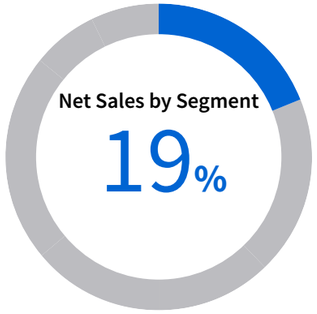
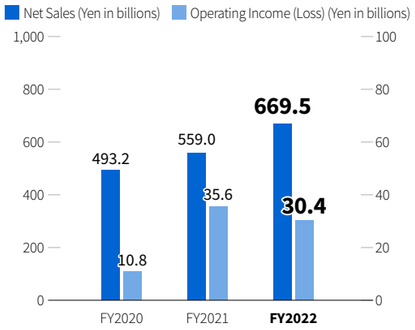
Energy Systems & Solutions



Net Sales/Operating Income (Loss)



Main Businesses

(As of March 31, 2023)

- Nuclear power generation systems
- Thermal power generation systems
- Hydroelectric power generation systems
- Solar Photovoltaic systems
- Transmission & Distribution systems

Business Overview

The Energy Systems & Solutions segment saw higher sales. Power Generation Systems recorded higher sales, as Nuclear Power Systems recorded higher sales due to the difference in progress of projects to enhance safety measures, etc., and Thermal & Hydro Power Systems saw higher sales due to the difference in progress of orders received, etc. Transmission & Distribution Systems also saw higher sales as, Transmission & Distribution Systems and Solar Photovoltaic Systems recorded higher sales.

In terms of profit and loss, the segment as a whole saw a decrease in operating income. While Transmission & Distribution Systems saw an increase in operating income from the impact of higher sales, Power Generation Systems recorded lower operating income due to analysis of project costs by Toshiba Plant Systems & Services Corporation, and review of provision for Power Generation Systems product warranty, etc.

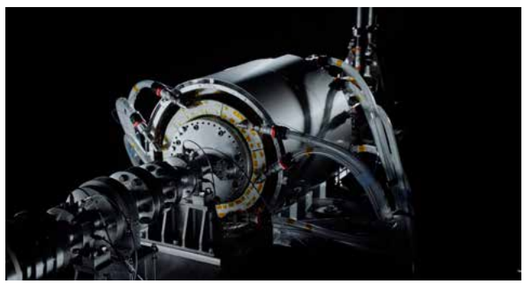
Development of Lightweight, Compact, High-Power Superconducting Motor Prototype for Mobility Applications

Toshiba Energy Systems & Solutions Corporation has developed a compact, lightweight, and high-power superconducting motor that is the first in the world to achieve the high-speed rotation required for large mobility applications such as aircraft.

As global environmental awareness grows, movements to reduce greenhouse gas emissions, such as CO_2, are accelerating rapidly in the mobility industry, including among aircraft and automobile manufacturers. The aviation industry has set a goal of reducing emissions of CO_2 to zero (net-zero carbon) by 2050. However, in addition to changing over to sustainable aviation fuel (SAF), the evolution of whole aviation systems is required, and the industry needs to develop lightweight and high-powered motors.

Toshiba Energy Systems & Solutions Corporation has developed a prototype for a compact, high-speed superconducting motor with a high-power output of 2 MW, bringing together its manufacturing technology for high-speed rotating machines and superconductivity technology that it has fostered over many years. The motor is less than 1/10th the weight and size of a conventional motor with the same level of power output. The motor is the first of its kind in the world, developed through the integrated strength of the Toshiba Group. It has earned strong recognition for its future possibilities, and was awarded the grand prize in the Total Solutions Category at the CEATEC AWARD 2022.

Going forward, we will work to make motors with even greater improvements, and by combining them with the products and services of the Toshiba Group, we will provide new value to the mobility industry and contribute to the realization of a carbon-neutral society.



Prototype of the superconducting motor

Toshiba Energy Systems & Solutions Corporation Begins Sales of Japan's First Environmentally Friendly Gas-Insulated Switchgear That Uses Natural Origin Gases

Toshiba Energy Systems & Solutions Corporation delivered a gas-insulated switchgear that uses natural origin gases to TEPCO Power Grid, Inc., and the switchgear began operations in February 2023.

