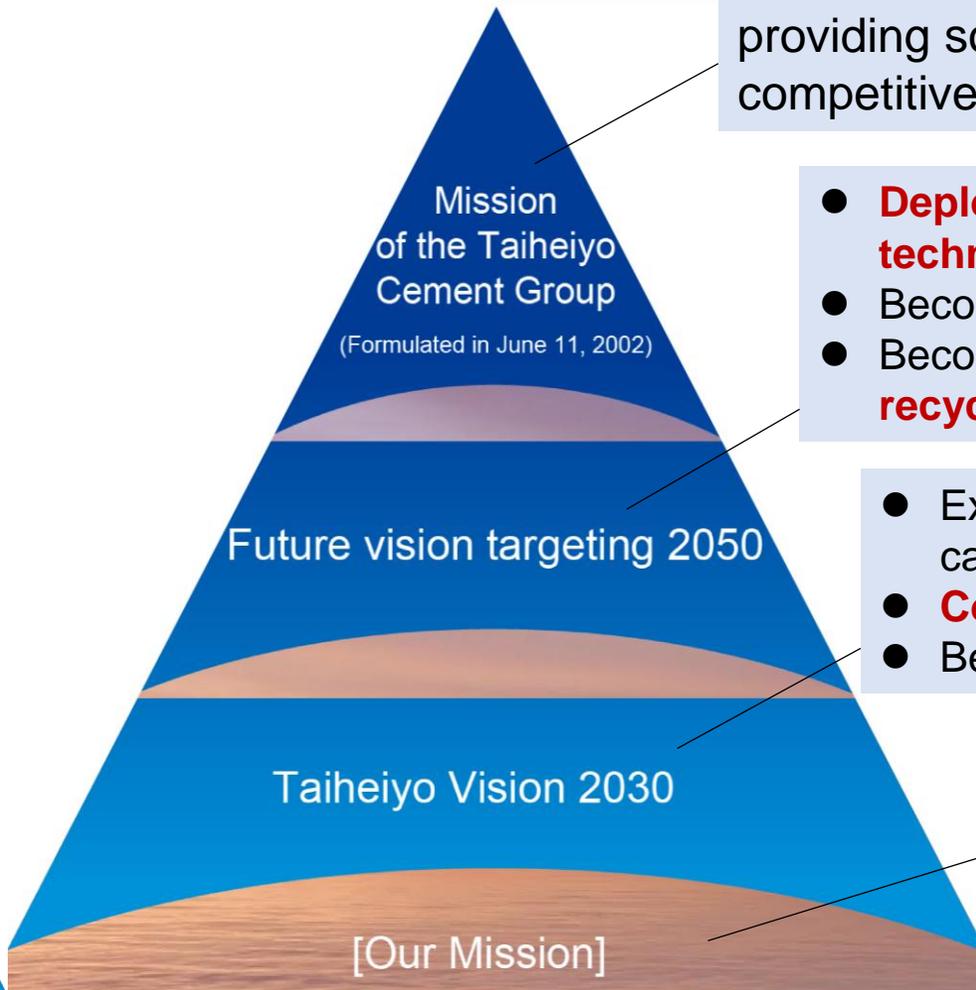
[Net Sales by Business (FY2024)]



I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

– 1. Taiheiyo Cement Group

[Our Group's Values]



Our mission is to contribute to social infrastructure development by providing solutions that are environmentally efficient, enhance our competitive position and bring value to our stakeholders.

- **Deploy around the world** the Group's overall capabilities and **revolutionary technologies including carbon neutrality**.
- Become a leader in the global cement industry.
- Become **a corporate group that supports a safe, secure, decarbonized and recycling-based society** for people.

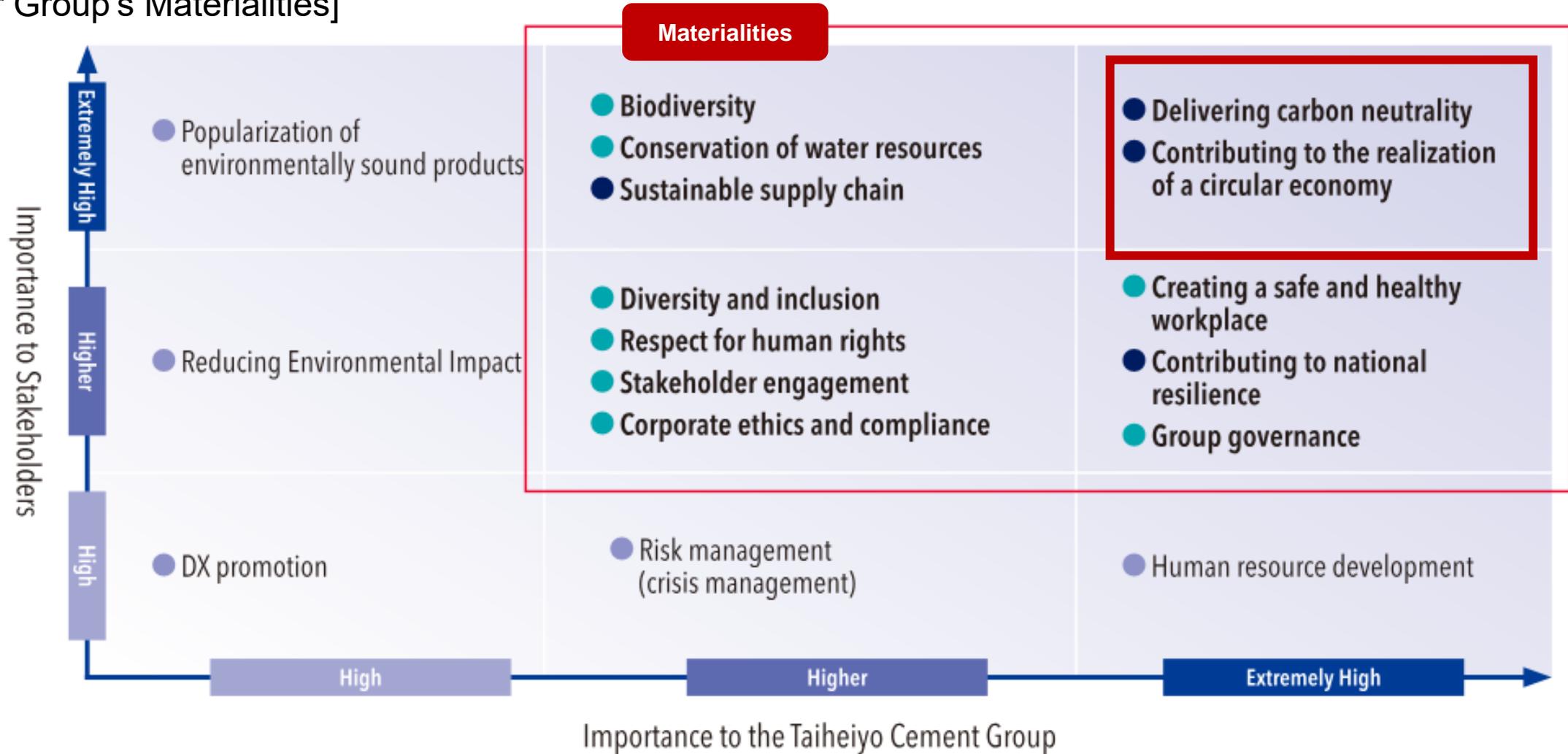
- Expand the Group's presence in the Pacific Rim by utilizing its overall capabilities.
- **Contribute to the achievement of carbon neutrality and circular economies.**
- Become a robust corporate group that grows sustainably.

Supply critical materials for national resilience
Key player in the formation of circular economy
Steady transition to carbon neutrality
+
Engagement with stakeholders

I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

– 1. Taiheiyo Cement Group

[Our Group's Materialities]



● Financial Aspects
● Environmental and Social Aspects

I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

– 1. Taiheiyo Cement Group

[Our Group's Strengths]

Leading Supplier of Cement and Limestone Supporting a Safe and Secure Society

- Providing a stable supply through a robust supply chain
- Developing quarries with a 100-year vision

World-Class Cement Production and Waste Recycling Technologies

- Technologies to utilize a wide range of waste and by-products as well as disaster waste in cement production
- Recycling technologies to avoid generating new waste

