

Engineering Business (JFE Engineering Corporation)

Maximizing use of DX to realize a green society with the mission of supporting the foundation of life

Just For the Earth

For JFE Engineering, digital transformation (DX) is an important growth engine to promote an evolution of its business domain related to “creation (EPC: engineering, procurement, and construction),” “responsibility (O&M: operation and maintenance),” and “connection” to the future as the foundation of life.

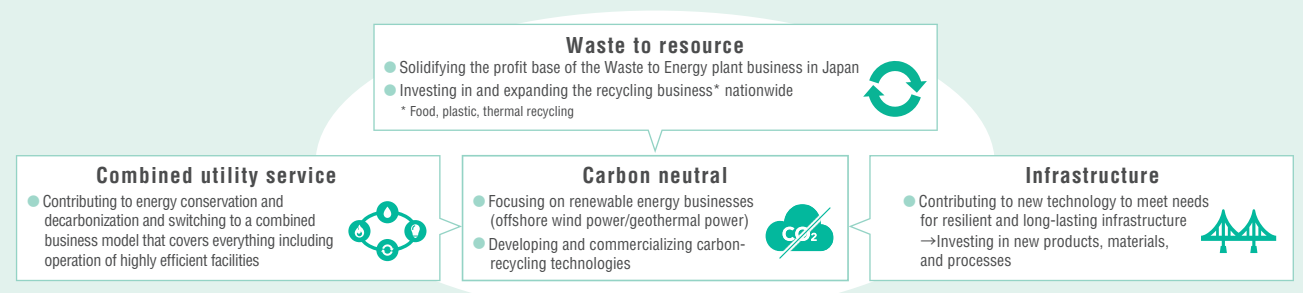
By proactively introducing digital technologies, we are raising business productivity and transforming the engineering business model using data collected through infrastructure construction and operations for a higher level of decision-making. At the same time, we are pursuing the realization of a green society (GX) as a leading company in the engineering industry for the sustainable enhancement of corporate value (SX).



Tateki Koyama
Managing Executive Officer

DX Strategy and Policy

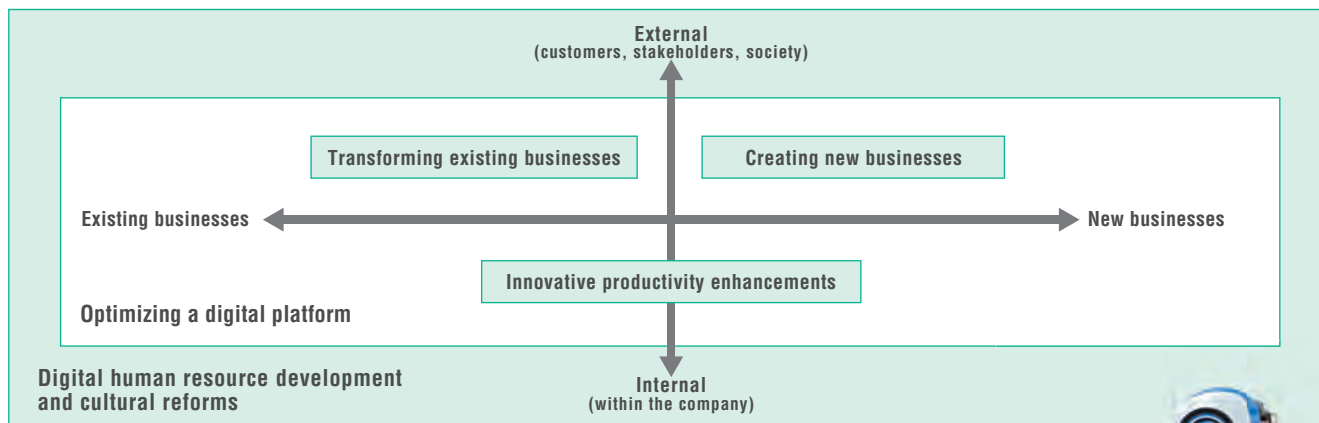
The Seventh Medium-term Business Plan designates four priority areas: Waste to resource; Combined utility service; Infrastructure; and Carbon neutral, and a policy for business expansion. We believe that digital transformation is essential for the achievement of this policy, and have positioned DX as an important initiative to support all business areas.



DX Accelerating achievement of SDGs with DX

To accelerate these initiatives, we established a DX Headquarters in fiscal 2022. The DX Headquarters comprises IT engineers who build and maintain the internal IT environment and provide cloud platforms, data scientists who analyze data, control system engineers who implement a data-collecting function and a new function using AI in our products at plants, and DX promoters who work together with business divisions to resolve various issues internally and for our customers, to work for the “transformation of existing businesses,” “creation of new businesses,” and “innovative productivity enhancements.”