This order is a replacement for equipment at TEPCO Power Grid, Inc.'s Fuchu Substation in Tokyo and is Japan's first environmentally friendly gas-insulated switchgear that uses natural origin gases to be used at a TSO (transmission system operator).

Gas-insulated switchgears are devices that interrupt current and prevent it from affecting other power equipment in the event of an anomaly in the transmission system and are essential equipment underpinning social infrastructure. As its electrical insulating medium, rather than sulfur hexafluoride (SF_6), a greenhouse gas, this equipment uses a mixture of nitrogen and oxygen, which are safe and have no global warming impact even in the event of a leak. This product is the result of joint development that Toshiba Energy Systems & Solutions Corporation has been pursuing with Meidensha Corporation since 2020. Having completed the prescribed type testing, sales of the product are now underway.

Toshiba Group has been working on gas-insulated switchgears since the 1960s, and has a great deal of expertise in their overall product development. Meanwhile, for more than 15 years, we have been conducting research and development of equipment that uses natural origin gases as a measure to reduce environmental impact.

In view of the ongoing adoption of environmental regulations governing the use of SF_6 gas for electric power equipment in Europe, North America, and other regions, we will expand our lineup of electric power equipment that uses natural origin gases, starting with gas insulated switchgears, which are easy to handle and pose no environmental risk, under the AEROXIA™ brand in Japan and overseas. By actively developing environmentally friendly products, the Toshiba Group will continue working to help achieve carbon neutrality.

AEROXIA™, environmentally friendly GIS(Gas-Insulated Switchgear)

Toshiba Energy Systems & Solutions Corporation Wins Contract for IoT Services Using EtaPRO™ for an Indonesian Geothermal Power Plant

Toshiba Energy Systems & Solutions Corporation, through its Indonesian subsidiary, Toshiba Asia Pacific Indonesia, has won a contract for an Indonesia's state-owned geothermal power company, PT Geo Dipa Energi, for an IoT service for the power generation facilities at its Patuha Geothermal Power Plant.

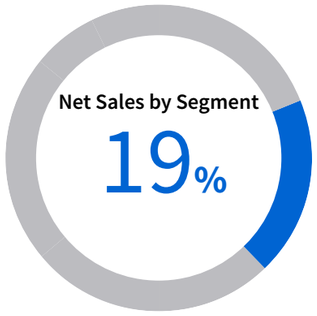
This service uses IoT and AI technologies, including predictive failure diagnosis and performance monitoring at the plant. The system provided through this service employs EtaPRO™, a monitoring software for plant operation acquired by the Company in FY2021, and represents the world's first commercial application of EtaPRO™ at a geothermal power plant.

The service uses AI to analyze real-time power plant operation data obtained from various sensors and detect signs of anomalies that may cause problems during normal operation. In doing so, it reduces the number and duration of power plant shutdowns. A demonstration project showed that it was able to reduce the rate at which problems occurred by over 20%. Compared to thermal power plants, the detection of anomalies in geothermal power plants is difficult, given the unstable condition of the steam flowing into the turbine, but this service allows the detection of anomalies even under those conditions.

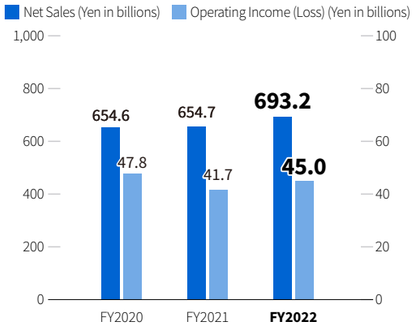
By deploying this service worldwide, Toshiba Energy Systems & Solutions Corporation aims to reduce the customer's cost of power generation by helping improve power plants' utilization rates, thereby promoting the spread of geothermal power generation and helping to achieve carbon neutrality.

Patuha Geothermal Power Plant in Indonesia

Infrastructure Systems & Solutions



Net Sales/Operating Income (Loss)



Main Businesses

(As of March 31, 2023)

- Water supply and sewage systems
- Road systems
- Telecommunication systems
- Railway systems
- Power distribution systems
- Communication & broadcast systems
- Security & automation systems
- Motor & drive systems

Business Overview

The Infrastructure Systems & Solutions segment saw higher sales overall. Public Infrastructure recorded lower sales due to decreased volume in the social systems business, but Railways and Industrial Systems reported higher sales mainly due to increased volume by recovery from market downturn caused by COVID-19 and exchange rate changes, etc. in the industrial systems.