Global Network Incorporating the Growth Markets of the Pacific Rim

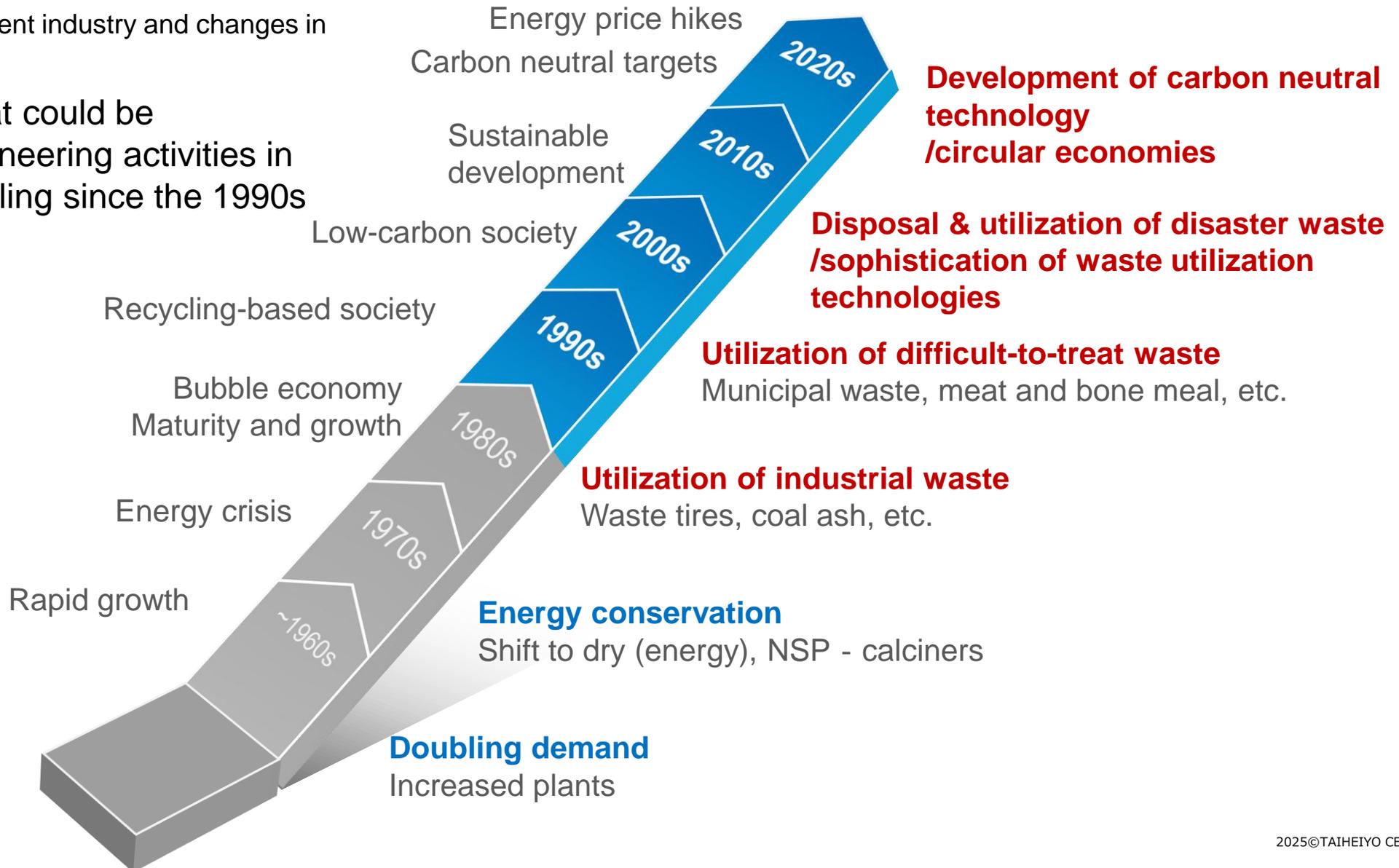
- Our Group's overseas net sales ratio: approx. 40%
- Maintaining the operation of our domestic plants by engaging in growth markets and exports through building a Pacific Rim supply chain

I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

– 1. Taiheiyo Cement Group

[Development of the cement industry and changes in the social environment]

- Promoting what could be considered pioneering activities in resource recycling since the 1990s



I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

– 2. Our Group's Business Structure and Manufacturing Process

- Cement is produced in high volumes at large-scale manufacturing facilities.
- Domestic cement production: 47,177 thousand t (entire industry in FY2024: from Japan Cement Association homepage)

Kiln interior

(inspection during regular repairs)

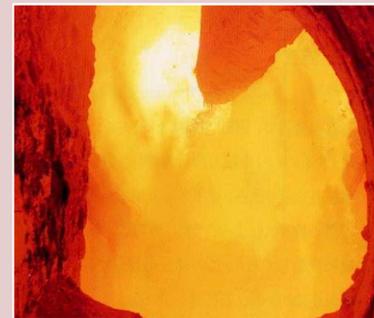


Preheater and kiln



Kiln interior

(1,450°C)



Clinker



(photo: Japan Cement Association)

Grinding

Cement

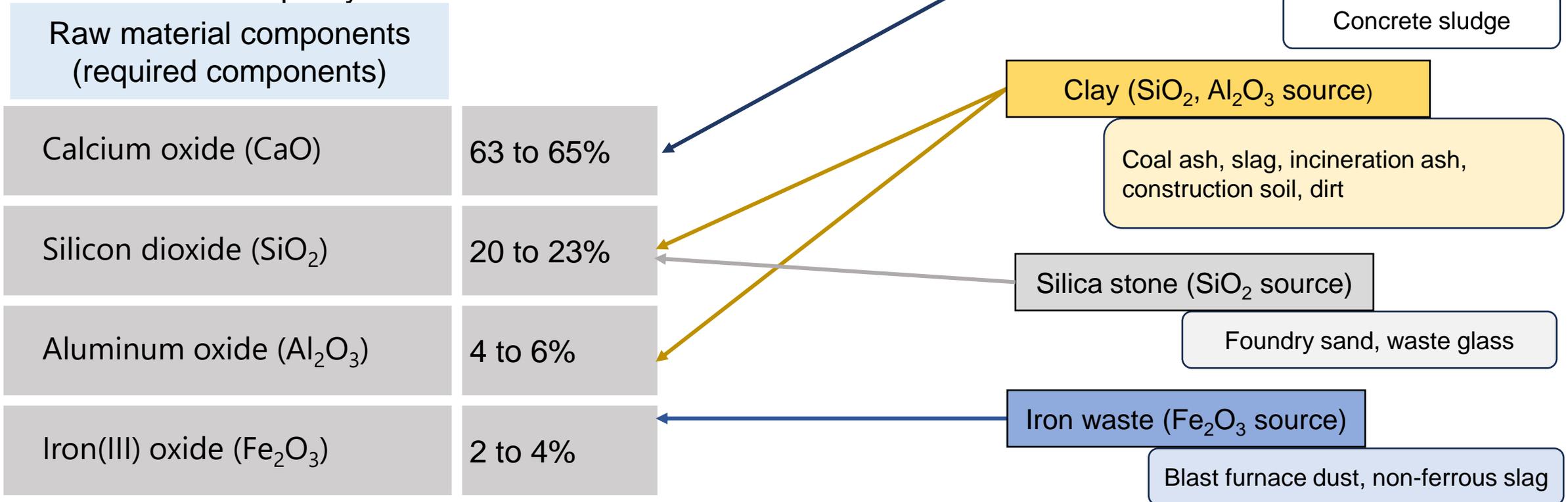


- Preheater: Height= approx. 80m
- Kiln: Φ 5-6m x length= approx. 100m

I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

– 2. Our Group's Business Structure and Manufacturing Process

- As cement is manufactured by blending raw materials high in four components (**calcium, silicon, aluminum, and iron**), **waste and by-products containing these components can be used as alternative raw materials**
- Meticulous component analysis and adjustments are performed to maintain the quality of the cement



I. Thoughts on Sustainability Management of the Taiheiyo Cement Group

– 3. Reasons Why Waste and By-Products Can Be Used at Cement Plants

1

The main components of cement are **calcium, silicon, aluminum, and iron**, and waste containing these components is **used as part of the raw materials**

2

Combustible waste is **used as part of the fuel** for the burning process in cement kilns (furnace)

3

Since the burnt residue from combustible waste is used as a raw material for cement, **no secondary waste is generated**

4

Since incineration temperatures reach a high point of 1,450°C,

- **Each raw material is converted into a hydraulic mineral through chemical reactions**
- **Hazardous chemicals such as dioxins are decomposed in the kiln**

I. Sustainability Management of the Taiheiyo Cement Group

– 4. Significance of Our Group's Engagement in Circular Economies and Carbon Neutrality

[Our Mission and the Significance of Engagement in Circular Economies and Carbon Neutrality]

Why is cement production necessary?

Supply critical materials for national resilience

- Provide stable supply of irreplaceable cement products for maintaining social infrastructure

Key player in the formation of circular economy

- Stable cement production is necessary to maintain waste treatment functions for commitments such as extending the lifespan of landfills

However, a considerable amount of CO₂ is emitted as a result of cement production

Steady transition to carbon neutrality

- In addition to reducing CO₂ emissions, innovative technologies to recover, store, and utilize CO₂ are necessary



