

# Climate-Related Disclosures Based on TCFD Recommendations

## Basic Concept

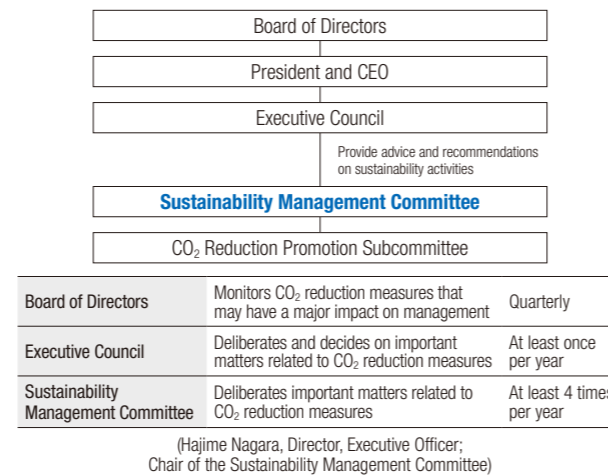
The KOBELCO Group recognizes CO<sub>2</sub> emission reduction as a top management priority. As such, we announced our aim to increase corporate value through a transition to carbon neutrality by 2050 in the KOBELCO Group Medium-Term Management Plan (FY2021–2023) announced in May 2021.

Going forward, the KOBELCO Group will continue to pursue reduction of CO<sub>2</sub> emissions in order to contribute to the realization of “a world in which people, now and in the future, can fulfill their hopes and dreams while enjoying safe, secure, and prosperous lives” as envisioned in KOBELCO’s View of the Future.

## Governance and Risk Management

We established the CO<sub>2</sub> Reduction Promotion Subcommittee under the Sustainability Management Committee (chaired by a director and executive officer) as an organization that specializes in dealing with issues related to the risks and opportunities associated with climate change. The subcommittee, tasked with conducting strategic reviews of climate change, studies and implements Companywide activities to address the risks and opportunities of climate change.

The activities of the CO<sub>2</sub> Reduction Promotion Subcommittee and its study outcomes are reported through the Sustainability Management Committee to the Board of Directors quarterly for supervision and guidance from the Board of Directors. In this manner, we have a system where the Board of Directors has direct governance over risks related to climate change.



## Strategy

The KOBELCO Group analyzes the medium- to long-term risks and opportunities associated with climate change considering various guidelines, including: the social scenarios presented by the International Energy Agency (IEA); the long-term visions formulated and announced by the Japan Iron and Steel Federation (JISF), the Japan Aluminium Association, and other industry organizations; and the energy policies of Japan. Based on the analysis results, we evaluate the appropriateness of our Group’s activities.

Group’s business performance and financial position. In addition, given the increasing severity of damages from floods and typhoons, it is anticipated that the increase of natural disasters due to climate change may cause declines in production volumes and disruptions of supply chains.

### Climate-Related Opportunities

As international concern for climate change-related issues rises, demand is growing for low-CO<sub>2</sub> products and services. We expect an increase in demand for the KOBELCO Group’s products and services that help reduce CO<sub>2</sub> emissions, such as materials for automotive weight reduction and the MIDREX® Process over the medium to long term.

### Climate-Related Risks

As exemplified by the introduction of carbon pricing schemes, environmental regulations on climate change are becoming stricter and may have significant impact on the KOBELCO

## Climate Change-Related Risks and Opportunities over the Short to Medium and Long Terms

	Risks		Opportunities	
	Short to medium term (until FY2030)	Long term (until FY2050)	Short to medium term (until FY2030)	Long term (until FY2050)
Policy and legal systems	Higher costs stemming from regulatory tightening		Growing demand for technologies, products, and services that contribute to reduction of CO <sub>2</sub> emissions (automotive weight reduction, MIDREX® Process, etc.)	
Market and technology transitions	Rising capital investments, R&D expenses, and operating costs associated with low-carbon technologies		Differentiation from other companies by establishing a reputation as a frontrunner in combating climate change	
Reputation	Deterioration of corporate reputation due to insufficient or delayed information disclosure		Increase in demand for products due to increased public and capital investments for disaster prevention	
Physical risks (natural disasters, etc.)	Reduction of production volumes and disruptions of supply chains due to increases in floods, typhoons, and other natural disasters	Increases in costs of countermeasures and reductions in production volumes at factories in coastal locations due to damage from rising sea levels and high tides		

