Connective Industries

Industrial Products & Services

May 28, 2026

Manufacturing & Industry

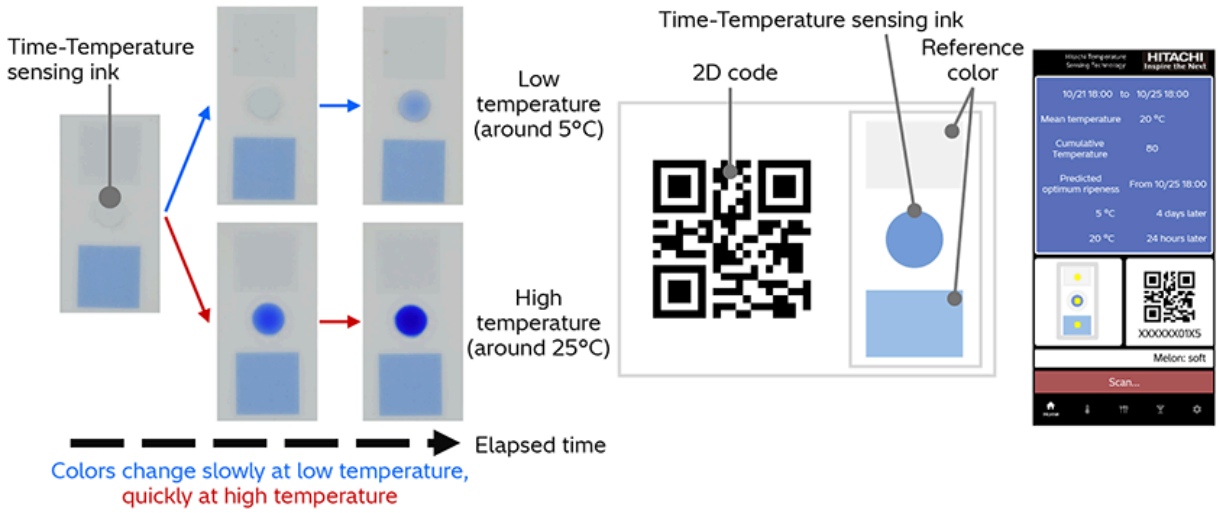
1. Quality Indicator Solution Using Time-Temperature Sensing Ink

Hitachi Industrial Equipment Systems Co., Ltd. has made its time-temperature sensing ink and a quality visualization solution that uses the ink available for purchase in sample quantities in anticipation of an upcoming full commercial launch. By using the ink to print labels that can be affixed to foods or other goods, these new products provide a way to measure temperature in the supply chain that is less expensive than the temperature loggers and other instruments used in the past, is easy to attach and check without the need for a power supply, and does not need to be recovered afterwards.

While the quality of goods such as foods and pharmaceuticals changes under the prolonged influence of temperature and time, there has been no easy way to visually check that history. With the time-temperature sensing ink, however, the color changes at a rate that is slower at low temperatures and faster at high temperatures, with the amount of change being dependent on cumulative temperature. By scanning the color of the ink using a purpose-designed mobile app, it is possible to calculate cumulative temperature over the period since a food product carrying one of these labels was shipped (for example, the value for an item that has spent four days at an average of

20°C will be 80) and to assess its condition or ripeness. As the solution can be used to provide an indication of quality criteria such as when fruit or vegetables are ready to eat, it has the potential to improve product value and reduce wastage.

(Hitachi Industrial Equipment Systems Co., Ltd.)



[1] Color Changes in Time-Temperature Sensing Ink and Quality Visualization Solution

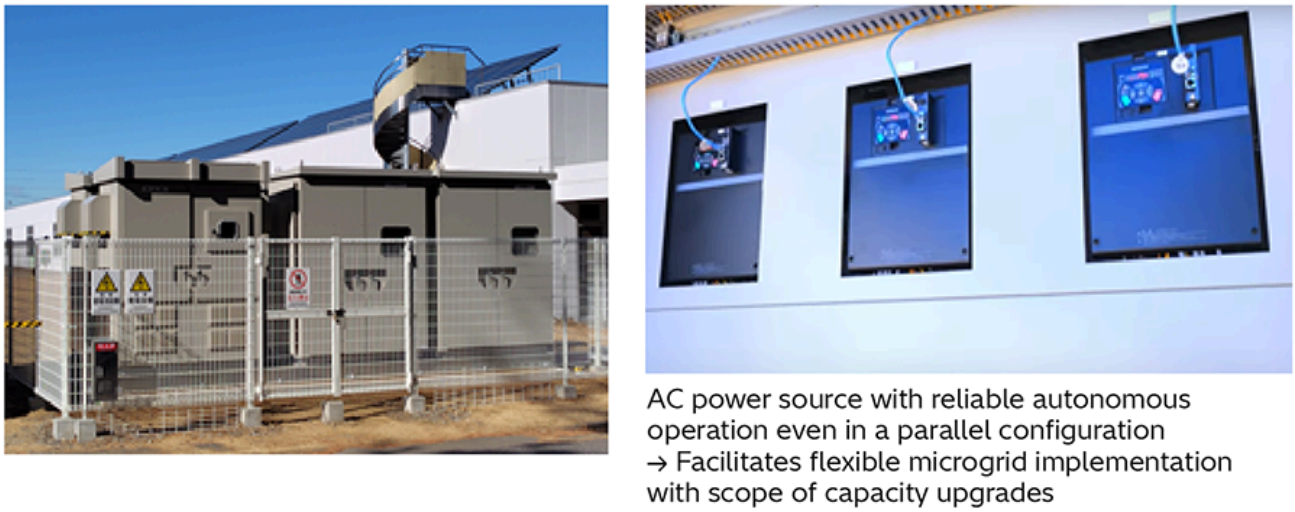
2. Use of Grid-forming Inverters in Factory-scale Microgrids