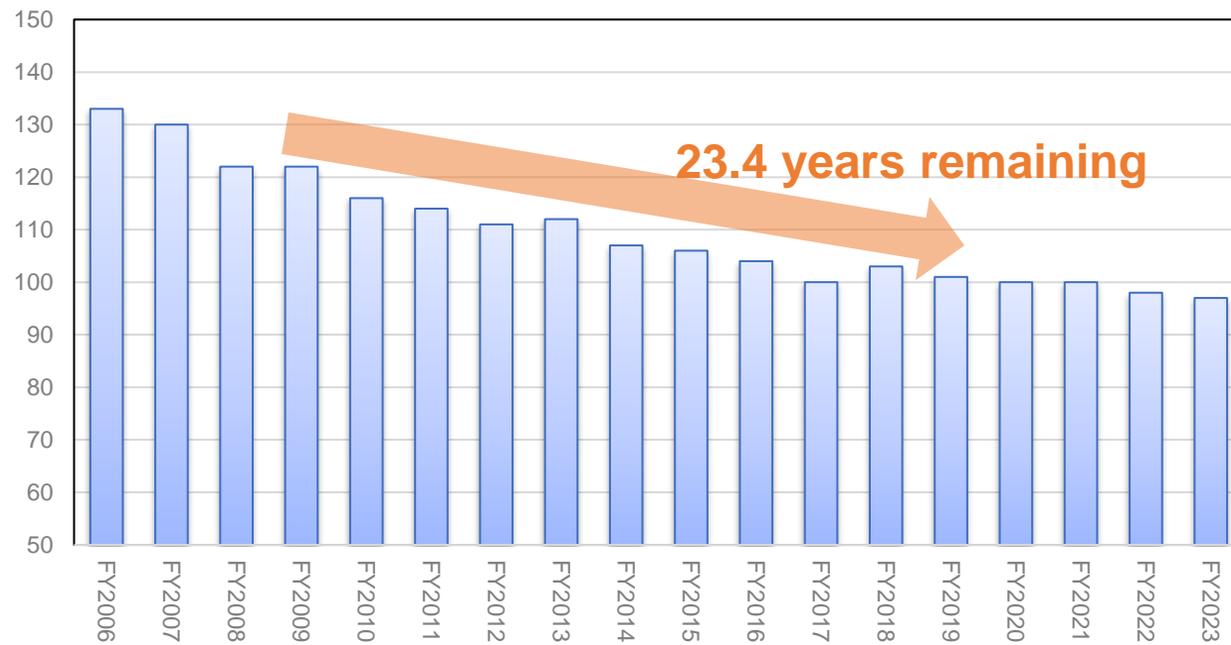
II. Initiatives for Circular Economies

II. Initiatives for Circular Economies

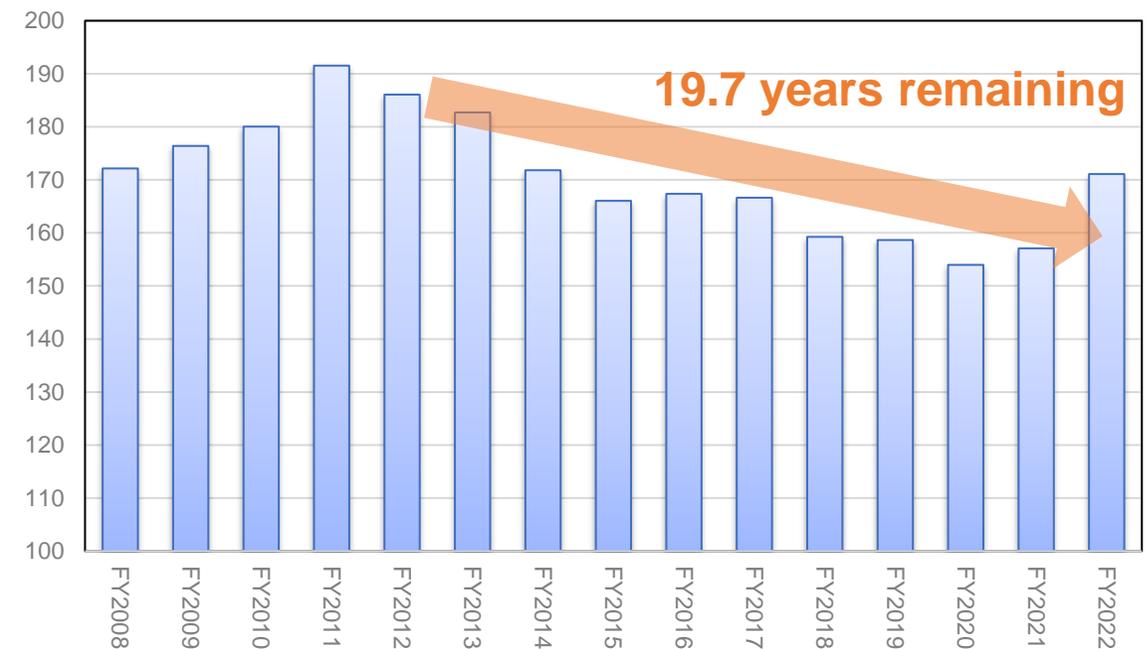
– 1. Remaining Capacity and Years of Landfills

- Remaining space in domestic landfills is decreasing every year → Landfills will ultimately be maxed out → Waste disposal through cement production contributes to expanding the lifespan of landfills

Remaining capacity at **general** waste landfills (million m³)



Remaining capacity at **industrial** waste landfills (million m³)



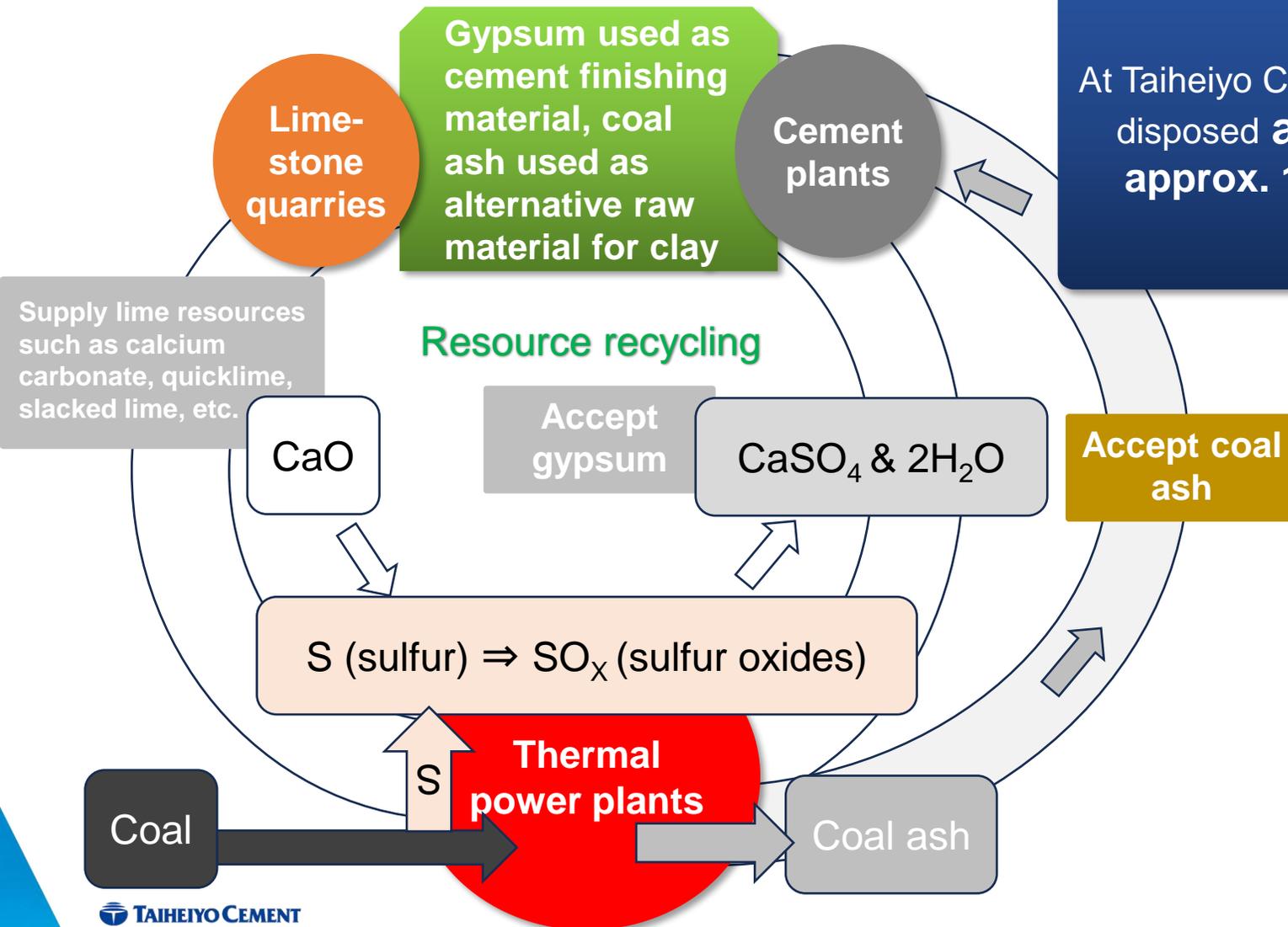
The remaining capacity at general waste landfills (left) and industrial waste landfills (right) [composed by Taiheiyo Cement based on data from the “2024 Environmental White Paper, Sound Material-Cycle Society White Paper, and Biodiversity White Paper” (Ministry of the Environment)]. According to these White Papers, the remaining lifespan of general waste landfills is estimated to be **23.4** years and the remaining lifespan of industrial waste landfills is estimated to be **19.7** years.

II. Initiatives for Circular Economies

– 2. Functions as a Recycling Company (Example 1)

Recycling of coal ash and by-product gypsum

—Resource recycling with thermal power plants—



Amount of domestic coal ash utilized

At Taiheiyō Cement alone, we...

disposed **approx. 1.7 million tonnes per year**,
approx. 14% of that in Japan as a whole (approx. 12 million tonnes)

- ✓ Coal ash generated from coal-fired thermal power plants is disposed of as a raw material for cement.
- ✓ Cement plants supply fine powder limestone (calcium carbonate) as a desulfurizing agent. Gypsum by-product is also utilized as a raw material for cement.