High risk Low risk Large opportunity Small opportunity

## Response to Risks and Opportunities (R&D)

### Reduction of CO<sub>2</sub> Emissions in Production Processes

Kobe Steel is collaborating with other steelmakers in the development projects being promoted by NEDO in a bid to further reduce CO<sub>2</sub> emissions in the ironmaking process and to realize practical application of these developments. One of these projects is the Hydrogen Utilization Project in Iron and Steelmaking Processes, which was selected as a project under the Green Innovation Fund established by METI. We are promoting efforts aimed at realizing carbon neutrality by 2050.

### Contribution to Reduction of CO<sub>2</sub> Emissions through Technologies, Products, and Services

Our existing lineup of products that help reduce CO<sub>2</sub> emissions includes automotive weight-reduction materials/parts and heat pumps. We will continue developing technologies to further contribute to CO<sub>2</sub> reduction with these solutions. We are also striving to develop new technologies, products, and services that help reduce CO<sub>2</sub> emissions, including MIDREX-H<sub>2</sub>™ (100% hydrogen-based direct reduction).

## Scenario Analysis

In order to better understand future climate-related risks and opportunities, we carried out medium-term (2030) and long-term (2050) scenario analysis. Our scenario analysis is based on the International Energy Agency (IEA)’s 2-degree scenario (SDS: Sustainable Development Scenario) and 1.5-degree scenario (Net Zero by 2050) as well as the 4 degree-scenario presented by the Intergovernmental Panel on Climate Change (IPCC) in its Sixth Assessment Report. For our analyses and evaluations, we also refer to long-term visions published by industry organizations to which we belong, such as the Japan Iron and Steel Federation (JISF) and the Japan Aluminium Association. For the electric power business, which is closely related to Japan’s energy policy, we conduct scenario analysis based on the energy policy of the national government. We also regularly review our analysis and evaluation of risks and opportunities based on changes in the external environment.

anticipate that our stakeholders, including national and local governments, investors, and customers, will pay greater attention to our efforts to reduce CO<sub>2</sub> emissions from our own facilities and expand our environmental menu that contributes to CO<sub>2</sub> reduction.

## Risks and Opportunities

One of the KOBELCO Group’s core businesses is the manufacture and sale of steel products, which falls under the industry category of energy-intensive basic materials. The Group’s CO<sub>2</sub> emissions in fiscal 2021 totaled 16.1 million tons (Scope 1 and Scope 2), which ranks high even in Japan’s manufacturing industry. Accordingly, we recognize that the trends of future national climate change policies, laws, and regulations, including carbon pricing, are transition risks that may have a significant impact on our business operations.

### Impact on Business

As more than 90% of our Group’s CO<sub>2</sub> emissions come from the steelmaking process, the medium- to long-term trends in the steel industry will have the greatest impact on our business. According to the “JISF Long-Term Vision for Climate Change Mitigation—A Challenge towards Zero-Carbon Steel,” there is a certain correlation between economic growth and the amount of steel stock per capita. Therefore, the demand for steel is expected to continue to increase along with the world’s economic growth and population growth.

As for physical risks, the Japan Meteorological Agency (JMA) and various research institutes have reported that, as global warming progresses, the amount of precipitation tends to rise due to the increase of water vapor in the atmosphere, and damage caused by heavy rain and typhoons tends to become more severe. The risk of production stoppages and supply chain disruptions stemming from severe typhoons and heavy rains in recent years is also becoming more and more evident. The KOBELCO Group recognizes that further intensification of typhoons, floods, and other natural disasters caused by climate change poses a risk that could have a significant impact on its operations and lead to suspension of production activities.

Steel production can be broadly divided into production with natural resources (iron ore, mainly using blast furnaces and DRI) and production with reused scrap (mainly using electric arc furnaces). According to JISF predictions, the reuse of scrap is expected to increase significantly due to the increase in the total amount of steel stock. On the other hand, demand for steel cannot be met by reused scrap alone. Accordingly, production using natural resources (iron ore) will continue to require the same level of production as at present.