Microgrids that can operate islanded from the commercial grid are being investigated as a means of addressing blackout risk during a natural disaster or other incident and as a means of keeping remotely located equipment in operation. When installed at a site such as a factory, the presence of a microgrid enhances the carbon neutrality benefits of using renewable energy and supplies electric power in tandem with an energy storage system.

Hitachi Industrial Equipment Systems has incorporated a new grid-forming control capability into power conditioning systems (PCSs) of high- and low-voltage, developing this technology for use in forming alternating current (AC) microgrids. The new PCS autonomous control can make it easy to operate multiple AC sources in parallel and supply the required level of power quality at 50 Hz or 60 Hz. This provides flexibility in microgrid implementation, allowing additional PCSs to be added as needed to cope with changes in demand and generation. The company is also proposing to combine this with a mix of products that support the supply of direct current (DC) power, having started

with the operation of a combined AC-DC microgrid at its Narashino Works with a capacity of about 50 kW in a three-way parallel configuration.

(Operation launched in April 2025)
(Hitachi Industrial Equipment Systems Co., Ltd.)



[2] Equipment Used in the Narashino Works Microgrid (left) and Grid-forming Inverters in a Three-way Parallel Configuration (right)

3. New Service for Obtaining Credits for CO_2 Emission Reductions Achieved by Air Compressor Upgrades

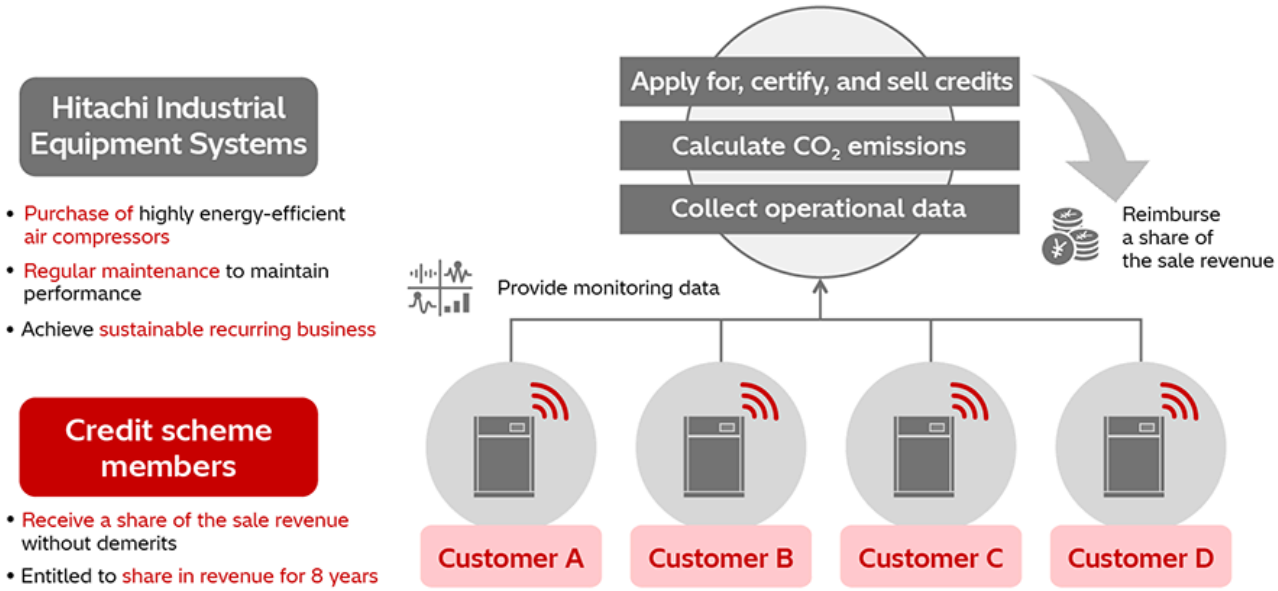
Given the need to adapt to a shrinking workforce and make the transition to a decarbonized society, the manufacturing industry is going through a transformation in which, in addition to selling products, it is also taking on more recurring business that makes use of data and artificial intelligence (AI).

Hitachi Industrial Equipment Systems has launched a new service that obtains credits for CO_2 emission reductions achieved by upgrading to new highly efficient air compressors and returns a share of the revenue back to customers. The J-Credit Scheme used by the service calculates emission reductions using the “baseline and credit” method. This works by comparing the energy requirements of the upgraded compressors with what they would be using in the old equipment and allocates credits in accordance with the size of the improvement. As Internet-of-Things (IoT) capabilities are a standard feature on the air compressors and they are supported by an equipment monitoring service

supplied by Hitachi Industrial Equipment Systems, obtaining information on CO_2 emission reductions is easy.