II. Initiatives for Circular Economies

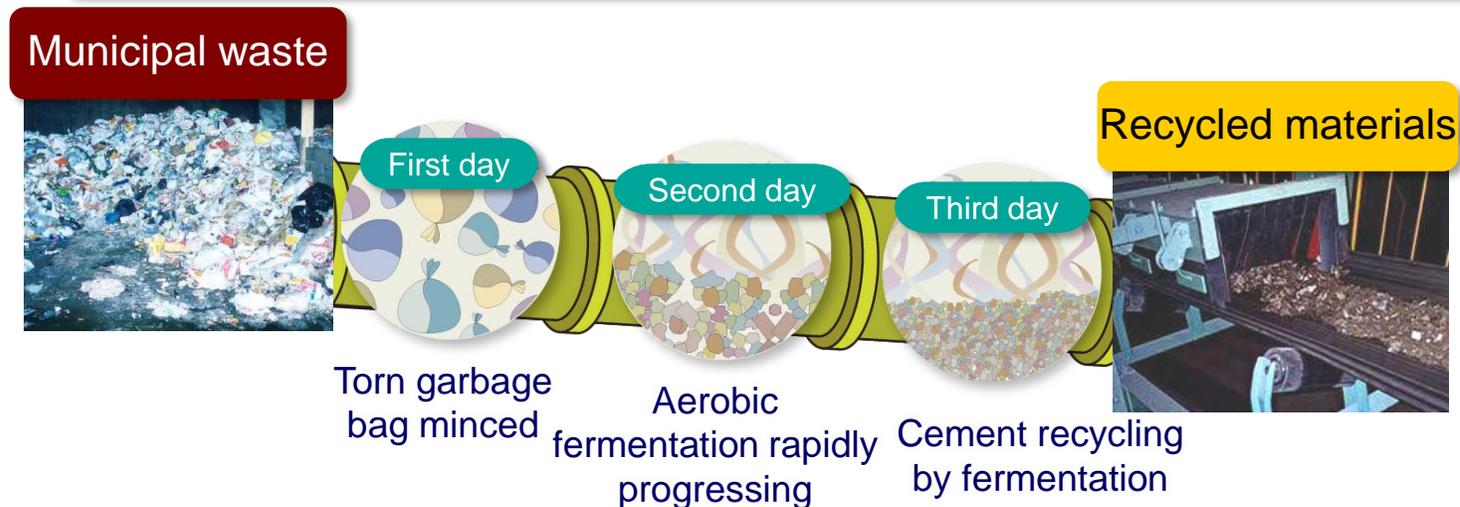
– 2. Functions as a Recycling Company (Example 2)

[Example of resource recycling initiative in collaboration with local government]

—AK system (municipal waste recycling system) in Hidaka City, Saitama Prefecture

What is the AK system?

The Applied Kiln (AK) System uses a waste recycling kiln to biodegrade (ferment) waste from homes so that it can be recycled for use as a raw material in cement.



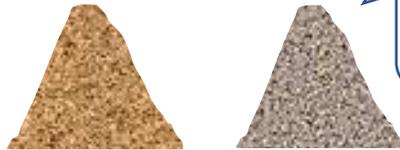
Waste is left in its bags when deposited into the waste recycling kiln to be treated, eliminating the need for treatment (incineration) plants!

In Hidaka City, a population of approx. 54,000 residents, **every year 14,000 t** of waste from homes **is turned into materials that can be used in making cement**

II. Initiatives for Circular Economies

– 3. Acceptance of Disaster Waste (Example 3)

● Disposal of disaster waste from the Great East Japan Earthquake



Combustible waste Sediment

Tsunamis cause salt from seawater to mix in with the sediment

Reinforce equipment for disaster waste disposal



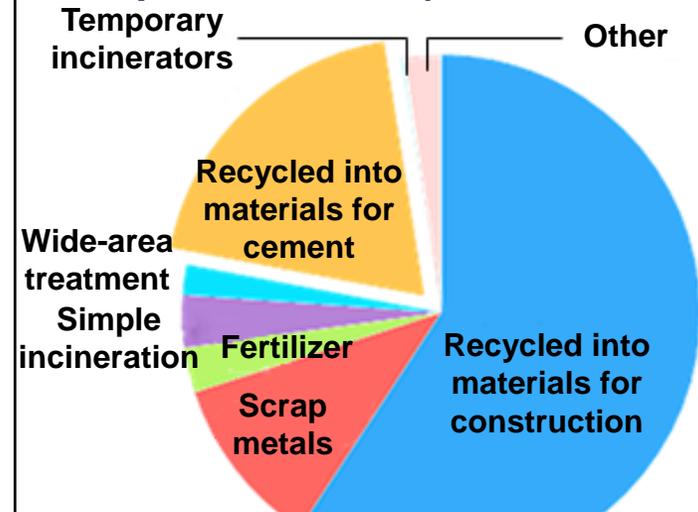
Equipment for removing salt

Ofunato Plant
(Iwate Prefecture)

*Salt contamination...

- (1) Affects the quality of cement
- (2) Clogs equipment

FY2012 disaster waste disposal composition ratio (Iwate Prefecture)



Approx. 17% of disaster waste in Iwate Prefecture is treated at the Ofunato Plant

Disposed of **1 million tonnes** of disaster waste from 2011 to 2014

II. Initiatives for Circular Economies

– 3. Acceptance of Disaster Waste (Example 3)

Disaster waste disposed by Taiheiyo Cement

Event	Date	Amount utilized
Chuetsu Offshore Earthquake	July 2007	47 thousand tonnes
Great East Japan Earthquake	March 2011	1,037 thousand tonnes
Hiroshima Landslides	August 2014	2.5 thousand tonnes
Kumamoto Earthquakes	April 2016	80 thousand tonnes
Northern Kyushu Flood	July 2017	16 thousand tonnes
West Japan Floods	July 2018	60 thousand tonnes
2019 East Japan Typhoon (No. 19)	October 2019	20 thousand tonnes
2020 Kyushu Floods	July 2020	7 thousand tonnes
2024 Noto Peninsula Earthquake	January 2024	21 thousand tonnes (ongoing) ^{*1}

*1. FY2025 target: approx. 30 thousand t

II. Initiatives for Circular Economies

– 3. Acceptance of Disaster Waste (Example 3)

Promoting conclusion of agreements on promoting the formation of a recycling-based society

In order to work closely with local governments in the event of emergencies and ensure the rapid disposal of disaster waste, we are making progress on the conclusion of **agreements on promoting the formation of a recycling-based society** with the municipalities in which our cement plants are located.

- | | | |
|-------------|-----------------------------------|------------------|
| •8/28/2015 | Inabe City, Mie Prefecture | (Fujiwara Plant) |
| •12/2/2016 | Tsukumi City, Oita Prefecture | (Oita Plant) |
| •10/19/2017 | Ofunato City, Iwate Prefecture | (Ofunato Plant) |
| •6/7/2019 | Miyagi Prefecture | (Ofunato Plant) |
| •12/24/2020 | Hokuto City, Hokkaido Prefecture | (Kamiiso Plant) |
| •1/18/2021 | Kumagaya City, Saitama Prefecture | (Kumagaya Plant) |
| •7/13/2023 | Hidaka City, Saitama Prefecture | (Saitama Plant) |

Taiheiyō Cement disposed of disaster waste (rice straw, etc.) left by the 2019 East Japan Typhoon at the Ofunato Plant based on a concluded agreement.

Taiheiyō Cement disposed of disaster waste left by Typhoon No. 18 in September 2017 at the Oita Plant based on a concluded agreement.

