KOBELCO

# Roadmap to Carbon Neutrality

May 19, 2026
Kobe Steel, Ltd.

# Today's Topics

- Our Group is advancing technical studies and development aimed at achieving carbon neutrality, with a focus on the steel and electric power businesses, in line with our roadmap to carbon neutrality announced in May 2021.
- We have updated the roadmap to reflect recent changes in the business environment, including both internal and external trends.
- Aligned with the roadmap for the ironmaking process, we are advancing studies on scrap melting furnace introduction as a key step in the transition toward realizing carbon neutrality.

1. Update of the Roadmap to Carbon Neutrality
2. Scrap Melting Furnace
3. Medium- to Long-Term Initiatives Toward Carbon Neutrality

# Update of the Roadmanp to Carbon Neutrality

# Recognition of the Business Environment Surrounding Carbon Neutrality

## Macro Trends

- Continued inflation
- The market for GX steel*1 is still developing.
- The power sector is re-evaluating the roles and economic value of dispatchable and backup power sources.
- Industries are moving from philosophy to implementation, focused on economic rationality and business competitiveness.

## Government Support & Regulations

- From FY2024, support programs for production process transformation—such as CAPEX support and strategic tax systems—will be fully launched.
- Development of concrete measures to promote GX steel is progressing in public-private collaboration.
- From FY2026, GX-ETS (Japan's emmision trading system) will be fully launched.

## Customer Trends

- In the automotive sector, GX steel adoption is increasing, supported by CEV subsidies*2, along with ongoing studies on high-recycled content steel, such as EAF steel, utilization ahead of stricter environmental regulations. —The focus is shifting from OEM declarations to procurement requirements.
- The construction sector is expected to increase the use of GX steel, primarily in public works; further expansion will require broader adoption in the private sector.

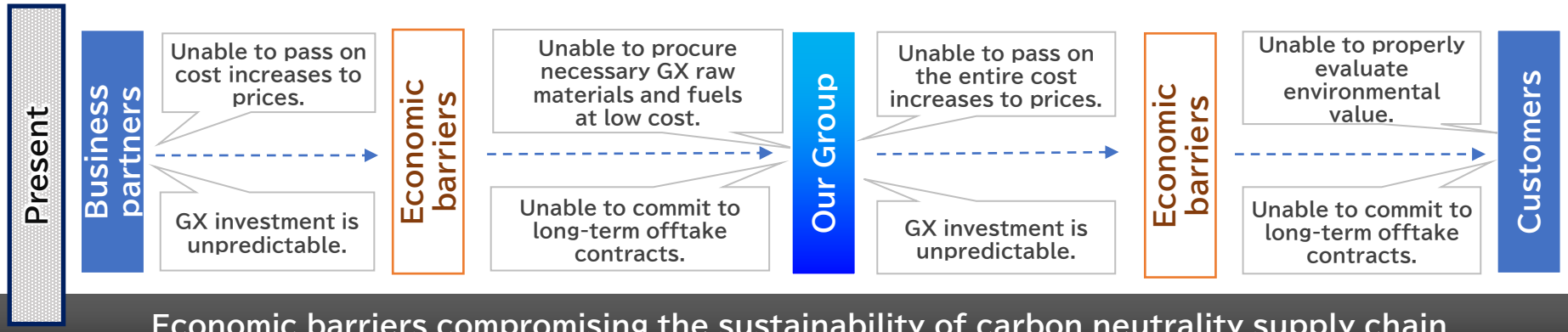
## Competitors & Industry Trends

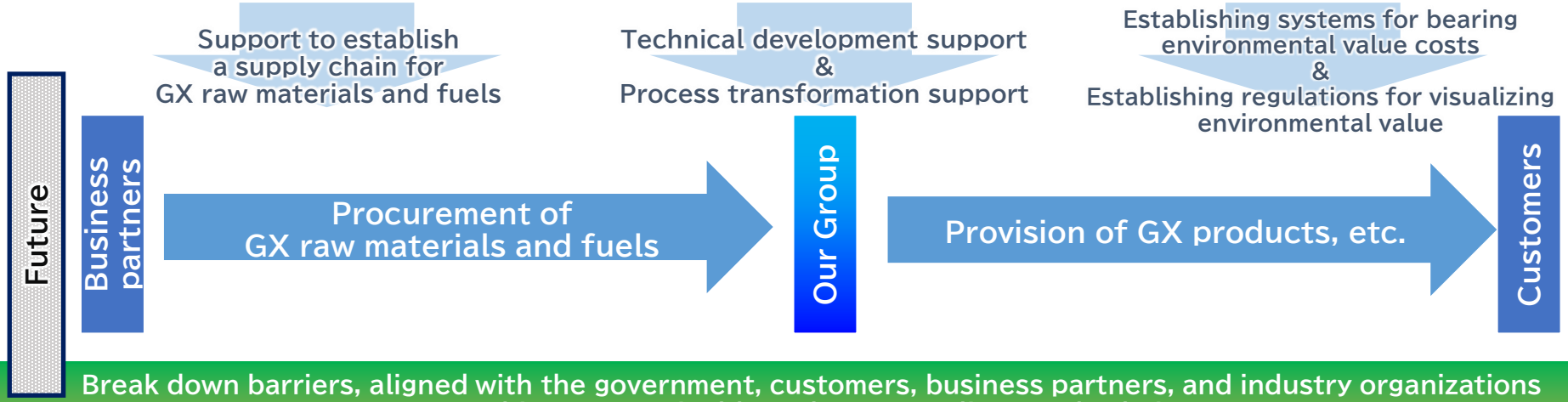
- Other integrated steelmakers have decided to introduce large-scale, innovative EAFs with government support.
- EAF steelmakers have added low CFP steel to their areas of competitive focus.
- The Japan Iron and Steel Federation (JISF) is advancing GX steel international standardization to be reflected in the CFP.