“Digital human resource development and cultural reforms” and “optimizing a digital platform” to allow everyone to use digital tools and data are very important for efficient DX promotion. The following pages introduce specific initiatives and examples in each area.



For more information on JFE Engineering’s DX initiatives, please visit the following:
<https://www.jfe-eng.co.jp/dx/en/index.html>



Initiative | 01 Digital human resource development and cultural reforms

In addition to implementing digital projects, we consider “digital human resource development” to enable employees to personally acquire technologies and expertise to promote DX and “cultural reforms” to create a corporate culture in which employees take ownership of DX and pursue challenges important for realizing DX. We are implementing various programs in these areas.

Please refer to page 6 for more information on digital human resource development.

	Objectives	Programs
Cultural reforms	<ul style="list-style-type: none"> Take ownership of DX Cultivate a DX mindset Share information across divisions 	<ul style="list-style-type: none"> Internal DX event “DX Day!!” DX award (annually) DX Information Portal
Human resource development	<ul style="list-style-type: none"> Raise level of DX-related knowledge Raise level of general ICT capabilities 	<ul style="list-style-type: none"> DX literacy training Data scientist training Specialist technology group (AI/IoT Technical Group)

Internal DX event “DX Day!!”

“DX Day!!” is held once a year to promote DX companywide by cultivating a DX mindset in employees, sharing information across divisions, and raising the level of digital knowledge. The fiscal 2023 event took place over two days with roughly 2,000 participants in a program that included shared cases of DX initiatives by internal divisions, hands-on digital technology and solutions experiences, presentations by experts, and an ideathon. The event was intended to spark interest in DX among employees and increase motivation to work toward its promotion, while providing an opportunity for active communication across divisions.



DX Information Portal

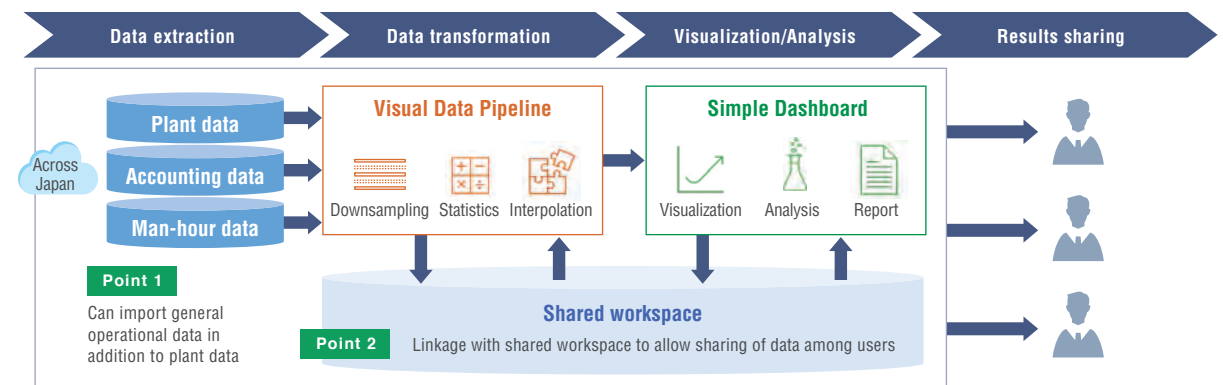
One project JFE Engineering is accelerating is the companywide launch in fiscal 2022 of the DX Information Portal as a portal site for collecting internal DX information. This portal site makes it possible to share cases of internal DX initiatives, disseminate DX-related information, and hold DX-related consultations and make inquiries.



Initiative | 02 Optimizing a digital platform

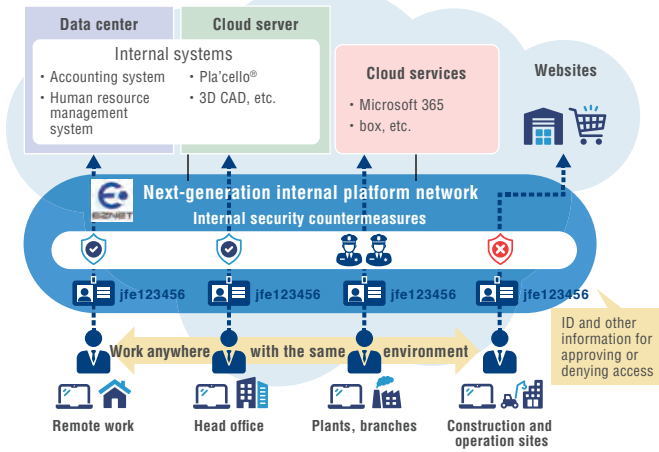
Pla’cello® Data Analytics Platform

Released in November 2018, Pla’cello® is a data analytics platform that enables employees without advanced knowledge of informatics or statistics to use data. The platform was developed in-house to respond flexibly to users’ requests and has already been used by more than 2,000 employees. Besides reducing the time required to compile a plant’s operational status report from roughly one day to 10 minutes, the platform has a wide range of applications including anomaly detection in a plant and visualization/analysis of plant data for stable operations. In fiscal 2023, the platform was extended to include accounting and other data. Going forward, we will promote the use of data in various other business tasks.