Oita Plant

Kamiiso Plant

Ofunato Plant

Kumagaya Plant

Saitama Plant

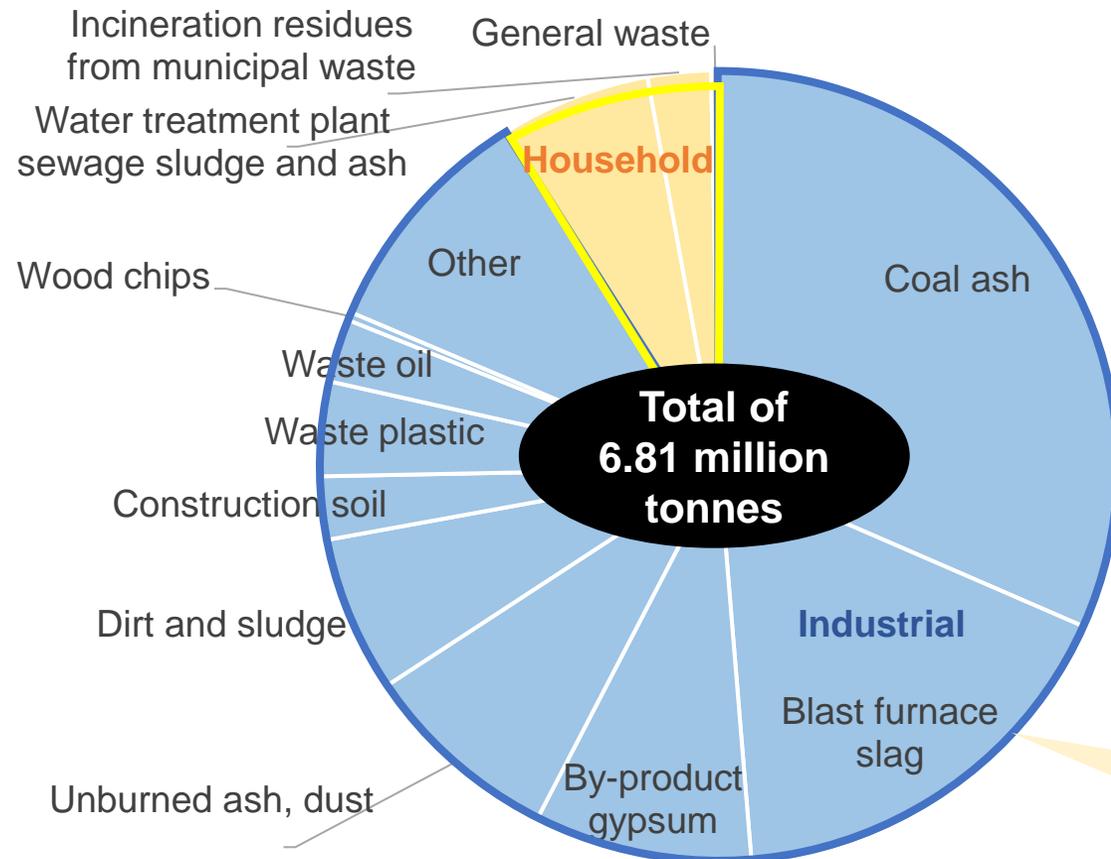
Fujiwara Plant

II. Initiatives for Circular Economies

– 4. Cement Business and Circular Economies

- Major revenue source of initiatives for circular economies: Waste and by-products recycling business
- Earn profits while simultaneously contributing to reducing the cost of cement production

[Volume of waste and by-products accepted by our Group (FY2024)]



Main locations accepting waste and by-products (waste and by-products)

- Thermal power plants (limestone, by-product gypsum)
- Steel mills (blast furnace slag, steel slag)
- Construction sites (construction soil, construction sludge, waste plastic, wood chips)
- Water treatment plants (sewage sludge)
- Incineration plants (clean centers) (burnt residue)
- Feed production plants (meat and bone meal)
- Foundries (foundry sand), etc.

400 kg or more per tonne of cement

II. Initiatives for Circular Economies

– 5. Initiatives to Resolve Challenges

<Challenges in our circular economies>

(1) Decreased cement sales in Japan

- The amount of waste and by-products accepted is affected by cement production at domestic plants.
- The amount of waste and by-products used is decreasing with the decrease in cement production in Japan.

(2) Changes in waste disposal demand

- There is demand and competition from various industries for fuel-based waste, which is easy to dispose. On the other hand, difficult-to-treat waste is flowing to packed landfills.

Difficult to maintain the volume of waste and by-products accepted at the current rate

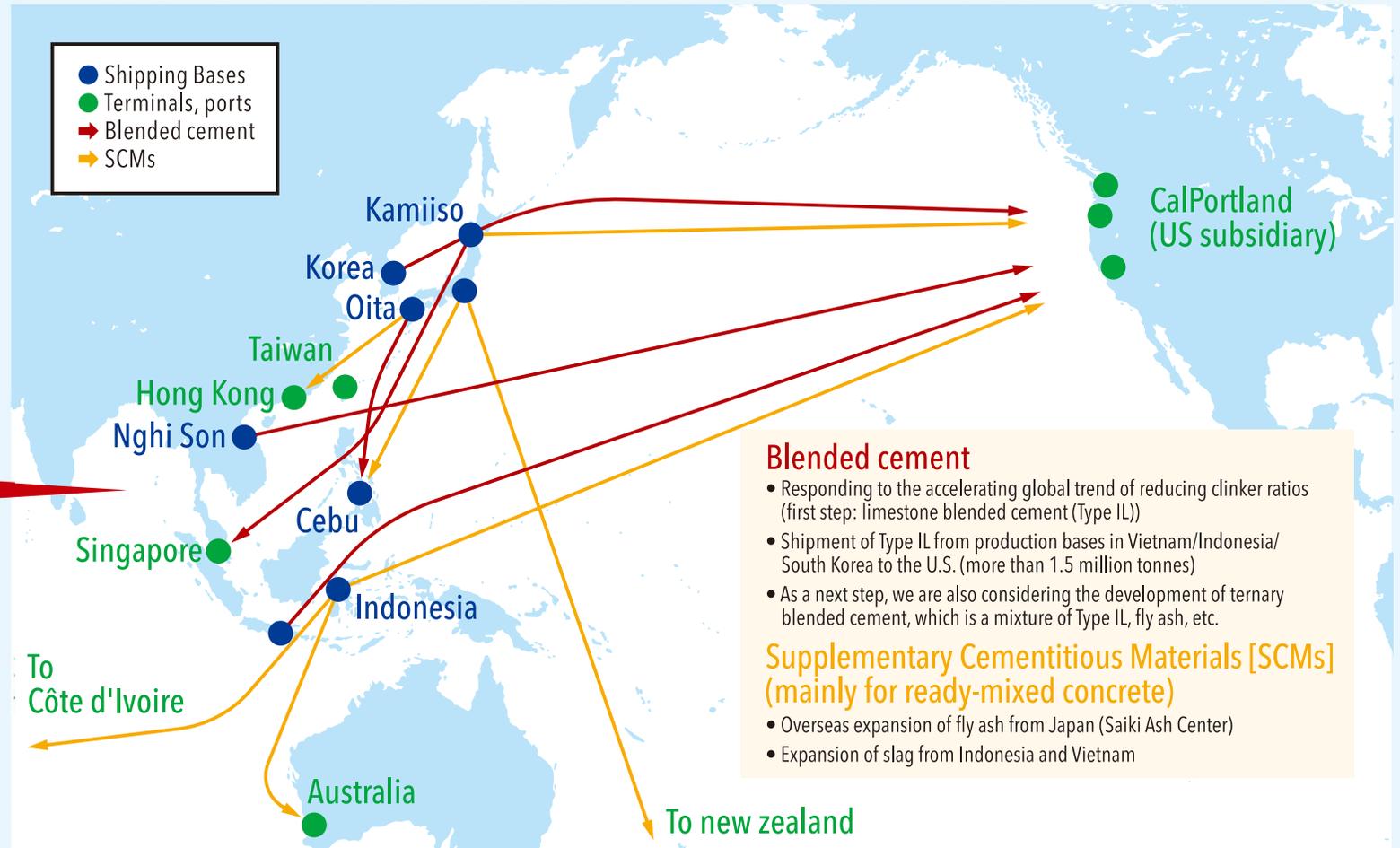
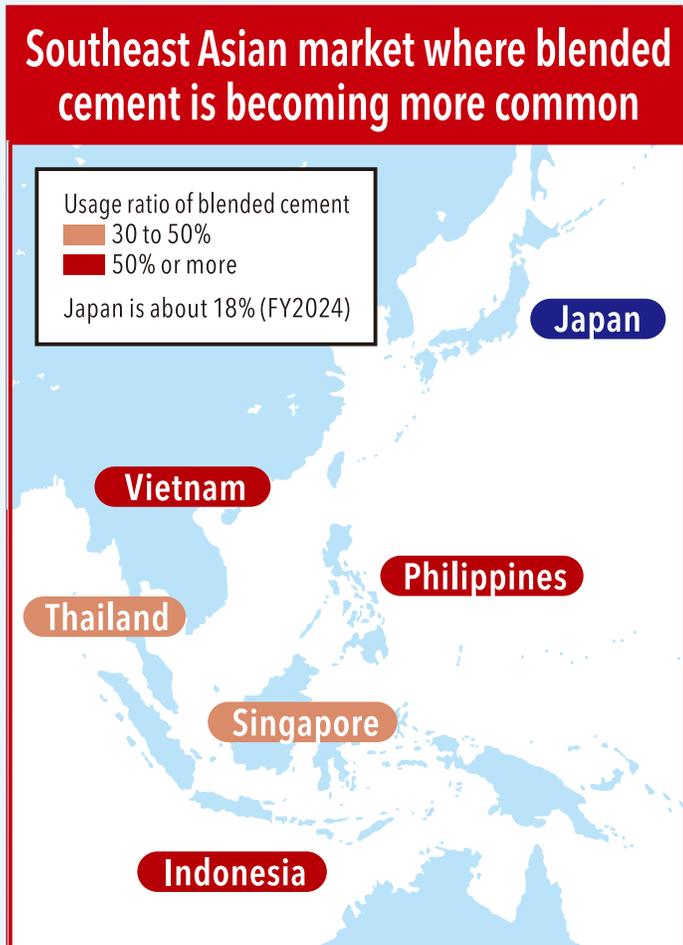
Difficult to honor our commitment to “addressing social challenges” such as extending the lifespan of landfills, reducing environmental impacts, etc.