*1: Green Steel for Green Transformation, defined by the study group launched by METI.
*2: Clean Energy Vehicle (CEV) Subsidy

# Challenges in Advancing Carbon Neutrality

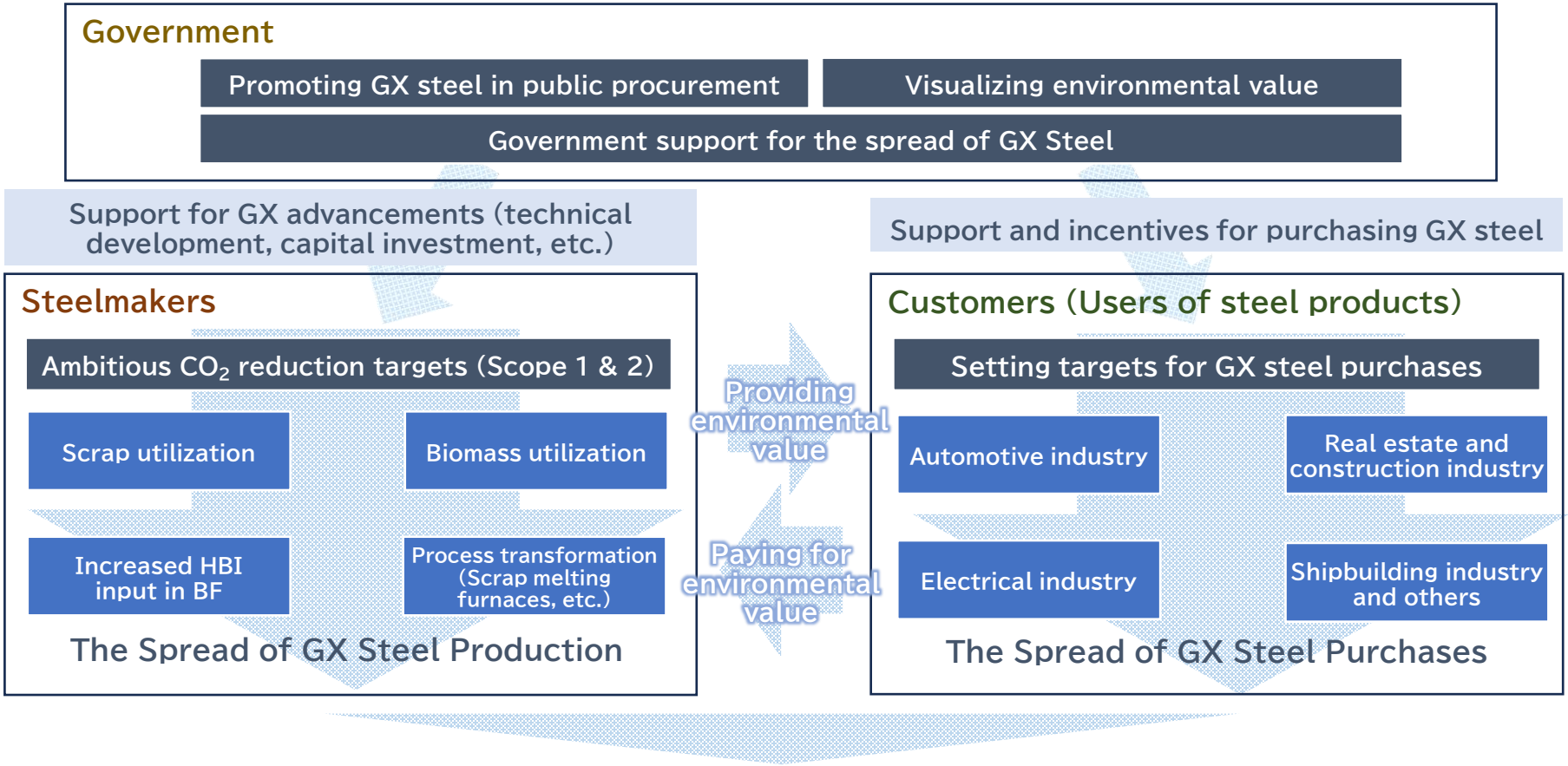
- Achieving carbon neutrality in our Group's steel and electric power businesses requires process transformation in manufacturing and power generation, alongside technological development, procurement of GX materials and fuels, and passing on GX product costs.
- Currently, economic barriers **hinder the carbon neutrality supply chain from being fully sustainable.**
- Some of these challenges cannot be overcome by our Group alone; **Need to work together with the government, customers, business partners, and industry organizations for a carbon neutrality transition across the entire value chain.**



# Expanding the GX Steel Market

- **Expansion of the GX steel market** is key to achieving carbon neutrality in the steel business.
- Market expansion cannot be achieved by steelmakers alone. It requires broader adoption of GX steel by customers (users of steel products), along with support measures from the government.