New value is being delivered by the manufacture and sale of highly efficient products with low CO_2 emissions and use of the collected operational data. Through this service, Hitachi Industrial Equipment Systems is working with customers to help create a sustainable society by providing post-sales maintenance and digital support to maintain the performance of products during operation.

(Hitachi Industrial Equipment Systems Co., Ltd.)



[3] Recurring Business Using J-Credit Scheme

4. CTU Series Unit-type Instrument Current Transformers

The CTU series of unit-type instrument current transformers (CTs) are housed in plastic cases and used for measuring AC current on low-voltage circuits. They can be connected directly to the load side of Hitachi molded-case circuit breakers and earth leakage circuit breakers. As the CT secondaries have a general-purpose 5A output, they are suitable for use with most electronic meters and other measurement devices, including electric power monitoring system units from Hitachi.

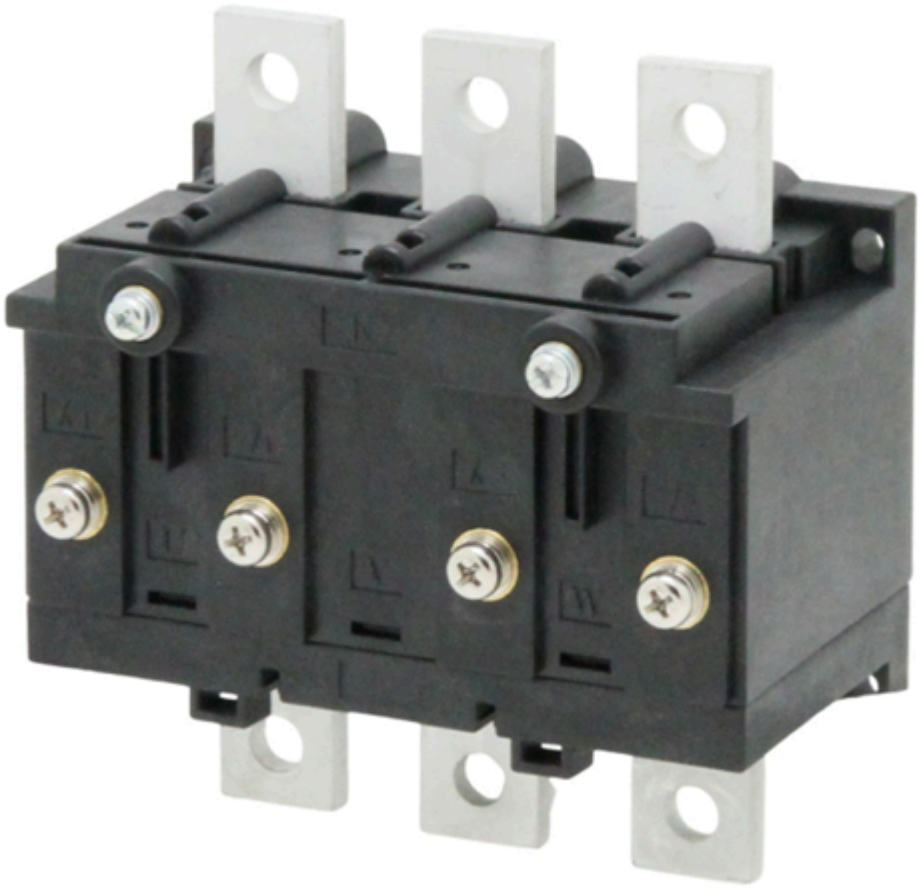
As conventional feed-through CTs occupy a large amount of space and require wires to be bent during installation, they impose both constraints on the design of distribution

panels and additional workloads at manufacturing facilities.

Because the CTU series is designed to allow direct secondary-side breaker connections, they take up less space than feed-through CTs, allowing distribution panels to be more compact and conferring greater design flexibility. By eliminating the need to bend wires and feed them through the CT, they also help reduce workloads and shorten the time required for installation.

The CTU series will be launched progressively, starting with the CTU-250 for connection to 250-Ampere-frame (AF) circuit breakers. The final product range will have four models for 100-AF, 250-AF, 400-AF, and 800-AF breakers respectively.

(Hitachi Industrial Equipment Systems Co., Ltd.)