II. Initiatives for Circular Economies

– 5. Initiatives to Resolve Challenges

[Measure 1] Maintain domestic operation rate through blended cement production

- Maintain domestic operation rate and volume of waste and by-products accepted by expanding production and exports of blended cement, demand for which is increasing overseas



II. Initiatives for Circular Economies

– 5. Initiatives to Resolve Challenges

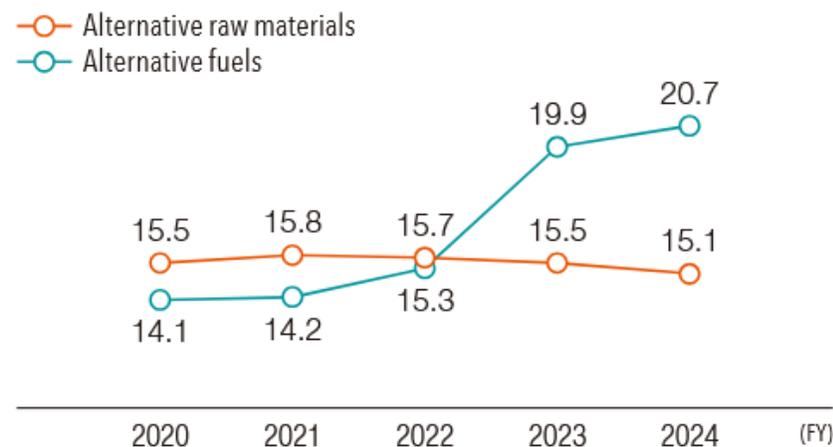
[Measure 2] Improve thermal energy substitution rate

- Taiheiyo Cement will improve the thermal energy substitution rate by increasing the ratio of combustible waste used in cement production.



Chlorine bypass system. Effective against the increase in chlorine caused by the use of waste plastics, etc.

Ratio of Alternative Raw Materials and Fuels (%) **GCCA**



- ◆ Technology introduction and technology development (chlorine bypass/burner combustion technologies, etc.)
- ◆ Accepting a wide range of waste
- ◆ Developing the logistics network to plants where waste is difficult to collect

II. Initiatives for Circular Economies

– 6. Our Strengths and Circular Economies

Challenges in our Group's circular economies

(1) Decreased cement production in Japan

(2) Changes in waste disposal demand

Measures in response to challenges

[Measure 1]
Maintain domestic operation rate through blended cement production

[Measure 2]
Improve thermal energy substitution rate

[Measure 3]
Accept difficult-to-treat waste

Realized through our Group's competitive advantage
(stable production system, high technological capabilities, global sales channels, etc.)

Value of circular economy initiatives at our Group

Extension of the lifespan of landfills

Acceptance of disaster waste

Neutralization of dioxins, etc.

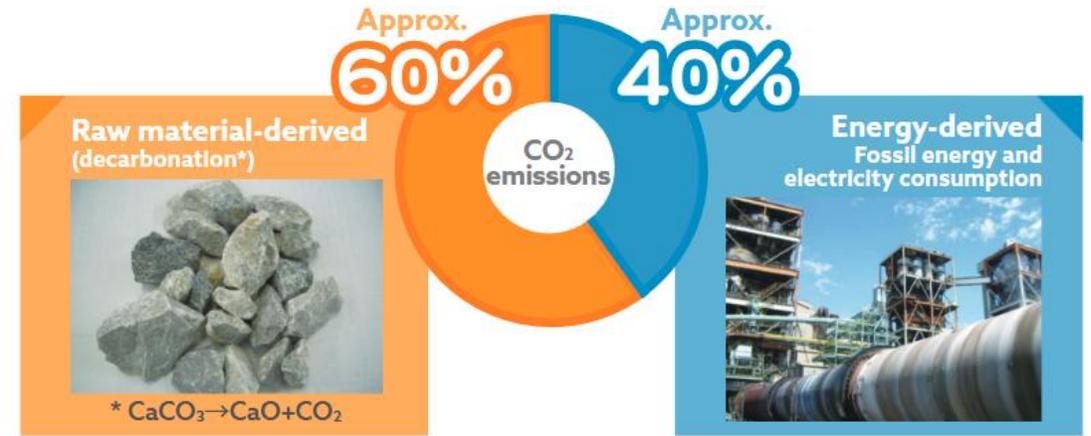


III. Initiatives for Carbon Neutrality

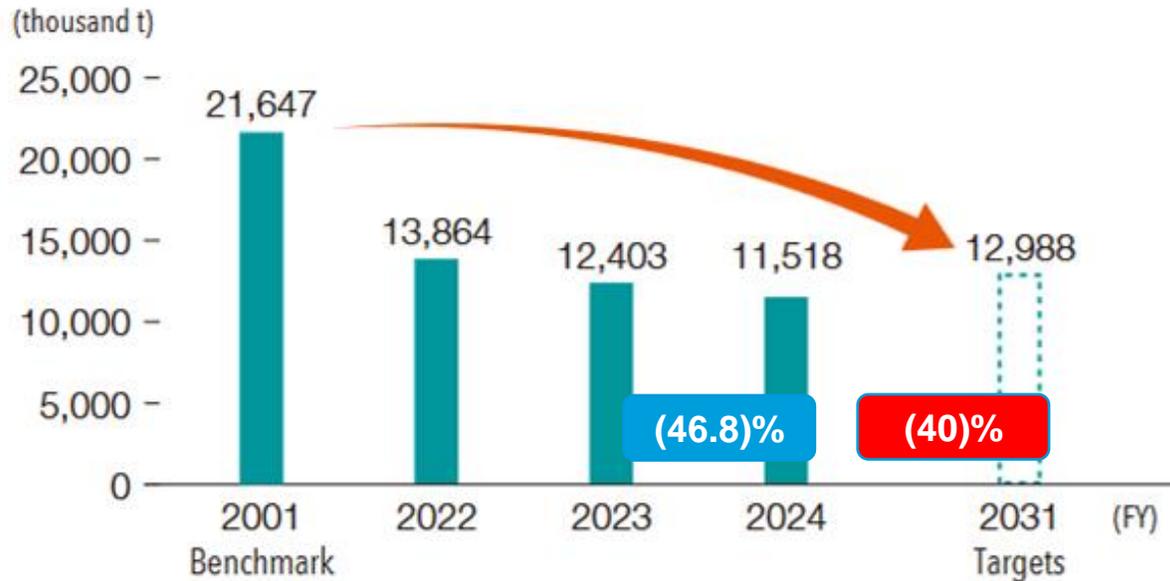
III. Initiatives for Carbon Neutrality

– 1. CO₂ Emission Results

- CO₂ emissions from cement production account for 90% of the Group's CO₂ emissions
- 40% of emissions in the cement production process are derived from energy
- 60% of emissions are derived from the decarbonation of limestone, the main raw material
- → Toward Carbon Neutral Strategy 2050