**Government, customers, and steelmakers working together to expand the GX steel market**

# Electric Power Business Environment and Our Thermal Power Business

- Japan's electricity demand is expected to rise with greater use of generative AI and industrial electrification.
- Thermal power capacity is expected to fall, especially among older plants, raising demand for high-efficiency thermal power.
- Despite advances in renewable energy, challenges remain, including weather-driven output fluctuations and regional disparity in site development.

Our electric power business operates large-scale (3.95 GW) coal and gas-fired thermal power plants near demand areas, unaffected by weather.

## Electricity market trends

### Increase in electricity demand*1

1.1–1.2 trillion kWh in 2040

Increased demand
・Generative AI
・Electrification

0.98 trillion kWh in 2023

### Decrease in thermal power generation capacity*2

145.7 million kW in 2019

・Aging
・Stricter regulations

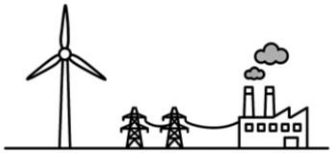
Retirements > New additions

96.9–135.8 million kW in 2040

### Hurdles to expanding renewable energy

Instability in power generation

Regional disparity in site development



## Challenges

### Responding to Increasing Power Demand

| High-efficiency thermal power | Nuclear restart/ new builds | Renewable energy expansion |
|---|---|---|
| 68.6% in 2023 → Up 30–40% in 2040 | 8.5% in 2023 → Up 20% in 2040 | 22.9% in 2023 → Up 40–50% in 2040 |

| Need to secure dispatchable power supply | Regional supply imbalance & insufficient transmission capacity |
|---|---|

## Our roles

- Responding to society's demand for higher efficiency
- Operating large-scale power plants (3.95 GW) in the Kanto and Kansai regions

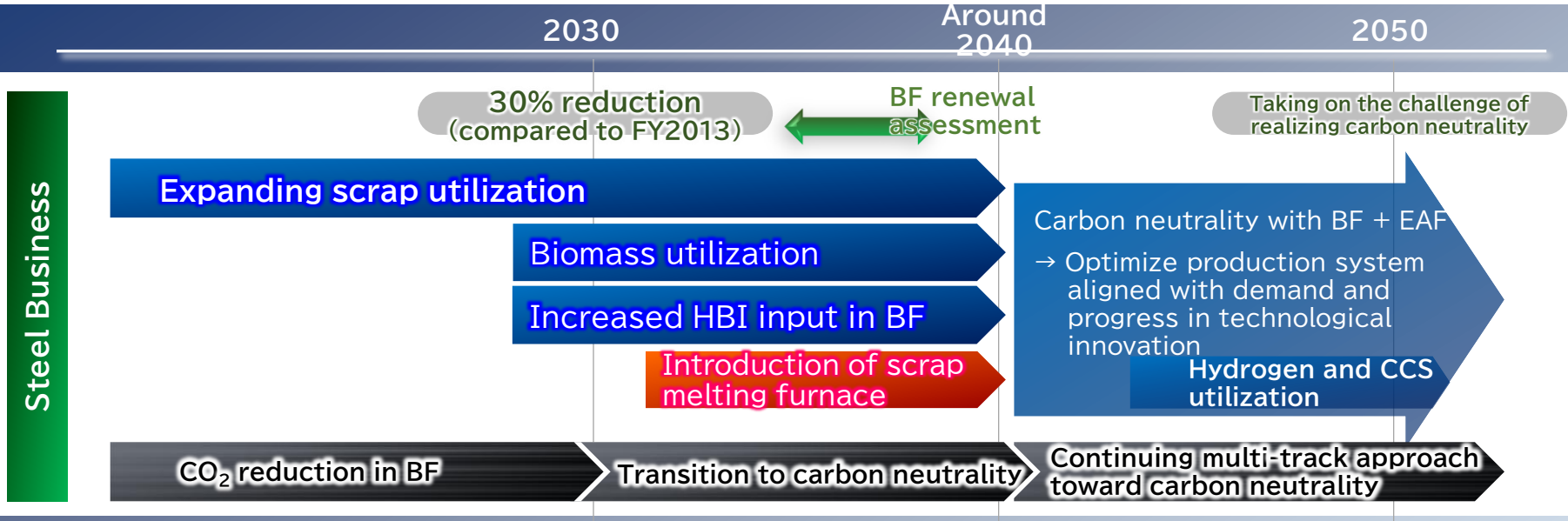
| Operational in cloudy, windless conditions | Urban plants near demand areas |
|---|---|