■ Zero trust security initiatives

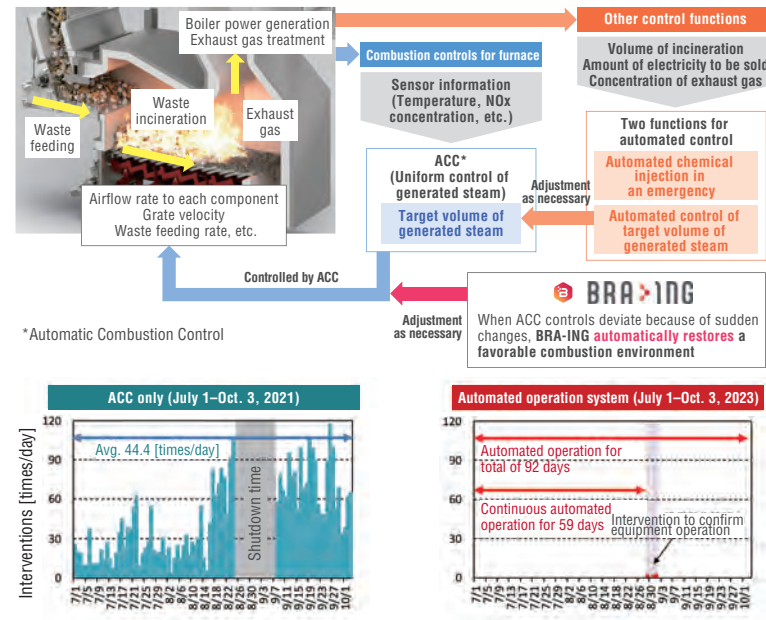
In response to increasingly diversified work styles and work environments including remote work and globalization, JFE Engineering is striving to create an information and communications technology (ICT) infrastructure that allows employees to work securely anytime and anywhere. As part of this effort, in fiscal 2023, we became the first JFE Group company to begin migrating to a “zero trust” internal ICT infrastructure platform. Zero trust is a security approach that assumes no access from within or outside the network is necessarily safe. This change has increased security and also enhanced employee convenience. We plan to complete the introduction at all major domestic locations during fiscal 2024 and to roll it out across the Group and overseas going forward.



Initiative | 03 Transformation of existing businesses

■ Efforts to fully automate waste-to-energy plants

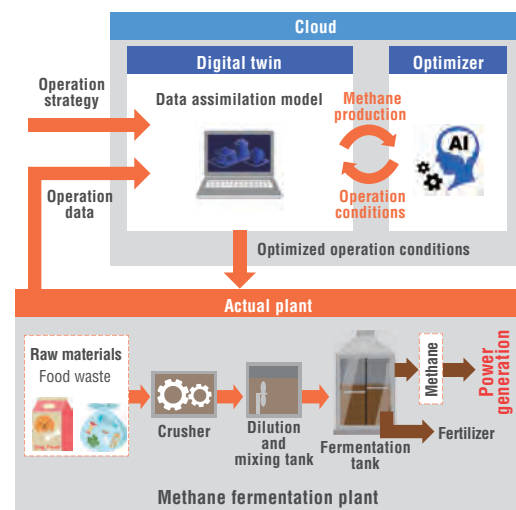
Plant work sites are facing shortages of human resources due to the aging of operators and a contraction of the working-age population, making it difficult to rely on human labor as in the past. To address this, JFE Engineering is continuously pursuing cutting-edge development and initiatives to automate all plant operations. Automated operations at waste-to-energy plants are one such initiative. Along with enhancing the existing automatic combustion control (ACC) function, we have developed and are introducing the BRA-ING automated operation AI system for incinerators. We are also developing fully automated operating systems that expand the scope of automation to include manual intervention work by operators other than the incinerator. In verification testing conducted during fiscal 2023, fully automated operations were achieved for 92 days over 95 days of testing, with continuous fully automated operations for 59 days. We are improving these technologies with the aim of unmanned plant operations.