[4] CTU-250 Series Unit-type Instrument Current Transformer

5. Hitachi Energy Recovery System for Microhydro with as Little as 3-m Effective Head

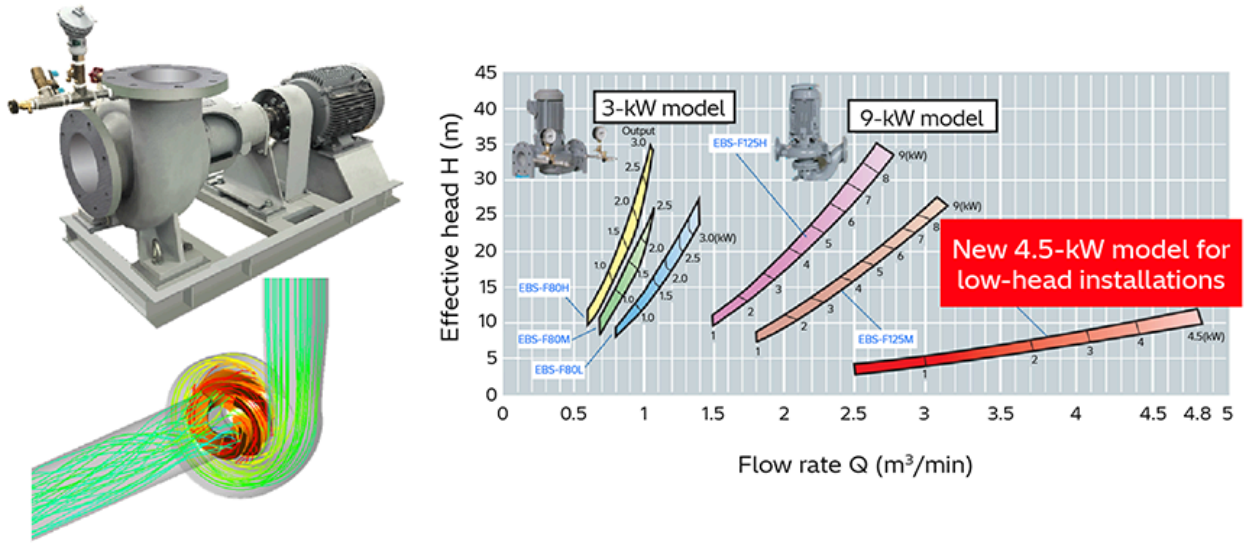
Energy recovery systems generate electricity using the residual energy from the chilled water cycle of buildings or industrial water. To expand their scope of application, Hitachi

has developed and commercialized a system that is able to work with a low hydraulic head.

This new model was developed in response to market demand for generating electricity from water with a lower hydraulic head (pressure). It features a series-first diagonal-flow water turbine that enables generation with only one-third the head of previous models, meaning it can work with effective heads as little 3 m. It is also able to maintain high generation efficiency over a wide operating range, using computational fluid dynamics to identify the operating conditions that maximize generation efficiency and a turbine controller for variable-speed operation that responds to changes in flow rate. This was also used to select an appropriate generator.

In this way, the system contributes to decarbonization and reducing the load on the environment by generating electricity under conditions where the hydraulic head would be too small for previous systems to function. Future plans include further new product development aimed at increasing the generation capacity of systems with heads of 10 meters or less.

(Hitachi Industrial Equipment Systems Co., Ltd.)



[5] Images Showing Energy Recovery System for Low-head Installations and Selection Chart

6. New G Series Oil-free Scroll Compressors

The high temperatures of recent years are driving demand for compressors that can cope with the heat. Improving energy efficiency is also important for preventing global

warming. Other features in strong demand include a compact design to provide greater flexibility over where the compressors are installed and IoT capabilities to reduce workloads.

Hitachi has launched its G series (1.5 kW, 2.2 kW, and 3.7 kW) oil-free scroll compressors to meet these needs. A key feature of the series is its tolerance for heat. Improvements to the housing design and how the new compressor is mounted mean it can operate at an ambient temperature of 45°C, 5°C higher than the previous model. It also features a new heat safety control mode that allows operation up to 50°C. To improve energy efficiency, the new ECO control mode and low-pressure-shift control mode have reduced power consumption. To save space, the air intakes are all located on the left side of the compressor body so that it can be positioned close to walls on the other two sides (the right side and rear). For IoT integration, external Modbus* communication is also provided as a standard feature and operational information can be forwarded to cloud servers via a smart device app and accessed remotely. This further enhances the convenience of remote monitoring and operation.

(Hitachi Industrial Equipment Systems Co., Ltd.)

* See the list of “Trademarks.”

[6] G series Oil-free Scroll Compressor Package (left) and Cutaway Image of New Compressor Unit (right)