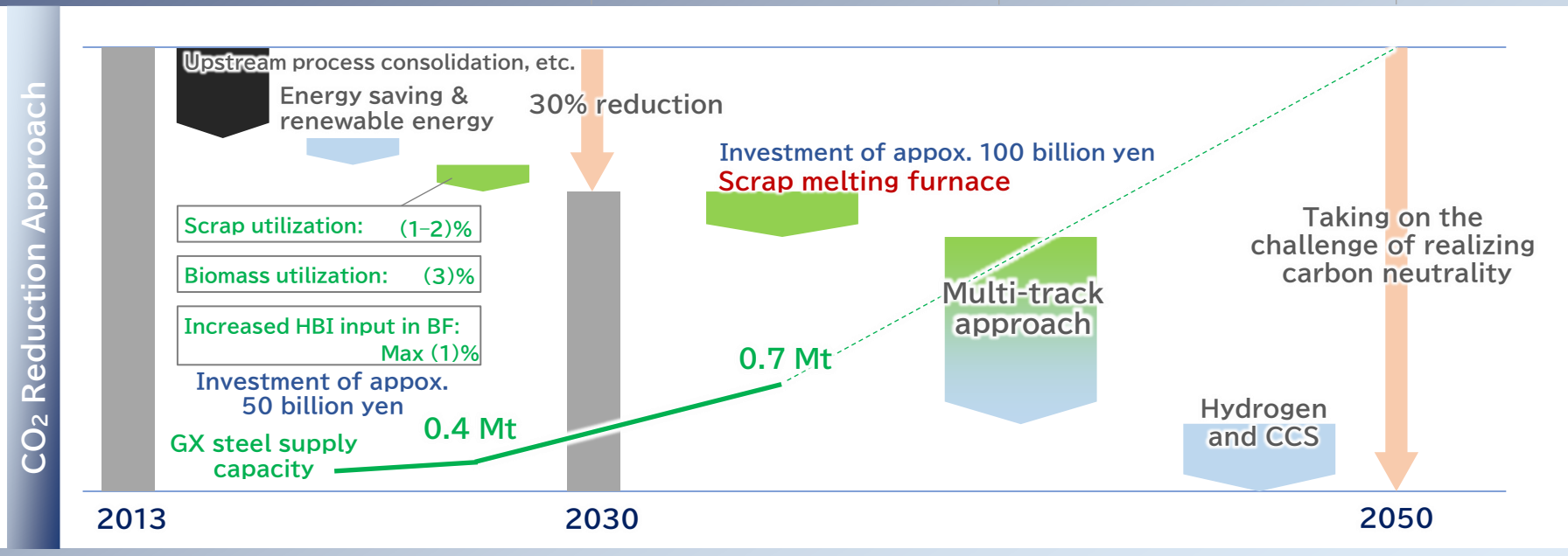
**Through carbon neutrality initiatives, we will contribute to Japan's stable power supply over the medium to long term.**



*1. The 7th Basic Energy Plan: Outlook for energy supply and demand in fiscal 2040 (February 2025)
*2. Report from the study group on future electricity supply-demand scenarios

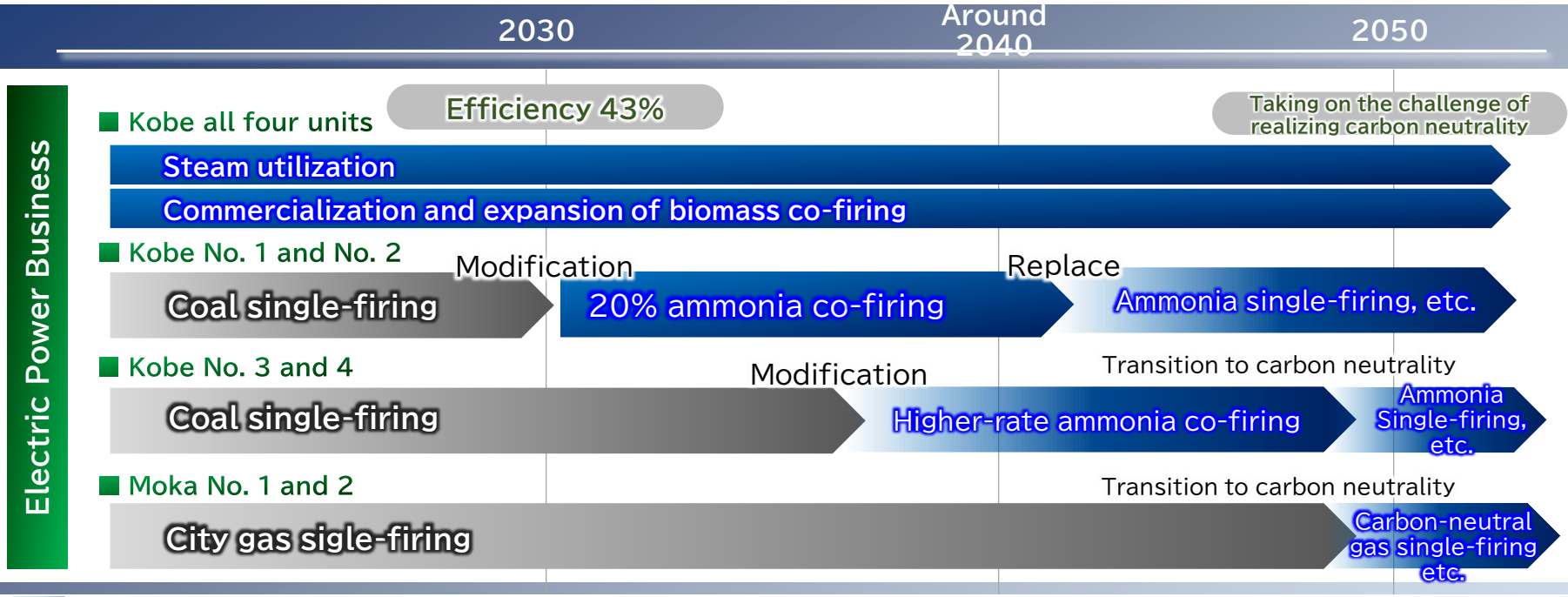
# Steel Business's Carbon Neutrality Roadmap