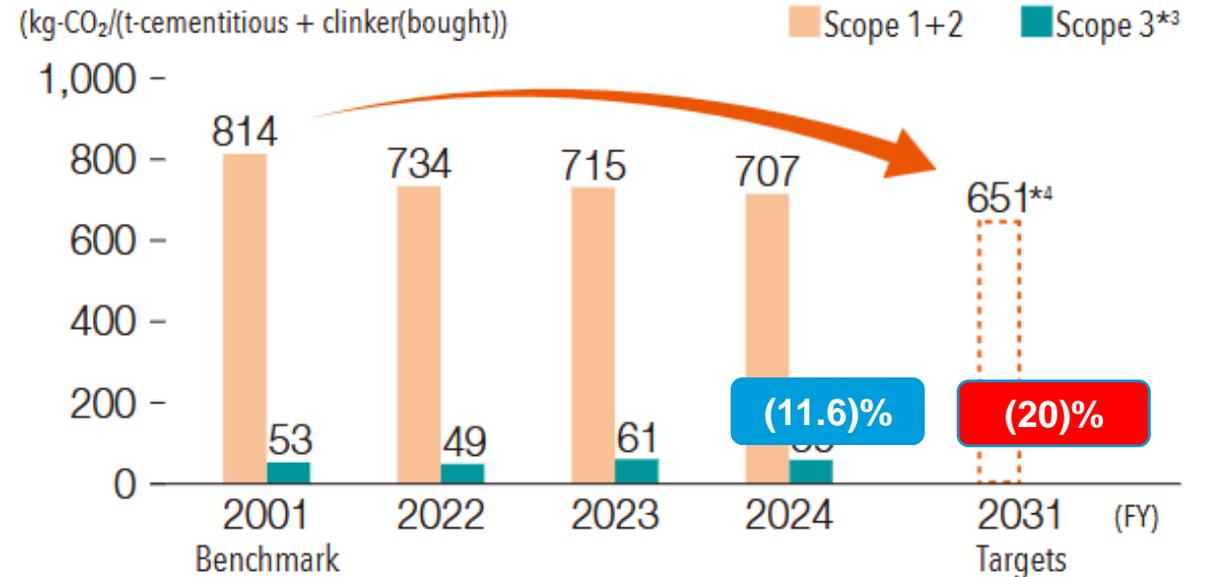


● Total Domestic CO₂ Emissions



GCCA

● Specific CO₂ emissions in the supply chain

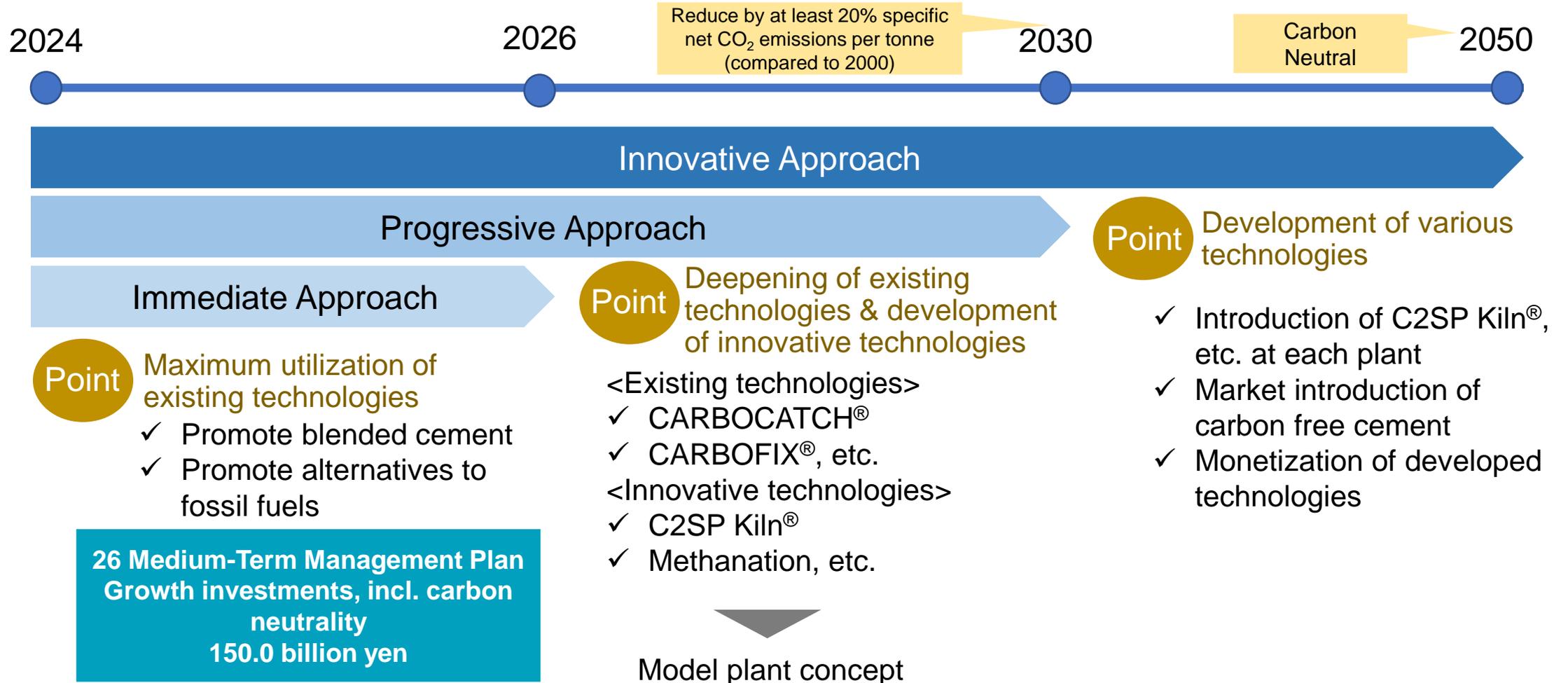


GCCA

III. Initiatives for Carbon Neutrality

– 2. Outline of Carbon Neutral Strategy 2050

- Promote strategy from three approaches toward **achieving carbon neutrality in the entire supply chain by 2050**
- In the short term, reduce CO₂ emissions while utilizing existing technologies; in the medium to long term, promote the utilization of innovative technologies
- In the future, maintain concept to expand sales of carbon neutral cement and use various carbon neutral technologies as a revenue source



III. Initiatives for Carbon Neutrality

– 3. Key Strategies during the 26 Medium-Term Management Plan (Immediate Approach and Progressive Approach)

- Maximize utilization of existing technologies to contribute to CO₂ emissions reduction during the 26 Medium-Term Management Plan

Measures to reduce raw material-derived CO₂

- Promote the use of blended cement

<Japan>

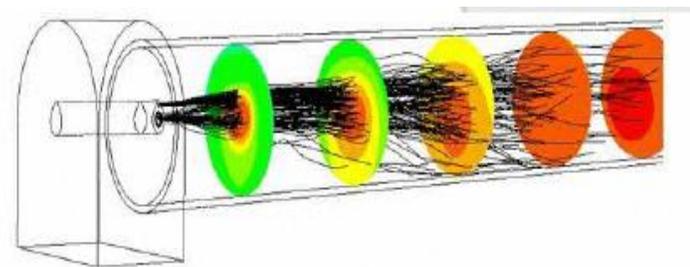
- Increase the amount of supplementary cementitious materials for ordinary Portland cement
- Study and practically apply new blended cement standards

<Overseas>

- Develop new blended cement that meets the needs of each business area
- Promote blended cement by utilizing new cement admixtures and grinding aids, etc.

Measures to reduce energy-derived CO₂

- Promote alternatives to fossil energy



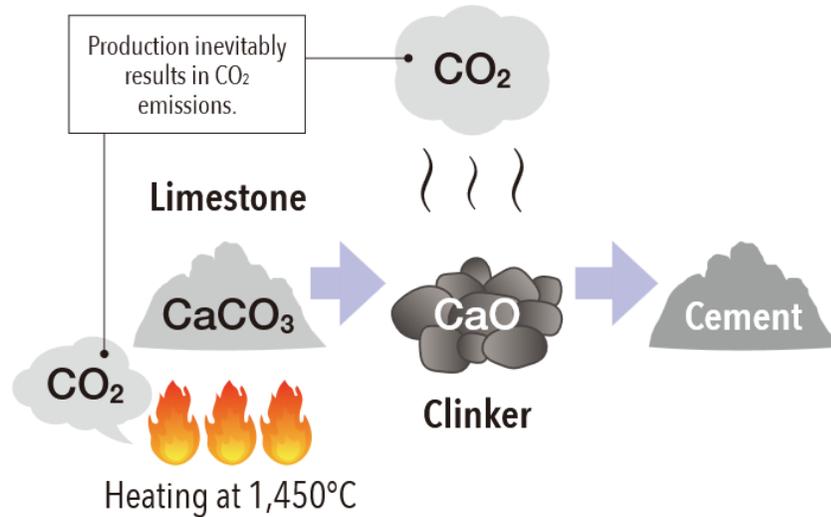
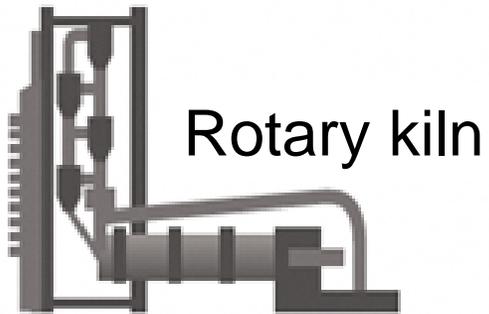
Gas temperature distribution inside the kiln and waste plastic tracking (example)

III. Initiatives for Carbon Neutrality

– 3. Key Strategies during the 26 Medium-Term Management Plan (Immediate Approach and Progressive Approach)

[Reference] Why does blended cement have a CO₂ reducing effect?

Portland cement



Large amounts of CO₂ are emitted during the thermal decomposition of limestone.