In accordance with our Group’s Risk Management Regulations, we have defined “climate-related regulations” and “natural disaster preparation and recovery” as “Top Risks” that are expected to have a particularly severe impact when an event occurs, with the aim of strengthening our risk management.

Amid growing interest in the response to climate change and the disclosure of relevant information, the importance of CO<sub>2</sub> reduction efforts in the iron and steel industry is expected to continue increasing. For this reason, we

As for opportunities, demand for low-CO<sub>2</sub> products and services is increasing amid growing international interest in climate-related issues. We expect demand for products that help reduce CO<sub>2</sub> emissions, such as our automotive weight-reduction materials and the MIDREX® Process, to grow over the medium to long term.

## Metrics and Targets

### Metric A Reduction of CO<sub>2</sub> Emissions in Production Processes

#### Targets

In May 2021, the KOBELCO Group announced that it would take on the challenge of realizing carbon neutrality by 2050 and aim to increase corporate value through this transition. We have also set 2030 targets as our medium-term goals.

#### Trends in CO<sub>2</sub> Emissions

In the wake of the oil crisis, which spanned from the 1970s to the 1990s, Japan's steel industry moved to utilize energy more effectively by installing waste heat recovery systems and conserving energy while switching to continuous process flows and streamlined processes. From the 1990s, the steel industry took steps to effectively use waste materials, focused on upgrading waste heat recovery systems and increasing the efficiency of equipment. In recent years, industry players have introduced highly efficient gas turbine power plants.

The KOBELCO Group has also maintained a consistent approach in advancing various energy conservation and CO<sub>2</sub> reduction measures through proactive capital investments. For example, we installed highly efficient gas turbine power generation facilities that use gas from blast furnaces at Kakogawa Works over the period from fiscal 2009 to fiscal 2014, resulting in a substantial reduction of CO<sub>2</sub> emissions.

Compared to the previous year, the Group's CO<sub>2</sub> emissions in fiscal 2021 increased as the impact of the COVID-19 pandemic has eased, and production has recovered. As a result, the CO<sub>2</sub> reduction rate was 16% compared to fiscal 2013.

In the ironmaking process, we have completed a technical test and verified that CO<sub>2</sub> emissions in the blast furnace process can be reduced by approximately 20% by charging a large quantity of direct reduced iron (DRI) in the form of hot briquetted iron (HBI) manufactured with the MIDREX<sup>®</sup> Process into the blast furnace. Going forward, we will continue to work to achieve our 2030 targets by further developing the HBI charging technology and AI-based blast furnace operation technology to reduce CO<sub>2</sub> emissions from blast furnaces. With a view to achieving carbon neutrality in 2050, we will proceed with a double-track approach of reducing CO<sub>2</sub> emissions through utilizing existing blast furnaces and manufacturing high-grade steel in large electric arc furnaces.

#### CO<sub>2</sub> Emissions from Energy Use

In fiscal 2021, our Group's CO<sub>2</sub> emissions from energy use totaled 16.1 million tons. Of this amount, about 94% was emitted from the steel & aluminum-related business, about 3% from the advanced materials-related businesses, and about 2% from the electric power business.

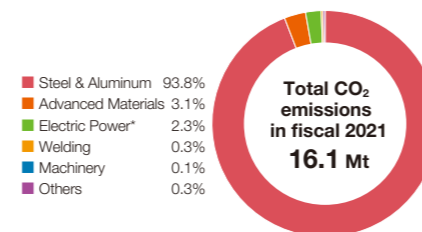
**2050 Vision**  
Taking on the challenge of realizing carbon neutrality

**2030 Target**  
Reduce CO<sub>2</sub> emissions in production processes **30–40% reduction** (compared with fiscal 2013)\*1\*2