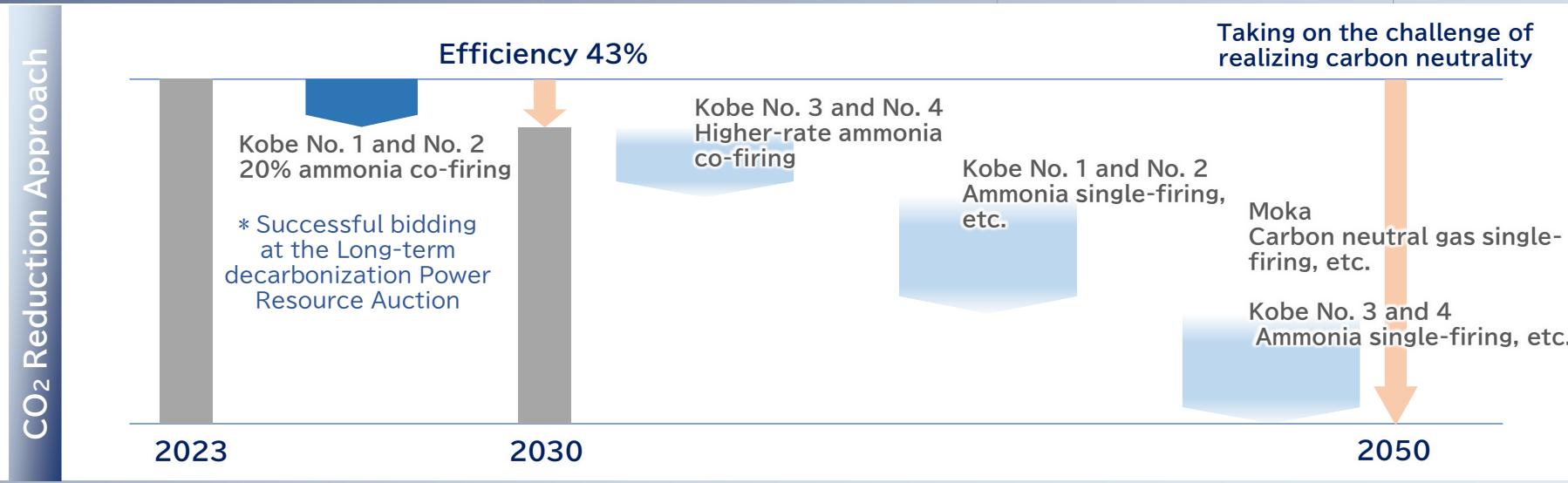


# Electric Power Business's Carbon Neutrality Roadmap

KOBELCO



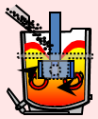
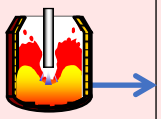
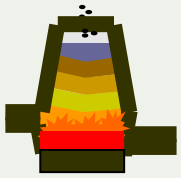
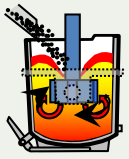
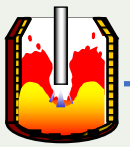
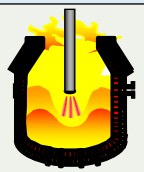
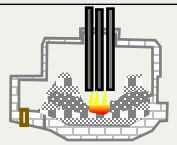
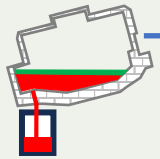
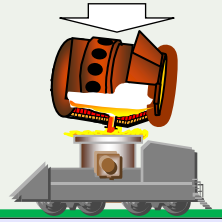
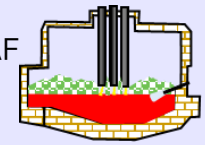
# Scrap Melting Furnace

# Scrap Melting Furnace—Combined Metal Charging Method

In the combined metal charging method, hot metal from a scrap melting furnace is mixed with molten pig iron from a blast furnace (BF) in a basic oxygen furnace (BOF).

| Quality | Recycled material ratio*1 | Manufacturing range |
|---|---|---|
| Equivalent to BF steel | Max 50% | All steel grades, including high-grade steel |