In terms of profit and loss, the segment as a whole saw higher operating income. While Public Infrastructure saw lower operating income due to lower sales in social systems business, Railways and Industrial Systems saw an increase, reflecting higher sales in the industrial systems and by impact of the absence of the previous year's restructuring, etc.

Delivery of Multi-Parameter Phased Array Weather Radar Systems

Toshiba Infrastructure Systems & Solutions Corporation delivered two multi-parameter phased array weather radar systems to the Radio Research Institute of NICT.

These two systems replaced the phased array weather radar systems installed in Kobe City, Hyogo Prefecture, and Suita City, Osaka Prefecture. The new weather radar has a new multi-parameter (also known as dual-polarization) feature that estimates rainfall by simultaneously emitting electromagnetic waves in two directions—vertically and horizontally polarized waves. This new feature enables the radar to measure rainfall with higher accuracy in addition to three-dimensionally tracking raincloud at high speed in 30 seconds to 1 minute.


Multi-parameter phased array weather radar

In recent years, tremendous damage caused by localized heavy rains (also known as torrential rains), tornadoes, and other extreme weather events has become a social problem. This upgrade provides improved accuracy of rainfall observation, making it possible to predict the signs of torrential rains and resulting rainfall quickly and accurately. The new radar also achieves network observation with multiple weather radars for the first time as a multi-parameter phased array weather radar. This expands the observation range and ensures rainfall observation accuracy even when it deteriorates during heavy rains by having the other radar cover the area. For this reason, it is expected to accelerate research and demonstration for use in flood prevention activities and evacuation instructions for residents in the Kansai area.

We will continue to promote the installation of multi-parameter phased array weather radar systems in other areas to help mitigate damage caused by heavy rains.

Local 5G Research and Business Co-Creation Initiatives

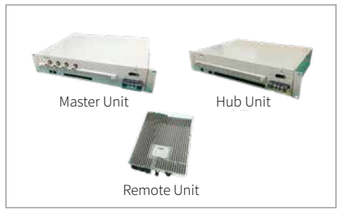
Differently from "public 5G" by which carriers provide nationwide communication services, in addition to the features of 5G wireless including high-speed, high-capacity, low-latency, and multi-connections, "local 5G" is built and operated independently by vendors for designated areas and uses. As such, it has expected benefits in a wide range of fields, but also has issues such as obstructions causing lost signals and signals leaking outside of coverage areas.

To resolve these issues, Toshiba Infrastructure Systems & Solutions Corporation is conducting verification testing with various universities and companies.

In March 2022, with Nakao Research Laboratory of the Department of Systems Innovation, School of Engineering, The University of Tokyo, we began joint research to evaluate the effectiveness of the use of technological know-how to eliminate radio shielding as well as the company's proprietary Distributed Antenna System (DAS), and participated in a technological evaluation of a local 5G system on public roadways.

We also launched joint research with the Metropolitan Expressway Co., Ltd and Nokia Solutions and Networks Japan G.K. on building a local 5G wireless communication area to contribute to collecting accurate information during disasters and to speed operations during normal times, evaluating the feasibility of developing local 5G on metropolitan highways within about one year.

Furthermore, from November 2022 through February 2023, with Sharp Corporation, BIG RED FARM, Niikappu-cho, Hokkaido, EXEO Group, Inc., CHOWA GIKEN Corporation, YANMAR AGRIBUSINESS CO., LTD., Nagoya Broadcasting Network Co., Ltd., and Dogin Regional Research Institute Co., Ltd., we conducted verification testing of grazing land management using local 5G at BIG RED FARM Meiwa in Niikappu-cho, Hokkaido.



Local 5G DAS (Distributed Antenna System)

In August 2022, we opened "Creative Circuit L5G™," the co-creation center to conduct verification testing of applications using local 5G at our Fuchu Complex. At the co-creation center, everyone including those from outside the Company can experience applications envisioning local 5G at infrastructure facilities. Toshiba Infrastructure Systems & Solutions Corporation is also working at the co-creation center to collect data using 5G wireless lines from devices in operation, such as robots and automatic guided vehicles (AGV) that had previously been difficult to collect, aiming to create added value in the use of AI, etc.