■ Digital twin (data synchronization) for optimal operations

Methane fermentation plants, which use methane gas generated by the fermentation of food waste and other substances for power generation, are easily subject to changes in the fermentation state depending on the composition of the raw materials used. Thus, maintaining a stable amount of generated methane is difficult. JFE Engineering has developed data synchronization technology that synchronizes a theoretical model showing the chemical processes of methane fermentation with plant operation data to make adjustments as necessary to predict the methane biomass emission with a high degree of accuracy. Utilizing this technology, we have built a digital twin able to grasp plant operations in stages from the introduction of raw materials to the generation of electricity. This digital twin contains algorithms that depict raw material introduction plans and operating conditions that achieve optimal power generation output while performing the required treatment of waste material, contributing to stable and efficient plant operations.

J Bio Food Recycle, the Group company that operates methane fermentation plants, is also working to convert the portion that remains after methane fermentation to fertilizer. In recognition of this concept of a double recycling loop that supplies “electricity” and “agricultural products made using fertilizer” to businesses that create food waste, the company received the Minister of Agriculture, Forestry and Fisheries Award at the sixth EcoPro Awards in 2023.

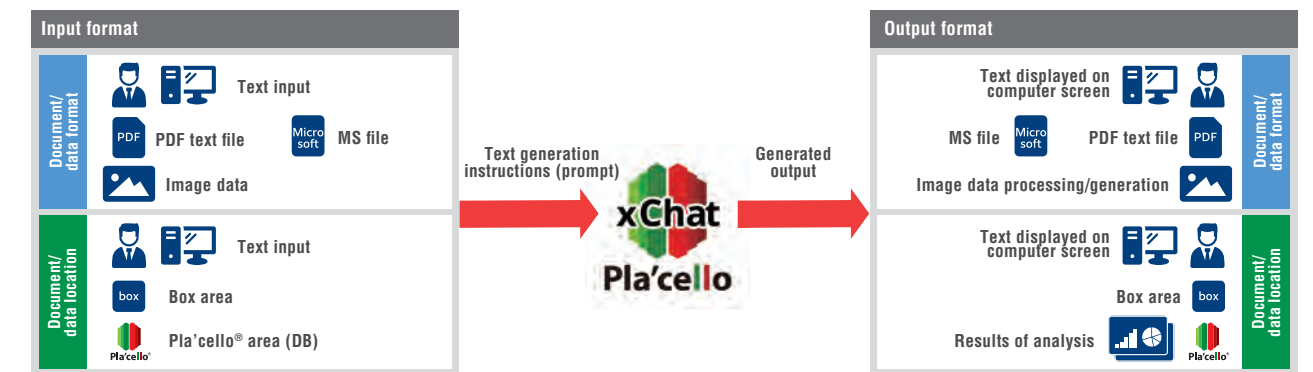


Initiative | 04 Innovative improvements in productivity

Due to a labor shortage caused by the contraction of the working-age population and aging population, the use of digital technologies to improve productivity is becoming an important management issue. JFE Engineering is using DX, including Robotics Process Automation (RPA), artificial intelligence (AI), and the Internet of Things (IoT), to improve productivity and is currently engaged in more than 100 DX projects. We began the initiative to utilize generative AI in fiscal 2023, are creating an internal environment for its use, and are considering its application to design operations.

■ Pla'cello xChat text generative AI service for internal use

JFE Engineering internally released a text generative AI service called Pla'cello xChat in September 2023. The service, which employs proprietary security measures and user guidelines for generative AI, has been prepared to provide a secure user environment with a minimal risk of information leakage. It currently has more than 1,000 users. An internal working group has also been established to consider how to use the service in operations, information is being spread via the internal portal site, and study groups have been organized to promote its use and create examples. We will promote further use of Pla'cello xChat and work to develop a system that utilizes internal data to perform tasks like documents search and make design operations more efficient.



Initiative | 05 Creation of new businesses

■ Achievement of energy-efficient operations with RODAS® new combustion control system

JFE Engineering's RODAS® DX service package is a solution for issues at boiler power plants. The system manages and analyzes huge amounts of plant operation data to contribute to optimal, stable power plant operations. In verification testing at a 20MW-class biomass power plant, the “new combustion control system,” an AI-driven solution, achieved highly efficient operations and reduced energy consumption in the plant (a 4% reduction in electricity used to power things like combustion exhaust fans). Initiatives including preventive plant maintenance and improved operating rates through remote support by the company's engineers have also received recognition, with the system winning the Minister of Economy, Trade and Industry Grand Prize, the highest award under the Energy Conservation Business Models category of the Energy Conservation Grand Prize 2022. We will promote the introduction of RODAS® to contribute to the optimal operations of biomass power plants and the increased use of renewable energy.