**Adding this process to the conventional BF-BOF route increases the overall recycled material ratio and CO2 reduction rates.**

| Category | | Manufacturing process | | | | | Content※2 | | |
|---|---|---|---|---|---|---|---|---|---|
| | | BF | De-Si | De-S | De-P | BOF | P | S | N |
| BF steel | BF-BOF |  |  Torpedo car |  KR process  Deslagging |  De-P furnace |  | High grade | | |
| Combined metal charging method | BF-BOF | BF | De-Si | De-S | De-P | BOF | High grade | | |
| | |  |  Torpedo car |  KR process  Deslagging |  Combied charging De-P-furnace |  Refining and tapping | | | |
| | Scrap melting | | | Scrap melting  Scrap melting furnace | Tapping  |  | | | |
| EAF steel | EAF | | | – | Large-scale, innovative EAF  | | Technology in development with GI fund, etc. | | |

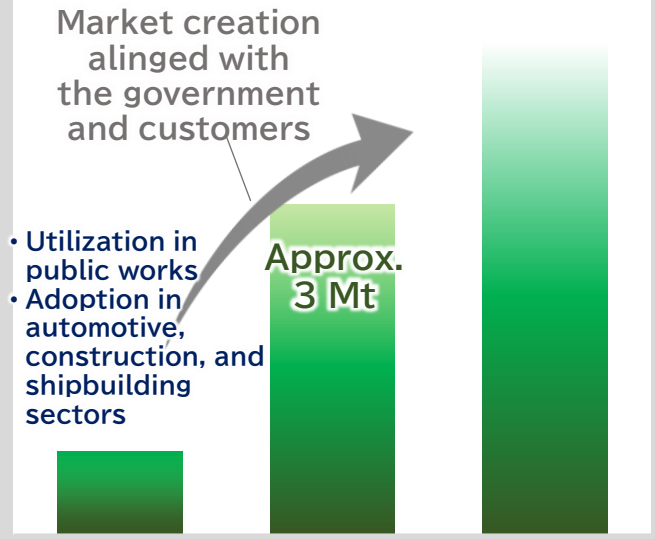
*1 Ratio of scrap, scale, and other iron sources
*2 Si=silicon, S=sulfur, P= phosphorus, N=nitrogen

# Significance of Scrap Melting Furnace Introduction

1 Transforming the production system gradually toward decarbonization

2 Meeting customer needs in carbon neutrality and circular economy

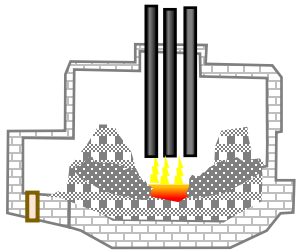
## GX Steel Demand Assumptions




## Our Responses

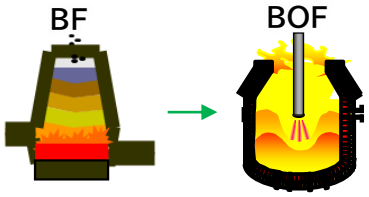
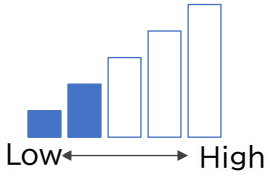
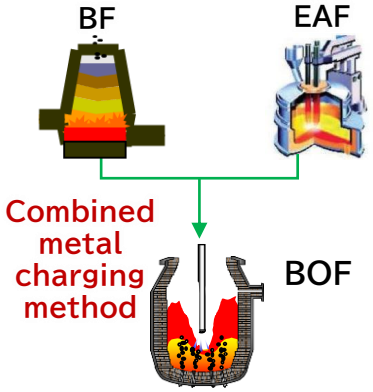
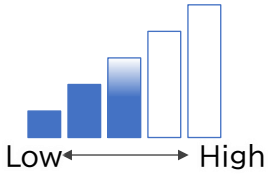
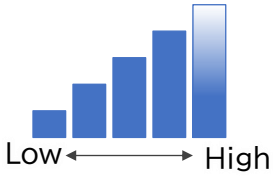
- ✓ Implement a gradual transition, rather than a rapid overhaul of productions systems, as the GX Steel market continues to expand.
  - ➡ Transition through the remaining blast furnace lifespan
- ✓ Expand our GX steel supply capacity
- ✓ Promote a circular society by utilizing scrap