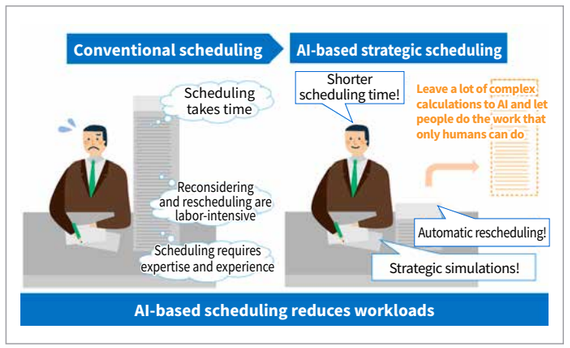
Going forward, we aim to aggressively develop 5G in various directions.

Optimizing Timetables and Train Operations Using AI on the Tokyo Tama Intercity Monorail

Toshiba Infrastructure Systems & Solutions Corporation and the Company have provided results in the optimization of timetables and train operations using AI to Tokyo Tama Intercity Monorail Co., LTD.

The optimization implemented by Toshiba Infrastructure Systems & Solutions Corporation uses the transportation optimization AI developed by Toshiba Corporate Research & Development Center using the timetables data assets of the Group's transit scheduling ICT solution TrueLine® introduced at Tokyo Tama Intercity Monorail Co., LTD.

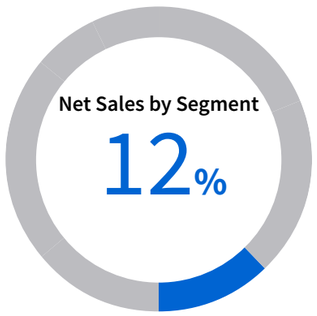
Railway companies combine trainset inspection and cleaning schedules with trainset rosters according to each timetables for efficient operations. However, understanding which trains are usable and responding to different timetables on weekdays, weekends and holidays are extremely complex. This process has required workers with specialized knowledge and experiences, as well as a significant amount of labor in rescheduling when even a single change occurs.



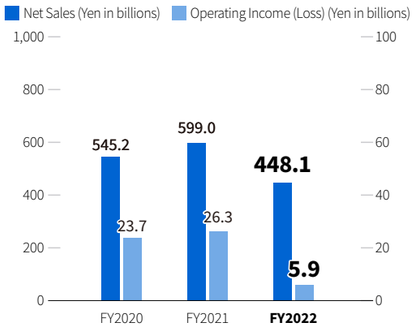
Toshiba Infrastructure Systems & Solutions Corporation has performed multiple evaluations using AI together with Tokyo Tama Intercity Monorail Co., LTD., confirming the ability to schedule for the efficient inspection and cleaning of trainsets and management plans that evenly distribute inspection cycles. Through these results, various everyday work scheduling has become simpler, and rescheduling can be done quickly in the event that they are disrupted. We have also confirmed results in reducing operating costs, and these results have been applied in revisions of timetables.

Toshiba Infrastructure Systems & Solutions Corporation will continue contributing to the operations of railway companies through our various digital technologies starting with TrueLine®, which uses the Group's AI.

Building Solutions



Net Sales/Operating Income (Loss)



Main Businesses

(As of March 31, 2023)

- Elevators
- Light fixtures
- Industrial light parts

Business Overview

Sales of elevator overseas business, and lighting increased, but due to impact of air conditioning business deconsolidation and lower sales in elevator domestic business, the Building Solutions segment saw lower sales overall.

In terms of profit and loss, lighting saw higher operating income, but due to impact of air conditioning business deconsolidation and lower operating income in elevator business the segment as a whole saw lower operating income.

Expanding Our Lineup of the Antibacterial, Deodorizing UVish Series

Toshiba Lighting & Technology Corporation has added the UVish Ceiling Recess Type to its UVish series lineup of disinfecting and deodorizing devices that feature the double effect of UV- LED that emits ultraviolet C waves considered highly effective in inactivating viruses and bacteria together with photocatalysis. Sales of the UVish Ceiling Recess Type were launched in March 2023.