Blended cement

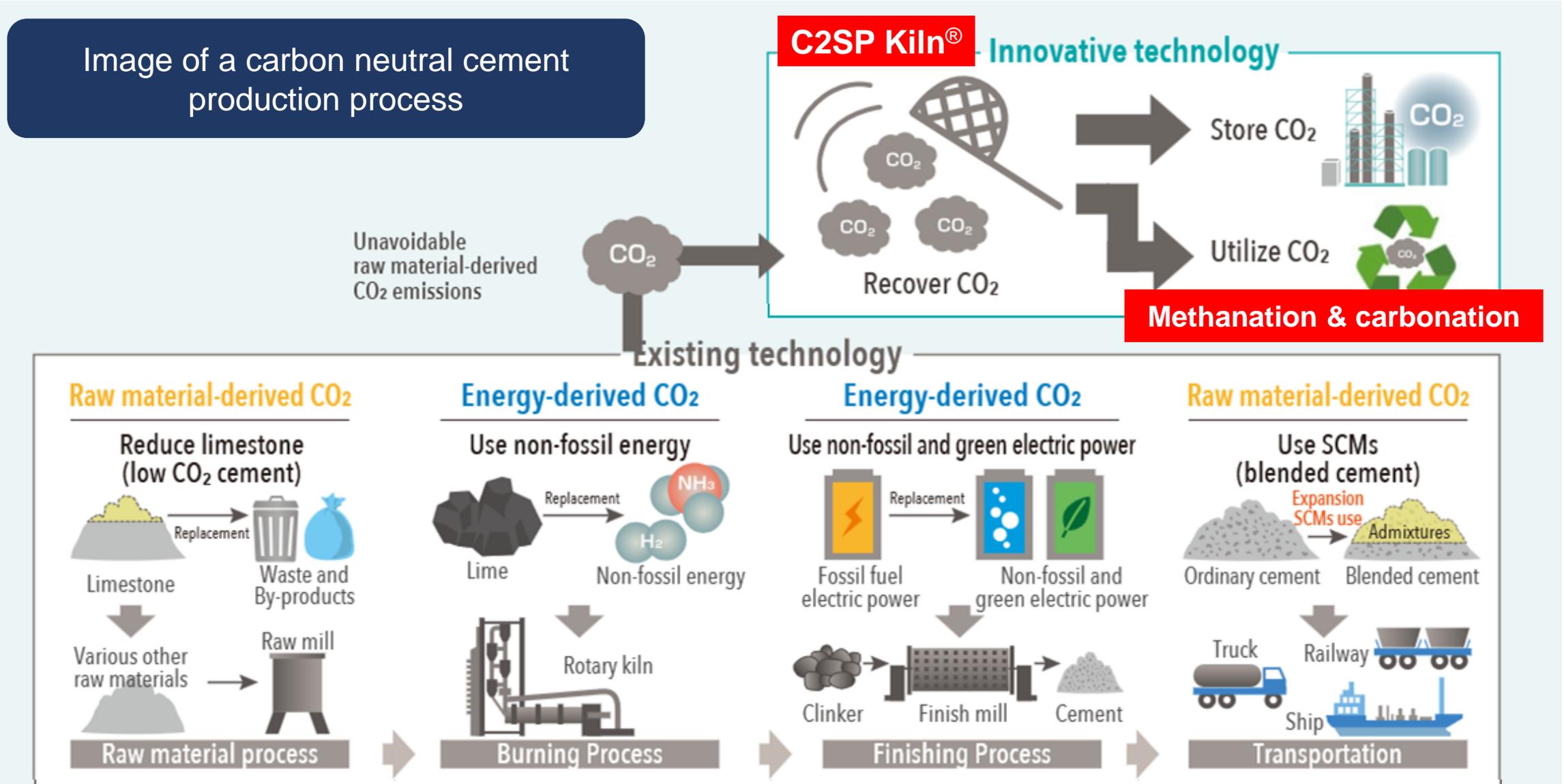


Blended cement is manufactured by replacing part of the Portland cement with cementitious materials such as granulated blast furnace slag. **CO₂ emissions are reduced as the amount of Portland cement used decreases.**

III. Initiatives for Carbon Neutrality

– 4. Innovative Approach

- Expect to complete innovative technologies in the manufacturing process such as CO₂ recovery and utilization by 2030



III. Initiatives for Carbon Neutrality

– 4. Innovative Approach (CN Model Plant Concept)

- Began conducting studies of the “carbon neutral model plant concept” for demonstrating various technologies at the Kawasaki Plant of DC Co., Ltd.



III. Initiatives for Carbon Neutrality

– 5. Countermeasures Against Intensifying Disasters Associated with Climate Change

—Our Proprietary Technologies and Future Development—

- We will also engage in technological development to respond to disaster reduction and recovery in addition to resource recycling of disaster waste, as measures against severe disasters to adapt to climate change.

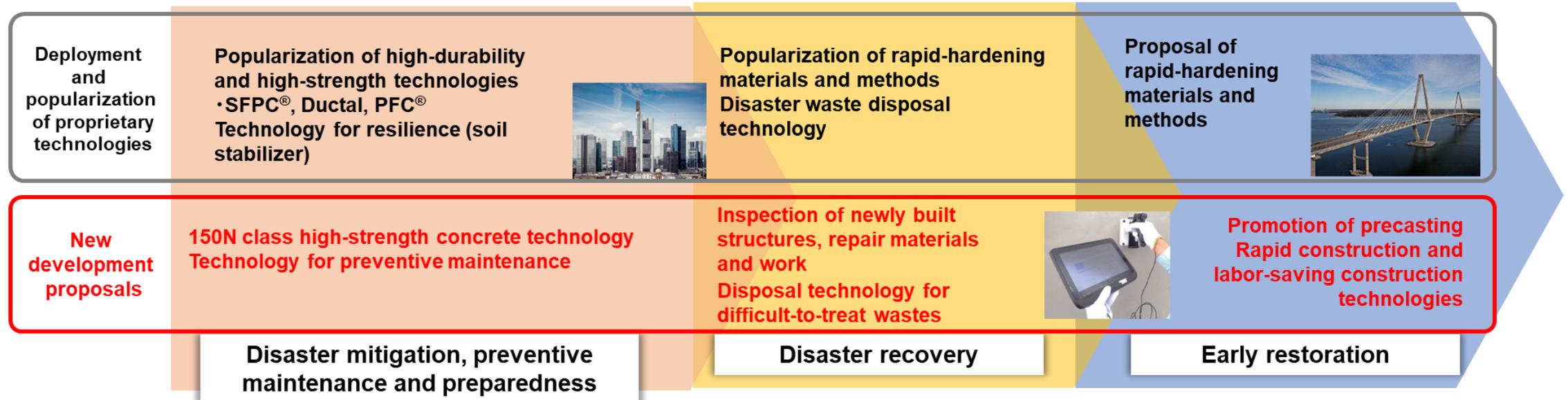
—Corporate activities and technical proposals to prepare for intensifying disasters associated with climate change and to respond to early recovery and restoration—



Recycling of disaster waste into cement resources

Contribution through experience in responding to the East Japan and Kumamoto earthquakes

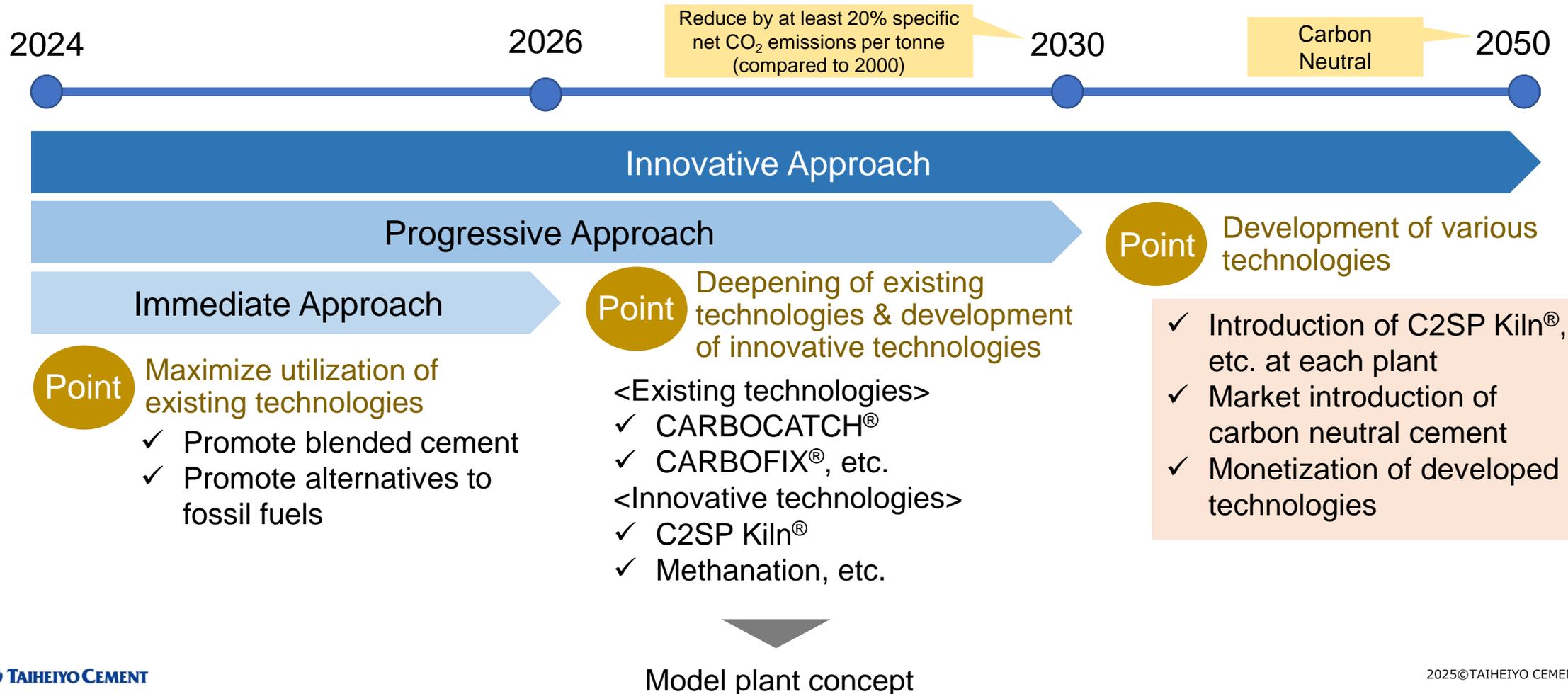
Promotion of technological development for disaster mitigation and restoration



III. Initiatives for Carbon Neutrality

– 6. Future Prospects

- On the behalf of carbon neutrality, we are formulating various strategies, making investments, and progressing toward implementation.
- In terms of technology, prospects are bright for our general path toward implementation.
- Cost is the biggest challenge. We will consider it while keeping an eye on technological innovation and market conditions.





IV. In Closing

IV. In Closing – Social Value of Taiheiyō Cement as a Representative of the Cement Industry

Business activities leveraging our competitive advantage

(1)
Top cement supply capability in Japan

(2)
World-class technological capabilities

(3)
Business foundation
(quarries, global sales channels, etc.)

Realization of sustainable management

Promote circular economies

- Deepen waste disposal technologies
→ Realize disposal of waste that is difficult to treat
- Export blended cement
→ Maintain domestic operation rate

Promote carbon neutrality

- Promote blended cement
→ Promote carbon neutrality and contribute to earnings
- Develop C2SP Kiln[®] and other innovative technologies
→ Realize carbon neutral cement production

Realization of the future vision targeting 2050

- **Deploy around the world** the Group's overall capabilities **and revolutionary technologies including carbon neutrality.**

- Become a leader in the global cement industry.

- Become **a corporate group that supports a safe, secure, decarbonized and recycling-based society** for people.

