# JFE Group's Initiatives Using DX to Address Social Issues

The JFE Group is using DX to resolve social issues in various ways by maximizing the Group's technological capabilities. The following section introduces some of the initiatives being carried out internally, including efforts to develop and secure DX human resources.



## Addressing the challenge of the "2025 Digital Cliff" Moving away from huge host computers

#### Necessity of upgrading systems at steelworks

Since the late 1960s, Japan's steel industry has been a leader in the industrial sector through the introduction of large, general-use computers (mainframes and host computers), beginning with the automation of administrative processing and expanding to the automation of factory operations, the quality enhancement of steel products, and increased efficiency in factory administration. The Internet did not exist at that time, and companies had to develop in-house many features including special structures and languages of computers and ways of linking equipment. As a result of rapid advances in computer technology, approaches like high-performance servers and, more recently, cloud computing have come to the forefront. Today, mainframe computers can be seen as a classic antiguated system.

The Ministry of Economy, Trade and Industry published its "DX Report: Overcoming '2025 Digital Cliff' Involving IT Systems and Full-fledged Development of Efforts for DX" in 2018. This report sounded an alarm, stating that roughly 80% of companies' computer systems were antiquated and that ignoring the problem would impede carrying out management and business strategies. The report said that for companies to grow, it would be imperative to review these antiquated systems, adopt the latest digital technologies, and effectively use the data they possessed.

JFE Steel was no exception to the ministry's claim. Various steelworks and their operations use one giant computer system. To avoid the 2025 Digital Cliff, we need to resolve to upgrade these systems.

#### Progress on system upgrades at steelworks

JFE Steel is upgrading its mission-critical systems at all steelworks and manufacturing centers. The Kurashiki district's shaped steel area has been replacing its proprietary mainframe computer system in stages (since May 2023) with a system built with standard specifications. The conversion for shipping areas for steel sheets, electrical steel sheets, and all other products was completed in August 2024, marking the migration of more than half of the Kurashiki district's mission-critical system (approximately 50 million steps) to an open platform environment. A large, integrated steelworks like the Kurashiki district occupies a wide area with many types of integrated equipment for tasks

#### Roughly 80% of companies' computer systems antiquated



#### Antiquated systems appear to impede DX at roughly 70% of companies



1. Feel strongly
 2. Feel somewhat
 3. Do not feel anything in pa
 4. Do not feel anything at all
 5. Other

Source: Created by JFE Steel and based on the Ministry of Economy, Trade and Industry's "DX Report: Overcoming '2025 Digital Cliff' Involving IT Systems and Full-fledged Development of Efforts for DX"



Photograph taken at the West Japan Works (Kurashiki district) during the migration in August 2024

ranging from the receipt and storage of raw materials to manufacturing processes like ironmaking, steel manufacturing, and rolling, to the shipment of final products. Because some systems needed to be temporarily stopped for the migration to an open platform environment, the migration to the new environment had to be carried out within a limited time so that the manufacturing processes would not be halted for an extended period. The entire steelworks and all project members, including staff from JFE Systems, successfully migrated roughly 20 million steps during a planned plant idling of only 18 hours. The upgrade for the entire Kurashiki district continues, with the aim of completion by the end of fiscal 2024. Migrations have been finished at the Sendai Works and Chita Works, and are being carried out in parallel at other districts. We plan to complete the migration of the roughly 200 million steps for the mission-critical systems at all steelworks and manufacturing centers during fiscal 2025.

We are striving to further enhance corporate value by proactively utilizing our wealth of data assets by applying the latest data science and AI, aiming for innovative productivity increases and stable operations. We also intend to support many other companies dealing with the 2025 Digital Cliff national crisis by providing expertise to help resolve this social issue.



I have been working at steelworks for many years. I am embarrassed to say that before I started this job, I did not know that every steelworks operated with huge computer systems bigger than those at major banks and that the computers themselves were already outdated.

At the same time, we have spent many years feeding various types of manufacturing expertise into computers, including data for product quality improvement, automation in various areas, and improved efficiency. The expertise we have amassed is very important and needs to be passed on. We must also avoid having antiquated systems become an obstacle to innovation. These upgrades need to be successfully completed to pass on this globally advanced technology and make further progress.



Keiichiro Nishi Managing Executive Officer General Manager, Business Process Innovation Team

Many companies and organizations have begun consulting with us. We hope to share the experience of our success so that society as a whole can avoid the 2025 Digital Cliff.