Prior to the UVish Ceiling Recess Type, disinfecting and deodorizing devices had generally been placed on the floor. However, when placing devices on the floor, there were various challenges. For example, obstructions to wheelchairs and walking in social welfare facilities, concerns about tampering by children and accidents from contact or falling in kindergartens and nursery schools, and space limitations in restroom booths have made installation difficult.

By installing the UVish Ceiling Recess Type in the ceiling, these concerns are resolved, allowing the disinfecting and deodorization of spaces where devices previously could not be installed.

Additionally, Toshiba Lighting & Technology Corporation further expanded the UVish series lineup with the sales launch of the UVish Floor Type 200, which can cover larger spaces than previous devices of up to 200 m³.

UVish Ceiling Recess Type with motion sensor and light

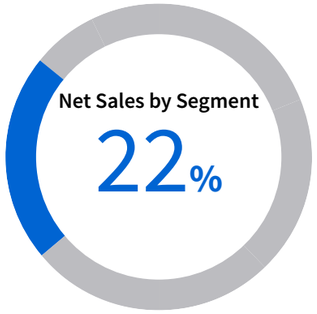
SPACEL Wins the GOOD DESIGN AWARD 2022

Toshiba Group company's SPACEL machine-room-less elevators won the GOOD DESIGN AWARD in the GOOD DESIGN AWARD 2022, an awards program to promote integrated design held by the Japan Institute of Design Promotion. The award was given to a joint application by the Company and Toshiba Elevator and Building Systems Corporation, and the following points received a positive evaluation.

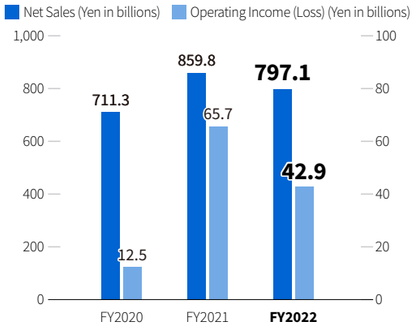
- A system for development and the ability to realize continuous evolution of a single brand for more than 20 years that has produced elevators that are disaster-resilient, safe, and peoplefriendly
- The achievement of a high level of completeness in which a wide range of know-how and design considerations are reflected in the various elements making up the space and function, based on a fundamental framework with a consideration of social issues
- Large indicators provide information in a manner that is intuitive and clearly visible, making conditions easy to gather in the confined space of an elevator and providing a sense of calm and comfort
- Attention to detail, as for example in the unique functions that fill the gaps around the door, providing various solutions to a range of user conditions

SPACEL, machine-room-less elevator

Electronic Devices & Storage Solutions



Net Sales/Operating Income (Loss)



Main Businesses

(As of March 31, 2023)

- Power devices
- Small-signal devices
- Optoelectronic devices
- In-vehicle digital & logic
- Analog ICs
- HDDs
- Semiconductor manufacturing equipment
- Devices & materials

Business Overview

The Electronic Devices & Storage Solutions segment as a whole saw lower sales. While Semiconductor saw higher sales from firm markets, mainly in industrial use, etc., HDDs & Others saw lower sales due to shrinkage in mobile and desktop HDD markets and nearline HDD market adjustment, etc.

In terms of profit and loss, the segment as a whole saw lower operating income. While Semiconductor saw higher operating income reflecting higher sales, HDDs & Others saw lower operating income due to lower sales and provision for product warranty, etc.

Launch of Third-Generation SiC (Silicon Carbide) MOSFETs That Contribute to Higher Efficiency of Industrial Equipment

As a new power semiconductor product, Toshiba Electronic Devices & Storage Corporation has commercialized third-generation SiC MOSFETs[*1] with low resistance during operation (on-resistance) and significantly reduced switching losses.

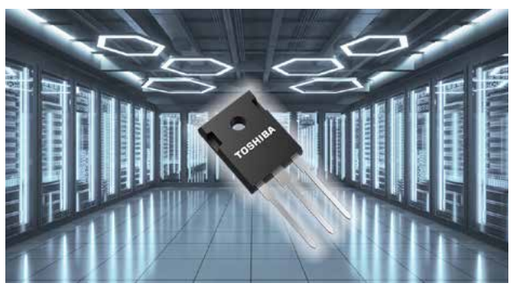
Power semiconductors, whose role is to supply and manage power, are essential components for boosting the energy-saving features of all types of electrical equipment, and for achieving carbon neutrality, and demand is projected to continue expanding against the backdrop of the continued electrification of automobiles, higher voltage and lower power consumption requirement for industrial equipment, etc. SiC is attracting attention as a next-generation power semiconductor material with higher voltage, higher current and lower loss than conventional Si (silicon).