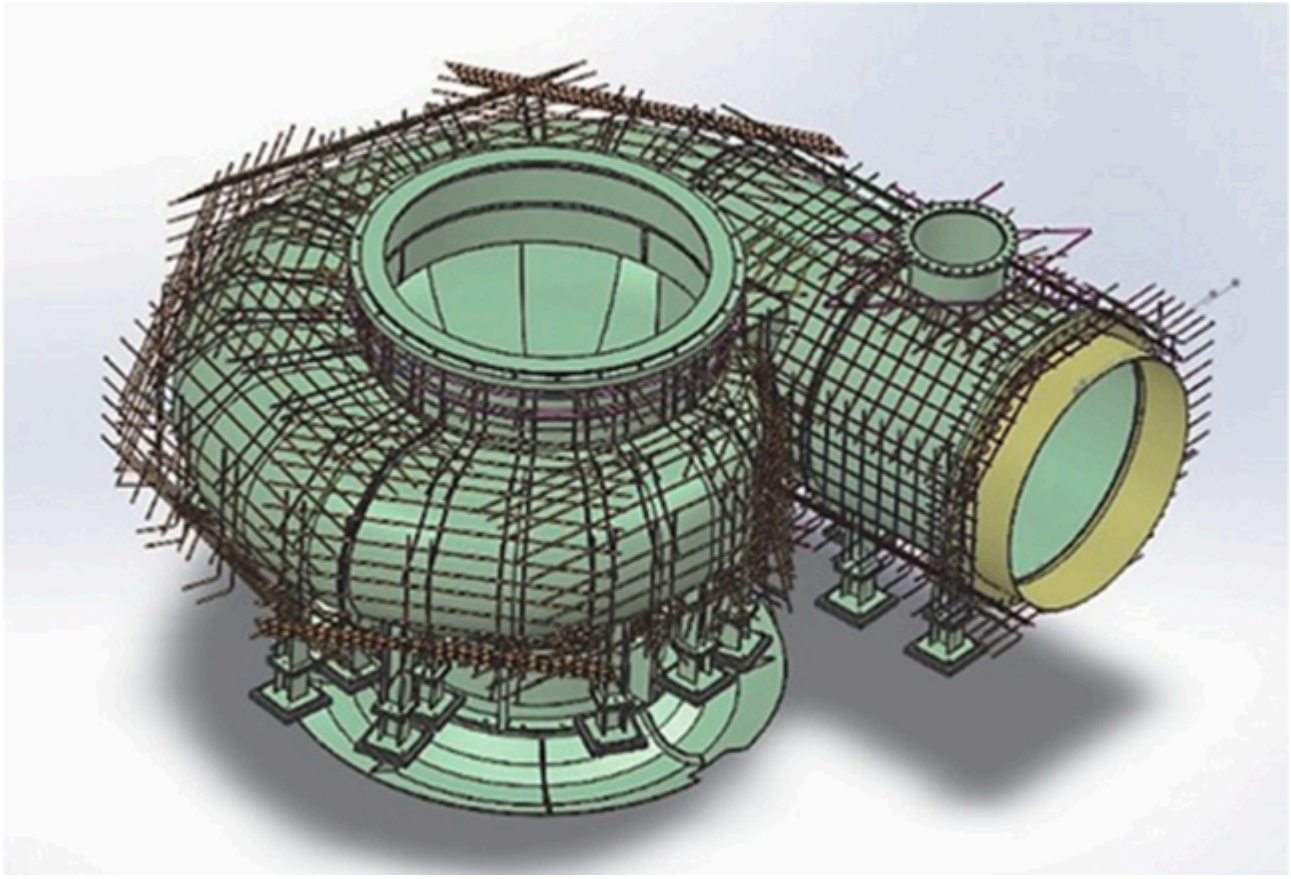
7. Completion of Drainage Pump with Steel Plate Concrete Casings for Kogasaka Drainage Pumping Station of Kyushu Regional Development Bureau

Hitachi has supplied a single high-capacity drainage pump for the Kogasaka Drainage Pumping Station of Kyushu Regional Development Bureau. The pump has a capacity of 15 m^3/s and a discharge pipe diameter of 2,400 mm. The drainage pumping station is located on the left bank of the Chikugo River and was installed for flood protection along the Kanamaru River, a tributary of the Chikugo, in Kurume City, Fukuoka Prefecture. The location has suffered from flooding due to the frequent overflows that have occurred in recent years. Following joint investigation by the relevant national, prefectural, and city authorities into comprehensive measures for addressing this problem on both hardware and software fronts, the installation of the additional pump was adopted as a hardware measure.

Because the large size of the pump made site delivery of component parts difficult, the design involved steel plate casings (used to direct the flow of water) that were assembled locally and then installed by embedding in concrete. This ensured that the structure was strong enough to handle the loads that occur during pumping. This installation work was completed in March 2024 and operation commenced a month later in April.

In the future, Hitachi Industrial Products, Ltd. intends to boost national resilience through the supply of pumps and flood control systems, especially drainage pumps for reducing the damage done by river flooding.

(Hitachi Industrial Products, Ltd.)



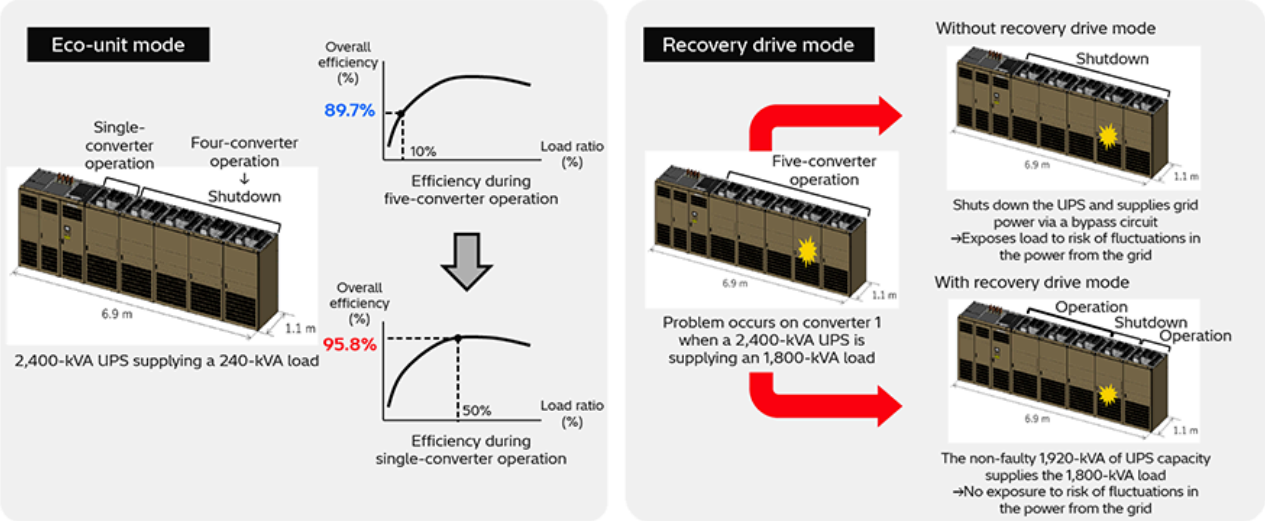
[7] Three-dimensional (3D) Model of Reinforcing Bar in Steel Plate Casing