**Fiscal 2021 Result**  
**16% reduction** (compared with fiscal 2013)\*1\*2

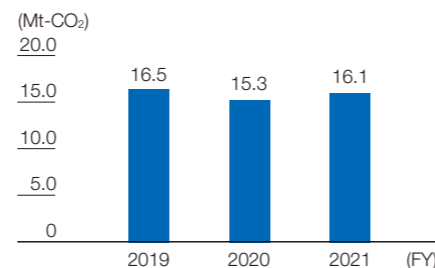
\*1. Total of Scope 1 and Scope 2  
\*2. Covered range for reduction target: Major business locations of Kobe Steel, Ltd. and Kobelco Construction Machinery Co., Ltd., together representing around 95% of CO<sub>2</sub> emissions of the entire Group (Fiscal 2021 actual results)  
Fiscal 2013 emissions in covered range: 18.2 million tons  
Fiscal 2021 emissions in covered range: 15.3 million tons

**CO<sub>2</sub> Emissions from Energy Use**  
Total of Scope 1 and Scope 2, excluding some areas\* (including domestic and overseas Group companies)



\* CO<sub>2</sub> emissions in the electric power business are calculated in accordance with the calculation method for the reporting system under the Act on Promotion of Global Warming Countermeasures. CO<sub>2</sub> emissions from the electricity sold (approximately 7.7 million tons) are not included in the above graph.

**CO<sub>2</sub> Emissions from Energy Use by Year**  
Total of Scope 1 and Scope 2, excluding some areas\* (including domestic and overseas Group companies)



\* For information on Group companies covered, see the Integrated Report for the corresponding fiscal years.

### Metric B Contribution to Reduction of CO<sub>2</sub> Emissions through Technologies, Products, and Services

#### Targets

The KOBELCO Group contributes to the reduction of CO<sub>2</sub> emissions in various areas of society through its distinctive technologies, products, and services. The KOBELCO Group has established a target for 2030 and vision for 2050 in terms of its contribution to reduction of CO<sub>2</sub> emissions.

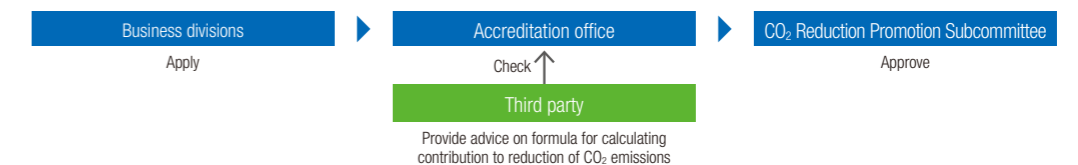
Regarding the contributions to reduction of CO<sub>2</sub> emissions through technologies, products, and services, the Group has instituted an internal accreditation system. For the formulas used in accreditations, we receive advice from Kiyotaka Tahara, the Director of the Research Laboratory for IDEA at the Research Institute of Science for Safety and Sustainability, Department of Energy and Environment,

the National Institute of Advanced Industrial Science and Technologies (AIST).

**2050 Vision**  
CO<sub>2</sub> emission reduction contribution: **100 million tons or more**

**2030 Target**  
CO<sub>2</sub> emission reduction contribution: **61 million tons or more**

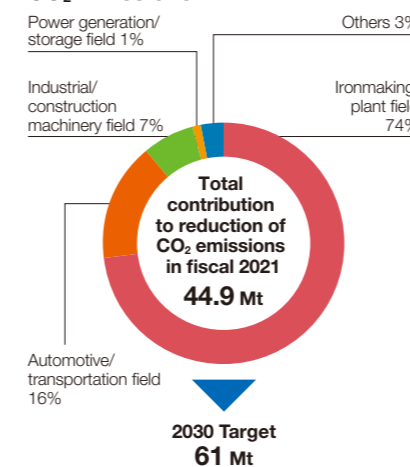
#### Accreditation Flow



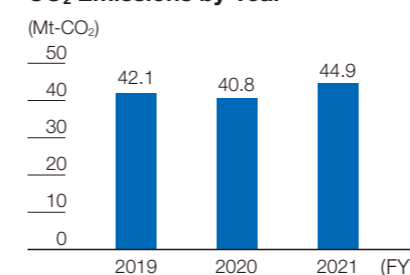
#### Contribution to Reduction of CO<sub>2</sub> Emissions

The CO<sub>2</sub> Reduction Promotion Subcommittee estimates that the KOBELCO Group's technologies, products, and services contributed to the reduction of CO<sub>2</sub> emissions totaling 44.9 million tons in fiscal 2021.