The new product reduces on-resistance per unit area by approximately 43%[*2] and switching losses by approximately 20%[*2]. The third-generation SiC MOSFETs, which achieve both reduced on-resistance and reduced switching losses, will contribute to further achieving larger capacity and improving the efficiency of industrial equipment.

Going forward, Toshiba Electronic Devices & Storage Corporation will continue to expand its power semiconductor product lineup and expand its production facilities, aiming to realize a carbon-free society by providing more user-friendly, high-performance power devices.

*1 MOSFET stands for Metal Oxide Semiconductor Field Effect Transistor, a type of transistor structure.

*2 Compared to second-generation SiC MOSFETs. According to testing conducted by Toshiba Electronic Devices & Storage Corporation.



Third-generation SiC MOSFETs

Construction of New Manufacturing Facility for Silicon Nitride Balls

Toshiba Materials Co., Ltd. has decided to construct a new manufacturing facility for silicon nitride balls on the premises of its headquarters. Production is scheduled to begin in November 2023 with an investment in excess of 5 billion yen. This investment will increase production capacity to 150% of the FY2021 level at full capacity.

With the electrification of automobiles, the market is demanding shorter charging times and lower costs. In response, there is increasing adoption of high voltage batteries and integration of motors with inverters (devices with power circuits that generate alternating current of different frequencies from either direct or alternating current). However, electrolytic corrosion (damage to a bearing caused by a current flowing through it) of motor bearings used in such Electronic Devices & Storage Solutions units has become a problem, and this may hinder the development of highly reliable and widespread electric vehicles. For this reason, in recent years, one of the most effective solutions has been the adoption of hybrid bearings which consists of ceramic balls that have the advantages of excellent strength and superior wear resistance in place of standard steel balls, and steel inner and outer races.

Toshiba Materials Co., Ltd. manufactures silicon nitride balls recognized for their reliability and for delivering the highest mechanical performance. Its experience and record of success in bearing balls that meet demands for high-speed rotation and anti-electrolytic corrosion, including machine tools, wind power generators and rolling stock, have won the company about 50% of the world market. With significant increases in demand for bearings for electric vehicles on the horizon, Toshiba Materials Co., Ltd. has now decided to make this significant investment in increasing capacity.

Toshiba Materials Co., Ltd. will continue stable supply of high-quality products, and will contribute to increased use of environmentally friendly electric vehicles.

Silicon nitride balls and bearings

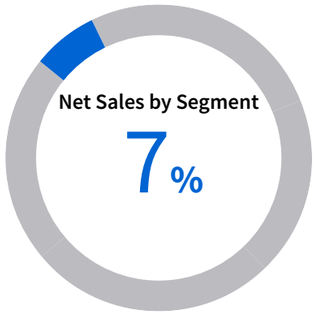
GOOD FACTORY AWARD® From the Japan Management Association

Buzen Toshiba Electronics Corporation has been awarded the 11th GOOD FACTORY AWARD® for 2023 by the Japan Management Association. This is the first time that a manufacturer in the Kyushu region has received this award. It is also the first time in seven years that the Toshiba Group has won the award.

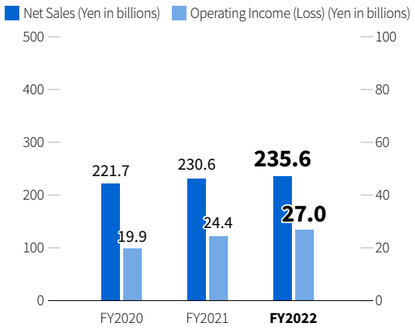
The GOOD FACTORY AWARD® consists of four different awards. In recognition of its management system and human resource development, Buzen Toshiba Electronics Corporation was selected for the Factory Management Award, which recognizes an overall high level of factory management and well-balanced factory operations.