# Responding to decrease in working-age population and reducing environmental impact

#### "BRA-ING®" AI system for automated operations of waste-to-energy plants

With the contraction of the working-age population due to the aging of society, the industrial plant sector is facing a serious shortage of plant operators. JFE Engineering is continuously developing technologies to fully automate waste-to-energy plants. As part of this development, along with the increased sophistication of the existing automatic combustion control (ACC) function, we have developed and are introducing the BRA-ING<sup>®</sup> automated operation AI system for incinerators. The stable combustion achieved with automated operation raises the energy recovery rate, reducing the wasting of resources while alleviating the environmental impact by cutting  $CO_2$  and other exhaust gas emissions. This technology has been introduced at 13 waste-to-energy plants across Japan over the five years since 2020.

The introduction of digital technologies at infrastructure facilities will continue to contribute to resolving social issues including the decrease in the working-age population and environmental considerations.





JFE Steel provides educational curricula to encourage all employees to take ownership of DX and actively participate. The DX Literacy Course raises the level of DX literacy among all employees, and training for management including officers aims to cultivate an organizational atmosphere that facilitates the pursuit of new challenges.

By the end of fiscal 2024, we plan to have developed more than 600 people in the data scientist category and more than 600 people in the digital designer category as core DX human resources.





Number of citizen developers Citizen development: Application development by operational division



#### DX achievements presentation

In addition to developing human resources, we hold a companywide DX achievements presentation to foster a culture in which all employees at all divisions pursue challenges. Replacing the presentation of data science dissertations that had taken place since 2019, this event was held for the 10th time in December 2024 with the scope of submissions expanded to employees in operational divisions at the head office and steelworks. The main location, the head office, was connected remotely to various steelworks and manufacturing centers via Teams, an internal network, and more than 700 people including the president and officers participated.

Ten presentations were made from manufacturing process areas and operational process areas, with an award given to the presentation recognized as particularly excellent from various considerations including logic, innovation, and potential.





JFE Engineering has designated the development and adoption of human resources and reformation of the organizational culture to create a foundation for DX promotion as important issues and is working to create an environment in which all employees proactively engage in DX. Specifically, we are implementing various measures based on three themes: "cultivating a mindset," "developing human resources," and "disseminating and sharing information." The company also provides opportunities for employees to progress on their own initiative in a broad range of areas in addition to DX, including support for obtaining accreditations, e-learning, and various training courses.

	Objectives	Main measures
Cultivating a mindset	<ul> <li>Understand the necessity of DX and take ownership of it</li> <li>Create motivation to implement reform on one's own</li> </ul>	<ul> <li>Internal event "DX Day!!"</li> <li>CEO award</li> </ul>
Developing human resources	Raise DX literacy among all employees	<ul> <li>DX literacy training</li> <li>Level-specific DX training</li> </ul>
	Develop specialized skills and know-how for DX promotion	<ul> <li>Data scientist training</li> <li>Al/IoT Specialist Technology Group</li> </ul>
Disseminating and sharing information	<ul> <li>Share information across divisions</li> <li>Promote DX initiatives to students and potential employees</li> </ul>	<ul> <li>DX Information Portal (internal)</li> <li>DX special website (external)</li> </ul>

#### Internal event "DX Day!!"

"DX Day!!" is held once a year to cultivate a mindset for companywide DX promotion and to raise the level of digital knowledge. The fiscal 2024 event was held over two days with roughly 3,000 participants including the CEO and executives. The event included the sharing of DX initiatives being carried out by internal divisions, hands-on digital technology and solutions experiences, presentations by experts, and seminars on using digital tools. Through these kinds of activities, we aim to have every employee feel a sense of ownership for DX and to cultivate an organizational culture in which employees will proactively address issues.

#### Data scientist training

Providing practical training, Pla'cello®—data analytics platform developed to effectively utilize data collected from plants—currently has more than 2,200 employee users.

We have also developed an internal data scientist training program with a curriculum comprising 17 classes over 120 hours to allow employees to acquire specialist data science knowledge. We aim to have a total of 210 employees take the course by the end of fiscal 2024.



### Total number of employees who took the data scientist training program



#### Generative AI

#### Promoting the use of generative AI in the JFE Group

The JFE Group is sharing examples of operational applications and technologies related to generative AI to promote its effective use.

Please refer to the following pages regarding initiatives being carried out at operating companies.

Page 10, Steel Business; Page 12, Engineering Business; Page 15, Trading Business

Group Using generative Al Al to Passing on knowledge and expertise SS; Using generative Al JFE Holdings JFE Shoji Sharing examples and technologies SS; Using generative Al Froduction and supply chain optimization Froduction and optimization Sharing examples and technologies