#### Total Contribution to Reduction of CO<sub>2</sub> Emissions



#### Contribution to Reduction of CO<sub>2</sub> Emissions by Year



\* Results for previous years have been revised due to a review of the calculation method.

Technologies, Products, and Services	Contribution to Reduction (10,000 tons/year)	CO <sub>2</sub> Reduction Concept	
Ironmaking plant field	MIDREX <sup>®</sup> Process	3,322	Low-CO <sub>2</sub> DRI production method
Automotive/transportation field	Ultra-high-tensile strength steel for automobiles	608	Improvements in fuel economy by using high-strength, lightweight materials to reduce weight of automobiles and transportation equipment
	Wire rods for suspension springs	18	
	Wire rods for automotive valve springs	56	
	High-tensile strength steel for ships	26	
Industrial/construction machinery field	Aluminum materials for automobiles	17	Benefit of weight reduction in reducing power consumption
	Aluminum materials for rolling stock	7	
Industrial/construction machinery field	Heat pumps, standard compressors, SteamStar, binary generators, Eco-Centri	246	Energy conservation by achieving higher efficiency and utilizing unused energy
Industrial/construction machinery field	Fuel-efficient construction machinery	41	Improvements in fuel economy by using fuel-efficient construction machinery
Power generation/storage field	Wood biomass power generation, waste-to energy (WTE)	22	Reducing fossil resource use through the use of resources that contribute to carbon neutrality
Others	Blast furnace cement Wire rods and steel bars with no need for heat treatment process	128	Energy-reduction effect in customers' manufacturing process through the use of recycled raw materials and products with no need for heat treatment process

#### Other Major Technologies, Products, and Services that Contribute to CO<sub>2</sub> Emission Reductions (The amount of contribution will be calculated in the future.)

Technologies, Products, and Services	CO <sub>2</sub> Reduction Concept
Automotive/transportation field	Fuel-cell separator materials, titanium for aircraft components
Hydrogen utilization field	High-purity Hydrogen Oxygen Generator (HHOG)
Power generation field	Conversion of sludge into fuel and its utilization at coal-fired thermal power plants (planned)

For detailed data, please refer to Response to Climate Change on pp. 14–28 of the ESG Data Book.

# DX Strategy



The KOBELCO Group is committed to creating a sustainable future together with customers to become a provider of products and solutions that help resolve social issues, including achieving carbon neutrality.

To this end, we will promote DX, increase synergies that leverage our Group's diverse businesses, and build a robust management foundation.

As the market environment continues to be uncertain due to rapid changes in society and the progress of digitalization, promoting DX initiatives is one of the important management strategies for the KOBELCO Group.

DX involves more than just revamping legacy systems and transforming IT infrastructure with the latest technologies. Our Group's vision is to have our organization, people, products, and solutions actively adapt to drastic changes in the business environment and markets.