Buzen Toshiba Electronics Corporation, winner of the 11th GOOD FACTORY AWARD®

Digital Solutions



Net Sales/Operating Income (Loss)



Main Businesses

(As of March 31, 2023)

- Digital solutions services

Business Overview

The Digital Solutions segment as a whole saw higher sales. While there was an impact of the sale of Chubu Toshiba Engineering Corporation, system projects for public and private sectors both grew.

In terms of profit and loss, the segment as a whole saw higher operating income. While there was impact of the sale of Chubu Toshiba Engineering Corporation, system projects for public and private sectors both went strong.

Promotion of Quantum-Related Businesses

Toshiba Digital Solutions Corporation is promoting businesses that utilize quantum technology, such as Quantum Key Distribution (QKD) and SQBM+™, a quantum-inspired optimization solution.

QKD is the technology to distribute the encryption keys that are used to protect important confidential data. Theoretically impossible to intercept the encryption key, it protects the data communication infrastructure from the threat of cyber attacks and enables secure data communication.

The Company is also working on quantum-inspired optimization technology inspired by quantum phenomena. This is proprietary technology of the Company for “combinatorial optimization,” which derives the optimal solution from a vast number of alternatives. For many social and industrial challenges, combinatorial optimization is essential for selecting the optimal items from an enormous range of choices; for example, optimizing financial transactions, the movement of industrial robots, travel and transmission routes, and molecular design for drug discovery. Through collaborations with research institutions such as universities as well as with companies, the Toshiba Group has been conducting verification experiments, etc. to solve social issues in a variety of fields. Drawing on the knowledge gained through these efforts, we were able to provide systematized SQBM+™ as a solution.

In April 2022, the Company launched the trial service of the world’s first QKD-secured metro network for commercial use in London, UK, and in August 2022, the Company received an order from Japan’s National Institute of Information and Communications Technology (NICT) for QKD and SQBM+™ for the Tokyo QKD Network. Going forward the Group will continue to contribute to the implementation of quantum technology in society and the creation of new industries.

Quantum Key Distribution System

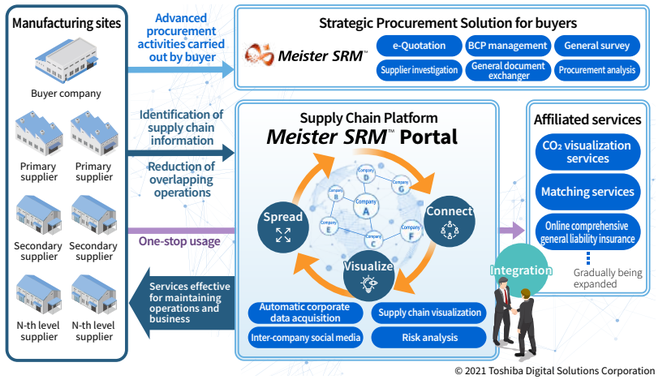
Launch of Meister SRM™ Portal, a Supply Chain Platform

Toshiba Digital Solutions Corporation has started offering the Meister SRM™ Portal supply chain platform, which is a new service of its Meister SRM™ strategic procurement solution.

In order to respond to unpredictable changes in the business environment, manufacturers need to take steps to strengthen their supply chains. Suppliers are also required to communicate closely with each other in order to develop new partners, understand the risk of production stoppages in the event of disasters, and monitor the status of their carbon neutrality measures.

The Meister SRM™ Portal is a cloud service that connects companies involved in manufacturing and supports the business activities of companies in the supply chain. By allowing companies subscribing to the service to disseminate and share information about themselves and to connect autonomously, the service makes the supply chain network visible and facilitates the understanding of risks in the supply chain and the expansion of networks of business partners. In cooperation with partners, we also provide services for calculating and visualizing greenhouse gas emissions, as well as business matching services for manufacturing. In October 2022, Mitsui Sumitomo Insurance Company, Limited linked its newly built insurance sales system to the Meister SRM™ Portal and began offering a mechanism to purchase comprehensive general liability insurance for the manufacturing industry over the Internet. We plan to continue expanding our services through the Meister SRM™ Portal.

Going forward, the Toshiba Group will continue to contribute to the strengthening and upgrading of supply chains by connecting companies involved in manufacturing, facilitating the dissemination and sharing of information between these companies, and providing a variety of services that support business activities in a coordinated and integrated manner.