8. UNIPARA 1,000- to 2,400-kVA UPS with New Failsoft Capability

There has been considerable growth in the scale of data centers over recent years driven by the spread of digital technologies such as artificial intelligence (AI) and the Internet of Things (IoT) and an expansion in the use of cloud services across numerous industries. While this has led to uninterruptible power systems (UPS) with larger capacities, challenges remain in the form of poor conversion efficiency under the low-load conditions at the time of system startup and that larger system size means that more UPS power supply capacity is lost when a system has a problem.

In response, Hitachi has developed two new modes for its UNIPARA UPS that target large data centers. Eco-unit mode improves UPS efficiency at low load and recovery drive mode isolates converters that have a problem and performs an automatic restart. This provides highly efficient operation from the startup phase of data center operations and automatically restores the supply of power via the UPS during the recovery delay after a problem provided that sufficient capacity remains to supply the load.

(Hitachi Industrial Products, Ltd.)



[8] Eco-unit Mode (left) and Recovery Drive Mode (right) on UNIPARA HIVERTER-UP2001i Series

9. A Compact Fanless Industrial Computer with High Robustness

The HF-W200E industrial computer is a high-reliability model designed for dependable operation in harsh industrial environments. By adopting a fanless design and solid-state drives (SSDs) to eliminate moving parts, the computer achieves high resistance to vibration and impact and is able to withstand shocks of up to 980 m/s^2. It can operate in

ambient temperatures of 0 to 60°C when running on a 24-V direct current (DC) power supply, and its compact A5-size housing helps to make efficient use of space.

The security features of the computer comply with CIS Benchmarks*, *1 through measures designed to ensure control system reliability, including minimizing exposure to attacks by disabling unneeded services and ports, enhancing authentication and access control, and standardizing the use of encrypted communications.

The computer has also been certified under a range of international safety and conformity standards, including Underwriters Laboratories (UL), Canadian Standards Association (CSA), Conformité Européenne (CE), United Kingdom Conformity Assessed (UKCA), Korea Certification (KC), China Compulsory Certification (CCC), and the Bureau of Standards, Metrology and Inspection (BSMI). By reducing the compliance workload when exporting, it enables rapid deployment at overseas sites. This provides greater reassurance for customers and delivers the security and reliability demanded by global markets.

Future plans include the development of IoT-enabled models incorporating a software-based programmable logic controller (PLC), enabling system configurations that can flexibly respond to advancements in industrial control systems and the evolution toward smart factory environments.

(Hitachi Industrial Products, Ltd.)

* See the list of “Trademarks.”

*1. Internationally recognized guidelines on IT system and software security certification published by the Center for Internet Security, Inc. (CIS), a US non-profit organization.

[9] A5-sized Compact Fanless Industrial Computer

10. CHAdeMO Certification for Multi-port EV Charger

Hitachi has developed and commercialized a multi-port EV charger suitable for use in solutions that incorporate electric vehicles (EVs) and has obtained certification under the latest 2.0.2 protocol of the Charge de Move (CHAdeMO) international standard.

The multi-port EV charger is made up of a 500-kW AC/DC converter for connection to the grid, a DC/DC converter, and charging stands for supplying power to the EVs. The charging stands support 90-kW, 50-kW, and 25-kW charging and these can be mixed and matched across the charging stands within the total available capacity of 500 kW. This allows for the staged installation of equipment to increase the number of charging stands in line with demand and provides flexibility in the choice of output capacities.

In the future, Hitachi intends to provide support for vehicle-to-X (V2X)[*1] capabilities and to progressively develop and obtain certification for charging and discharging management functions that leverage knowledge gained from a heavy-duty EV charging system using multi-connector charging stands that is currently being trialed at the Tsuchiura site of Hitachi Industrial Products[*2].

(Hitachi Industrial Products, Ltd.)

*1. Use of electrical energy stored on a vehicle to supply other loads (X) via the bi-directional transfer of electric power.

*2. "Launch of Workplace E-Powering Operations Utilizing Multi-port EV Chargers," Industrial Products, Hitachi Technology 2025 (2025.02).

Parameter	Specification	Remarks
DC output	90 kW : 200 Adc, 450 Vdc 50 kW : 125 Adc, 400 Vdc 25 kW : 62.5 Adc, 400 Vdc	Can be split between ports up to the total capacity of 500 kW
No. of chargers	Up to 20	Up to 80 on multi-connector model*
Standard	CHAdeMO 2.0.2	
Efficiency	95.7%	AC input to DC output (@DC450 V)

[10] Photograph and Specifications of Multi-port EV Charger

Notes:
* Certification pending.