**Koichiro Shibata**  
Executive Vice President and Representative Director  
(Chair of the DX Strategy Committee)

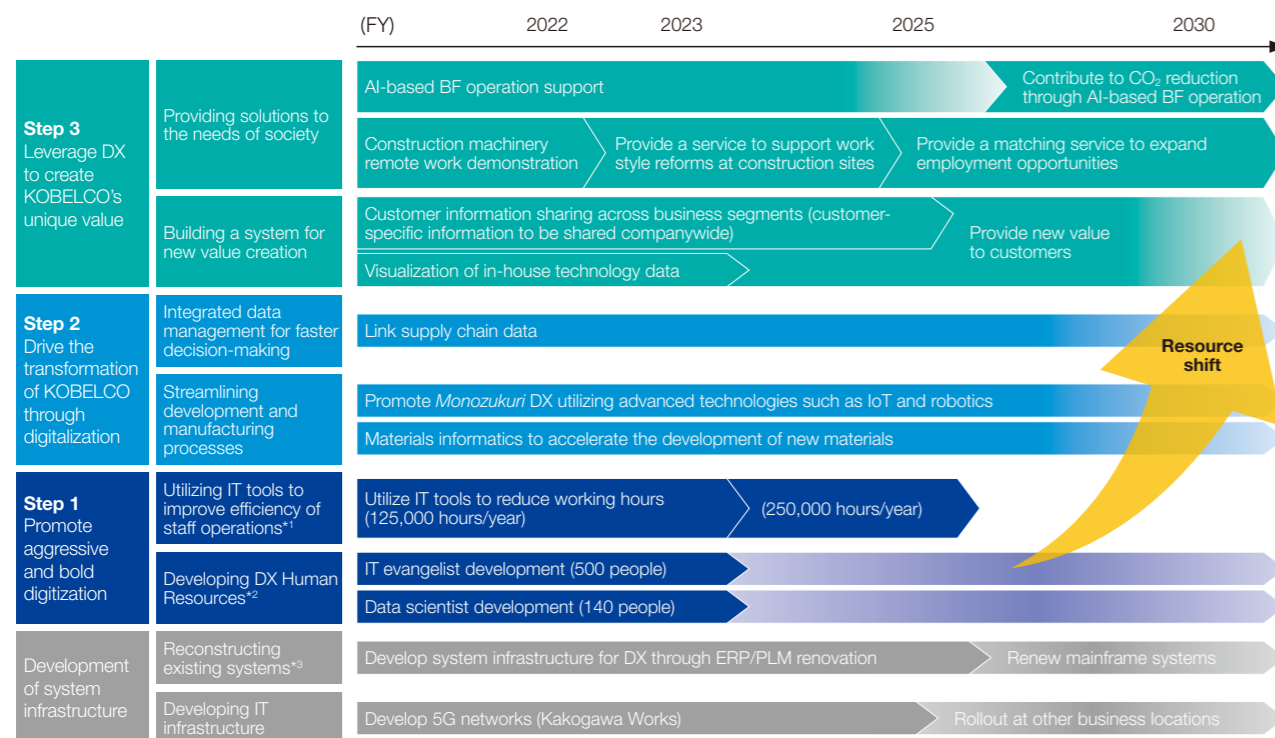
## KOBELCO Group's Basic Policy on DX Strategy

The world is changing at an unprecedented pace and the business environment is becoming uncertain amid the emergence of various new social issues, such as the rapid transition to a carbon-neutral society, changes in the industrial structure triggered by COVID-19, labor shortages due to aging populations, and rising geopolitical risks.

In this business environment, the KOBELCO Group believes it is essential to implement a DX strategy that utilizes its diverse and distinctive assets (technological assets and business assets) in order to enhance corporate value through the promotion of sustainability management. We will promote our initiatives, which are defined as Steps 1 to 3.

Utilizing the resources and assets (data) that have been

created and integrated through the implementation of Steps 1 and 2, we will move forward with Step 3 that pursues KOBELCO's uniqueness through DX. We will promote these initiatives that lead to the resolution of social issues and the creation of new value.



\*1 to \*3: Targets and the results for fiscal 2021 can be found in Materiality and Indicators/Targets on pp. 16-17.

## Examples of Major Initiatives

### Step 1 Promote aggressive and bold digitization

The KOBELCO Group is working to improve production efficiency innovatively by utilizing IT tools and raising the skill levels of its human resources. In particular, we are focusing on the development of IT evangelists in order to encourage users of IT tools (employees) who have firsthand knowledge of work procedures to take the initiative in promoting digitization and achieving operational efficiency.

To accelerate these initiatives, we are working on the development of an environment where all employees can work on DX, which includes the provision of trial licenses for IT tools, the establishment of a help desk, and activities to raise employee awareness.

### Step 2 Drive the transformation of KOBELCO through digitalization

The distribution and service industries in Japan, including logistics, are faced with significant labor shortages. Securing workers is an urgent task that must be addressed to maintain service levels. The KOBELCO Group's manufacturing sites are also facing the same challenge.