Conceptual diagram of Meister SRM™ Portal

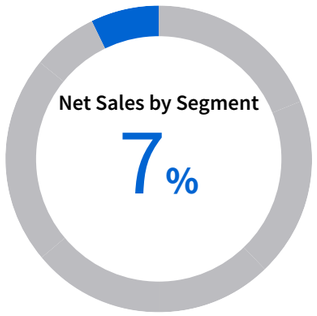
Establishment of a System to Strengthen the Smart Manufacturing Business

On April 1, 2023, Toshiba Digital Solutions Corporation and Toshiba Infrastructure Systems & Solutions Corporation established the Smart Manufacturing Division with the goals of strengthening Toshiba’s capacity to respond to digital transformation (DX) in the manufacturing industry, where market expansion is expected, and promoting business growth.

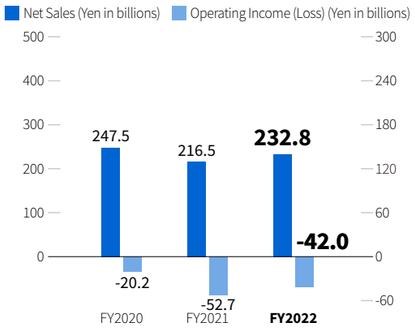
In response to uncertain social conditions and labor shortages, the manufacturing industry is accelerating its investment in digitalization for business continuity, including visualization and remote control and operation of factories, plants, and buildings, as well as supply chain resiliency. In addition, it is expected that DX investment in data utilization will continue to expand, including data linkage and system integration that encompasses a series of flows from design and development to production and maintenance. Furthermore, in order to respond to new social issues such as carbon neutrality, it is more necessary than ever to address issues that cut across the boundaries of IT, such as the optimal operation of facilities, the use of renewable energy, and resource reuse, as well as systems that control and operate control equipment in factories, plants, and buildings, and related technologies (OT: Operational Technology).

The Toshiba Group has established a structure to provide IT and OT solutions for the manufacturing industry in an integrated manner through the collaborative business operations of the Smart Manufacturing Division, which was co-established within both Toshiba Digital Solutions Corporation, which specializes in the IT domain, and Toshiba Infrastructure Systems & Solutions Corporation, which specializes in the OT domain. By leveraging the latest digital technology centered on the Meister series as well as technologies we have cultivated over many years in the industrial domain, we plan to accelerate our efforts to expand our Smart Manufacturing business, focusing on the DX market in the manufacturing industry.

Others



Net Sales/Operating Income (Loss)



Main Businesses

(As of March 31, 2023)

- Battery, etc.

Business Overview The segment as a whole saw higher sales and rise in operating income.

Ranked No. 1 in Japan, the U.S. and Europe in Overall Patent Strength for Lithium-Ion Battery-Related Technologies

An independent survey by Patent Result Co., Ltd. in September 2022 ranked Toshiba No. 1 in Japan, the United States and Europe for patents covering oxide-based negative electrode technology for lithium-ion batteries.

Toshiba began research and development in oxide-based negative electrodes before 2000, with a focus on Lithium Titanium Oxide (LTO) negative electrodes. Toshiba first applied the technology in the SCiB™, the lithium-ion battery it brought to market in 2008. Typical lithium-ion batteries have carbon-based negative electrodes, but Toshiba recognized that LTO, an oxide-based negative electrode, offered excellent characteristics in six crucial areas: safety, long life, rapid charging, high input and output, low-temperature performance, and a wide effective SOC[*1].

SCiB™ has been highly evaluated for its excellent safety, long life, and rapid charge/discharge characteristics, and is currently used in a wide range of applications including hybrids and other types of passenger cars, commercial vehicles such as electric vehicle (EV) buses, trains, ships, electric power, energy, and industrial equipment such as AGVs[*2]. SCiB™ also helps to reduce emissions of carbon dioxide (CO_2) and nitrogen oxides (NOx), and is expected to be further utilized in the accelerating global effort to realize a carbon-neutral society.

Going forward, we will continue to promote research and development of battery technologies that realize safe, secure, and efficient energy utilization and actively pursue further patent activities.

*1 SOC: State of charge. The batteries can be used at 0 to 100% state of charge, reducing the required battery footprint.

*2 AGV: Automatic guided vehicle

SCiB™, lithium-ion battery