11. B-CHOP Energy Storage System for Regenerative Electric Power Supplied to Shin-Hikida Substation of West Japan Railway Company

Hitachi has supplied a B-CHOP energy storage system for DC feeder systems to the Shin-Hikida Substation on the Hokuriku Main Line of West Japan Railway Company. The substation supplies electric power between the Omi-Shiotsu and Tsuruga stations, a section of the line that features a long gradient where the load drawn by trains is high. With the substation having only a single connection to the electricity grid, there were concerns about the voltage drop on the DC feed in the event of a loss of power supply from the electricity utility.

The B-CHOP system is made up of lithium-ion battery units and a converter that handles the transfer of electric power between the DC feed line and batteries. B-CHOP systems supplied to other sites have worked by charging their batteries when trains were regenerating (the primary objective being to prevent this energy from being lost) and then supplying this energy back to the DC feed when the voltage dropped. Given the special circumstances at the Shin-Hikida Substation, however, this standard operation was augmented by the addition of a function for maintaining the battery state-of-charge when neither regeneration nor a voltage drop on the DC feed are present and a function that, on detection of a loss of grid power to the substation, switches to an operation mode that prioritizes relieving the drop in voltage at the train pantograph. Hitachi intends to also deploy these new functions at a wide range of sites, such as battery posts that do not require electric power distribution equipment.

(Hitachi Industrial Products, Ltd.)

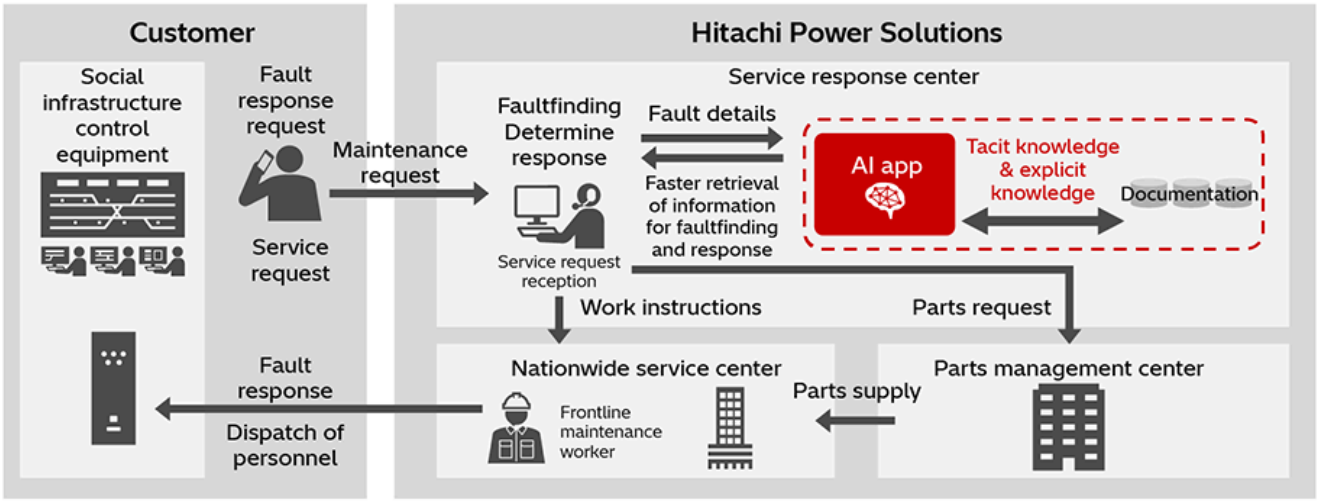
[11] B-CHOP Lithium-ion Battery Unit (left) and Converter Unit (right) Undergoing Testing

12. Adoption of Generative AI Agent for Responding to Maintenance Inquiries

Hitachi Power Solutions Co., Ltd. has started using generative AI at its service response center that handles customer service requests regarding control equipment faults. To provide work instructions to the maintenance personnel responding to a callout, the center undertakes faultfinding and devises solutions with reference to documentation such as equipment manuals or records of how past issues have been resolved. However, the wide variety of these reference documents means that this work takes a lot of time and effort. Accordingly, the center developed an AI app equipped with the know-how to extract information from these documents to put a system in place that provides efficient information retrieval tailored to the nature of the customer request. This improves service quality by speeding up the initial decision-making process for the person who receives the maintenance request.

Plans are in place to implement similar AIs for other maintenance services. By doing so, the hope is that the many other maintenance services of Hitachi Power Solutions will gain similar benefits to those achieved at the service response center, enabling them to supply their services more quickly and with even higher quality than before.

(Hitachi Power Solutions Co., Ltd.)



[12] How AI is Used in Actual Operations

13. Digital Twin of Dam Outflow Using 3D Fluid Dynamics with BIM/CIM

Time and cost have been a problem for outlet design during dam redevelopments, with studies based on small-scale hydraulic model testing taking around one year to complete.