**Investment of approx. 100 billion yen to introduce a scrap melting furnace**



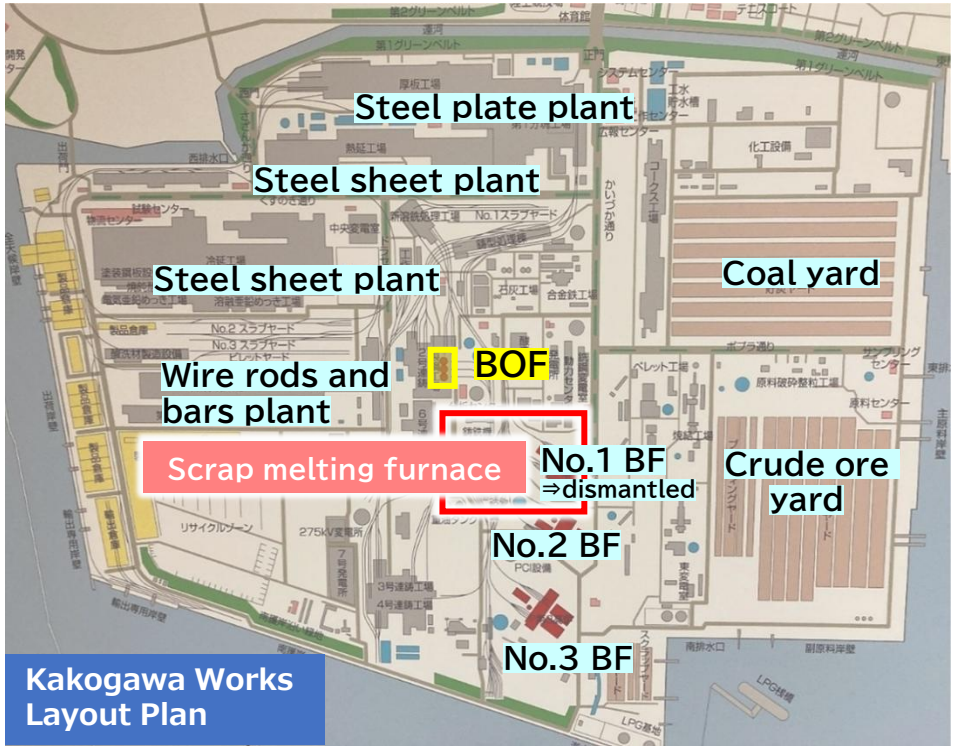
# Transforming Our Ironmaking Process

## Gradual transformation of the ironmaking process to maintain high-grade steel quality, aligned with advances in our production systems

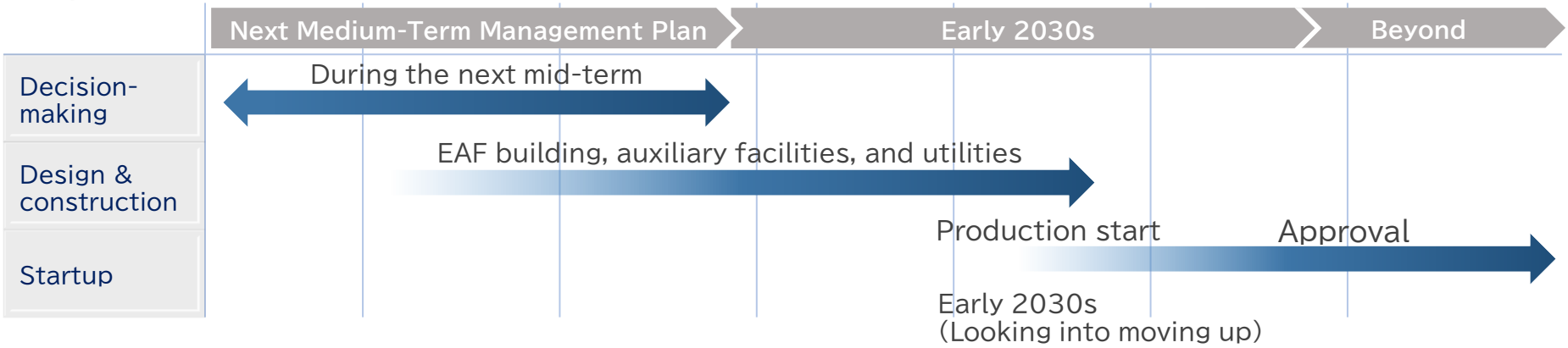
| Timeframe | Manufacturing process | Flow | Cost (variable cost) | Material order coverage rate |
|---|---|---|---|---|
| Present | BF-BOF |  |  | 100% |
| 2030s | BF-BOF<br>+<br>BOF [Combined metal charging]<br>(BF+ scrap melting furnace) |  |  | 100%<br>(Unchanged from the BF-BOF route) |
| 2050s or earlier | Innovative EAF<br>(with high-grade scrap, hydrogen reduction HBI) | Large-capacity green power source<br>• HBI<br>• High-grade scrap<br>  |  | 80%<br>(Current capacity)<br>⇒ Aim for 100% with future technological development |

# Overview of Scrap Melting Furnace Introduction Plan

| Item | Description |
|---|---|
| Installation site | Kakogawa Works (Hyogo Prefecture) |
| Purpose | • To implement gradual production system transformation<br>• To secure GX steel supply capacity (meeting customers' needs in carbon neutrality and circular economy) |
| Manufacturing method | Combined metal charging method —Mixing molten pig iron from a BF and molten steel from an EAF, utilizing an existing BOF |
| Investment | Approximately 100 billion yen (evaluating the option of using financial support programs) |
| Production capacity | 0.7 million tons/year |
| Production start | Early 2030s |
| Timing of decision | During the next med-term plan |




## Project Overview



# Medium- to Long-Term Initiatives Toward Carbon Neutrality

# Initiatives for Hydrogen Utilization

**Advanced initiatives focused on hydrogen production, storage and utilization are underway at Takasago Works as the core base. Kobelco Group aims to expand examples of collaborations with external partners and customers.**

## Production and Storage

- Demonstration of hybrid-type hydrogen gas supply system started in 2023


## Utilization

- Hydrogen co-firing in boilers started in 2024
- Hydrogen co-firing and single-firing in direct heating furnaces started in 2025

**Introduction of a hydrogen-fueled metal heating demonstration furnace with Japan's largest combustion capacity**

## Utilization

- Demonstration of hydrogen fuel cell excavotors started in 2025


**Japan's first hydrogen refueling, driving and excavation demonstration**

### Initiative in Progress

Takasago GX Try Field, consisting of Takasago Works' demonstration facilities, serves as a site for hydrogen, biomass, and $CO_2$ recovery and utilization demonstrations, as well as for co-creation with customers.