The KOBELCO Group and UD Trucks have reached a

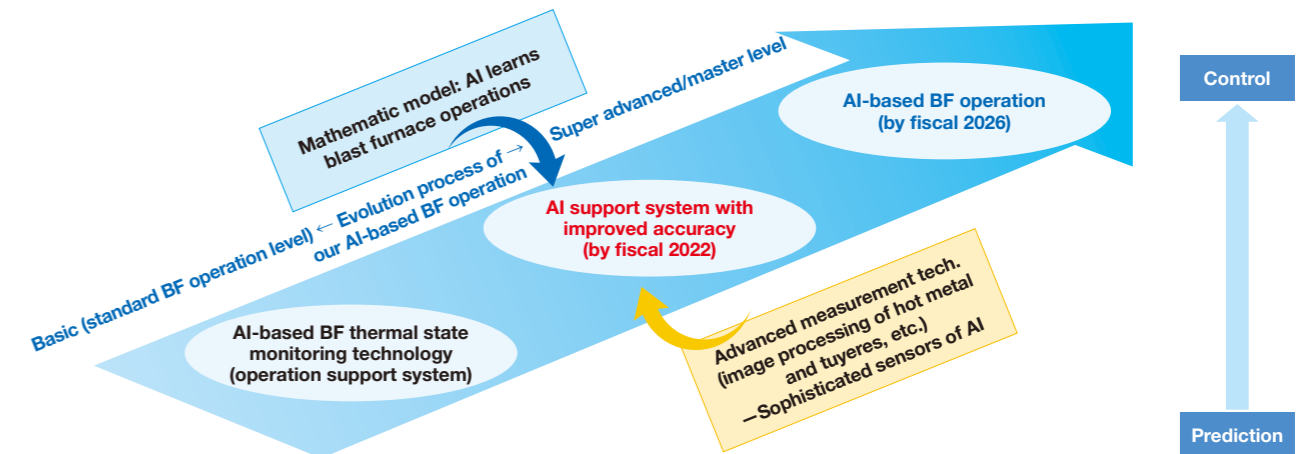
basic agreement to conduct an autonomous driving trial at Kobe Steel's Kakogawa Works, using a UD Trucks Quon equipped with L4 autonomous driving technology. Through this trial, we will promote DX at the KOBELCO Group's manufacturing sites while achieving labor savings and thereby contributing to solving social issues.

### Step 3 Leverage DX to create KOBELCO's unique value

In fiscal 2021, the KOBELCO Group established a technology that significantly reduces CO<sub>2</sub> emissions in the blast furnace process, and in fiscal 2022, we became Japan's first provider of a low-CO<sub>2</sub> blast furnace steel product, called Kobenable Steel. One of the key technologies that supported this achievement is our AI support technology for blast furnace operations utilizing AI-based blast furnace thermal state monitoring technology. We will work on further evolution of our technologies and realize AI-based blast furnace operation in which AI autonomously makes optimal judgments and controls. This will contribute to achieving our CO<sub>2</sub> emission reduction targets for 2030 and carbon neutrality by 2050.

For more details on Kobenable Steel, please refer to Taking on the Challenge of Realizing Carbon Neutrality on p. 49.

## Roadmap for Technical Development of AI-Based Blast Furnace Operation



## Companywide DX Promotion Structure

For the promotion of Companywide DX initiatives, we established the DX Strategy Committee as an auxiliary body to the Executive Council and subcommittees to address individual issues.

Executive Council	DX Strategy Committee	DX Strategy Project Group, IT Planning Department	Subcommittees		Business divisions
			Value Creation	Business Foundation	
			A. <i>Monozukuri</i> DX	Improves <i>monozukuri</i> capabilities through data utilization	Business divisions
			B. Customer Experience DX	Enhances the value of customer experience	
			C. Work Style DX	Improves productivity with digital technologies	
			X. New Business Creation	Creates new businesses that contribute to customer innovation	Technical Development Group
			D. System Reconstruction	Completely reconstruct existing complicated IT systems	
			E. Human Resources Development	Promote early and continuous development of DX human resources	Head Office divisions
			F. Infrastructure and Security	Build infrastructure and ensure security level to support DX initiatives	
			G. IT Architecture	Establish IT technology standards and processes	
					Group companies