In the redevelopment of the Shin-Maruyama Dam in Gifu Prefecture, Obayashi Corporation, Hitachi Power Solutions, and Hitachi, Ltd. sought to address this issue by utilizing building information modeling (BIM) and construction information modeling (CIM)[*1] data as a basis for 3D fluid dynamics[*2]. This involved the development of a precise digital twin that reflects the latest site conditions. It successfully shortened the design study period to about three months.

The study modeled the region from the outlet of the existing dam to the downstream river channel and obtained detailed predictions of water levels and flow rates that would result from the redevelopment. It also visualized internal flow conditions such as the formation of eddies that may impact embankments and the different flow rate distributions at the surface and near the riverbed.

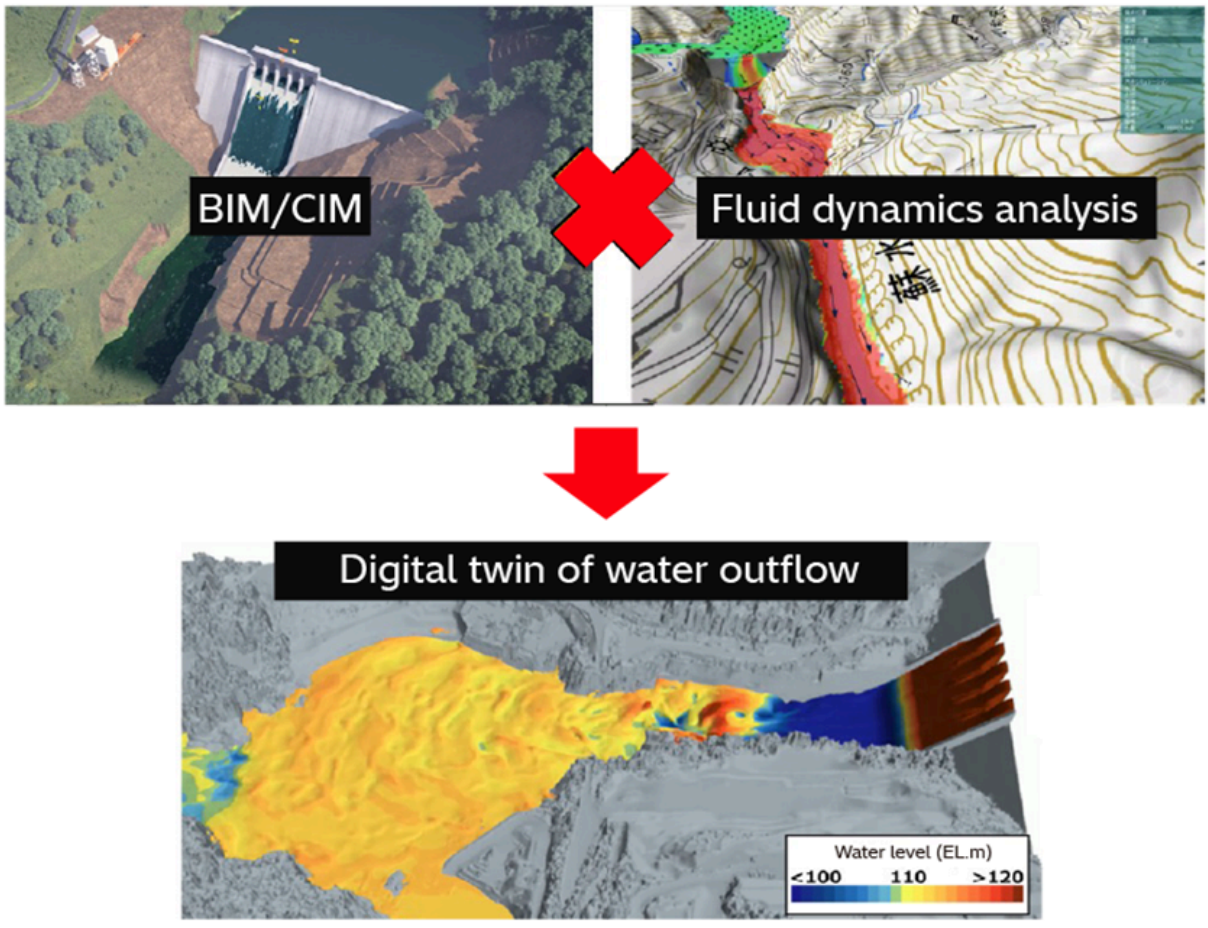
It provided insights into outflow conditions in the new dam's temporary bypass tunnel, including how hydraulic jump (splash) and the energy dissipation at the outlet would vary with flow rate. These results helped improve risk assessment and the development of safety measures for the construction phase.

This project combined the digital technologies of Lumada with multi-physics analysis to enhance infrastructure resilience. Moving forward, the goal is to support disaster prevention and mitigation by making the technology available as an advanced digital service that incorporates AI.

(Hitachi Power Solutions Co., Ltd.)

*1. Methods for using 3D modelling to enable more efficient information sharing across all stages of the construction process in the architecture and civil engineering sectors.

*2. A method for simulating the distribution of speed, pressure, and other parameters of a fluid (gas or liquid) by numerical analysis of the physical phenomena associated with its movement and flow, primarily using computational fluid dynamics.



[13] Use of 3D Fluid Dynamics in Dam Redevelopment Project