TAKASAGO GX Try Field

Including NEDO subsidized projects (liquid hydrogen vaporizers, heating furnaces, fuel cell excavators)

# Initiatives Focused on CCS (Carbon Capture & Storage)

- Medium- to long-term CCS projects are being explored, targeting 2030 and beyond.
- Joint feasibility studies for CCS projects are underway in collaboration with domestic and overseas energy companies

## Participation in the BHP-Led CCUS Hub Study

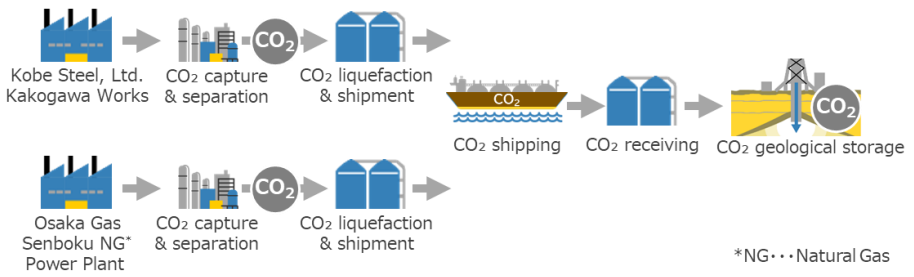
- As a member of an industry consortium led by BHP, Kobe Steel has participated an international joint study (CCUS Hub Study), examining the potential for recovering, storing, and utilizing industrial $CO_2$ emissions in the Asia-Pacific region from technical, regulatory, and commercial perspectives.
- Initiatives for industrial $CO_2$ reduction and long-term sustainability are being explored in collaboration with stakeholders, leveraging our steel manufacturing expertise.

AM/NS INDIA, BHP, Chevron, HYUNDAI STEEL, JSW, "K" LINE, KOBELCO, LETA, MITSUI&CO.

CCUS Consortium for Hard to Abate Industries

## Joint Feasibility Study with Osaka Gas and Shell

- In June 2025, Kobe Steel joined a joint study launched by by Osaka Gas and Shell in May 2023 to build a CCS value chain for capturing $CO_2$ from domestic plants and other emission sources and storing it in overseas geological formations.
- It was confirmed that the concept of building a Kansai area-based CCS value chain is viable.
- The study will continue in collaboration with partner companies.



# Group Corporate Philosophy

| | |
|---|---|
| **KOBELCO's View of the Future** | Our view of a society and future to be attained as we carry out KOBELCO's mission |
| | **We envision a world in which people, now and in the future, can fulfill their hopes and dreams while enjoying safe, secure, and prosperous lives.** |
| **KOBELCO's Mission** | Our mission and the social significance of the KOBELCO Group that we must fulfill |
| | **Our mission is to provide solutions to the needs of society, by making the best use of the talents of our employees and our technologies.** |
| **Core Values of KOBELCO** | The commitments of the KOBELCO Group to society and the values shared by the entire KOBELCO Group |
| | 1. We provide technologies, products and services that win the trust and confidence of our customers we serve and the society in which we live.<br>2. We value, and support the growth of, each employee on an individual basis, while creating a cooperative and harmonious environment.<br>3. Through continuous and innovative changes, we create new values for the society of which we are a member. |
| **Six Pledges of KOBELCO** | Code of Conduct for all Group employees to follow to fulfill the Core Values of KOBELCO and the Quality Charter |
| | 1. Uphold the Highest Sense of Ethics and Professionalism<br>2. Contribute to the Society by Providing Superior Products and Services **Quality Charter**<br>3. Establish a Comfortable but Challenging Work Environment<br>4. Live in Harmony with the Local Community<br>5. Contribute to a Sustainable Environment<br>6. Respect Each Stakeholder |

# Disclaimer Regarding Forward-Looking Statements

- Today's presentation contains forward-looking statements about the Company's forecasts, beliefs, expectations, aims, and strategies. These statements are based on the Company's judgements and assumptions using currently available information and may differ substantially from actual results due to uncertainties within its judgements and assumptions and a variety of factors that may change over time, such as future business operations and changes in internal and external circumstances. Kobe Steel assumes no responsibility for revising these statements or other contents in this presentation.

- Below is a list of factors of uncertainties and changes. This includes, but is not limited to:
  - Economic conditions and Changes in economic conditions, demand, and prices in major market
  - Various regulations such as Political situation and trade and other regulations in major markets
  - Fluctuations in foreign exchange rates
  - Availability and prices of raw materials
  - Business development of competing companies' products and services, pricing policies, alliances, M&A, and other business activities
  - Changes in strategies in strategies of the Company's alliance partners regarding our partnerships

KOBELCO