Review of Operations

Fiscal 2018 Performance

Seeking to complete the FY2018 Medium-Term Management Plan, Fuji Electric strengthened the power electronics systems business and aggressively invested in the expansion of its power semiconductor operations while also pursuing increased profitability by further enhancing manufacturing capabilities and re-energizing the Companywide Pro-7 Activities that are aimed at improving work quality.

Consolidated net sales in fiscal 2018 increased ¥21.5 billion year on year, to ¥914.9 billion, due to higher demand centered on the Power Electronics Systems—Energy Solutions segment, the Electronic Devices segment, and the Power and New Energy segment. Despite the impacts of slowdown in demand seen in the second half of the fiscal year as well as increased costs associated with a large-scale project in the Power and New Energy segment, operating income rose ¥4.0 billion year on year, to ¥60.0 billion.

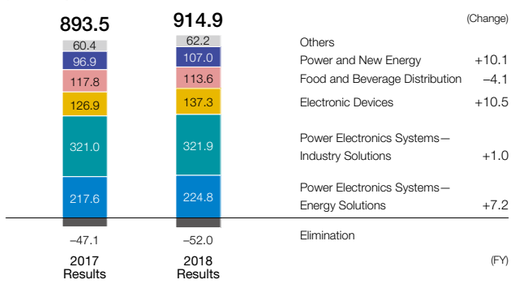
As a result, we achieved the targets of the FY2018 Medium-Term Management Plan for net sales, operating income, and net income attributable to owners of parent as well as for all relevant financial indicators.

(Billions of yen)	FY2017 Results	FY2018 Results	Change	FY2018 Medium-Term Management Plan (Target)
Net Sales	893.5	914.9	+21.5	900.0
Operating Income	56.0	60.0	+4.0	54.0
Operating Margin	6.3%	6.6%	+0.3pt	6.0%
Net Income Attributable to Owners of Parent	37.8	40.3	+2.5	34.0
Financial Indicators				
Net Debt-to-Equity Ratio*	0.4 times	0.4 times	—	0.7 times
Equity Ratio	36%	37%	+1pt	32%
ROA	4%	4%	—	4%
ROE	12%	12%	—	12%

*Net interest-bearing debt / Shareholders' equity

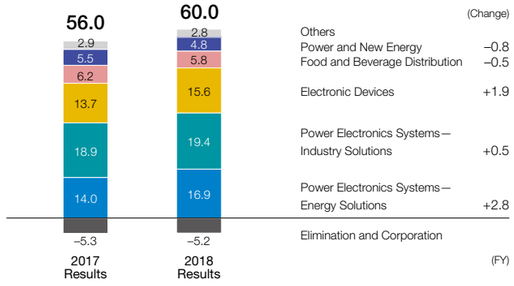
Net Sales

(Billions of yen)



Operating Income

(Billions of yen)



Major Initiatives by Segment

Segment	Major Initiatives
Power Electronics Systems—Energy Solutions	• Expanded comprehensive electrical equipment supply operations (semiconductor factories, data centers, oil depots, etc.) • Aggressively capitalized on substation replacement demand • Commercialized new storage battery systems using reused electric vehicle storage batteries
Power Electronics Systems—Industry Solutions	• Developed ship exhaust gas cleaning systems and delivered first unit • Established joint venture company with Dalian Bingshan Group Co., Ltd., to strengthen system operations in China • Commenced production of low-voltage inverters in India and France • Developed and launched OnePackEdge package bundling everything from production floor data collection to analysis • Developed inverters for railcars
Electronic Devices	• Invested in power semiconductor production capacity increases • Advanced development of 4th-generation direct liquid-cooling automotive modules
Food and Beverage Distribution	• Expanded lineup of vending machines (IoT-powered, beverage, food and other items) for the Chinese market • Commenced production of vending machines for the Southeast Asia market (P.T. Fuji Metec Semarang) • Developed and deployed store fixtures and equipment for addressing labor shortages
Power and New Energy	• Commenced on-site construction in Kenya for first geothermal power generation plant order received in Africa • Received several scrap and build* orders pertaining to hydro power generation systems

* Projects in which aged, inefficient facilities are decommissioned and replaced with new facilities to improve efficiency

Fiscal 2019 Management Plan

In fiscal 2019, the first year of the FY2023 Medium-Term Management Plan, Fuji Electric will strengthen the power electronics systems business, aggressively invest in and expand its power semiconductor operations, and pursue improvements in operational efficiency and work quality through Pro-7 Activities.

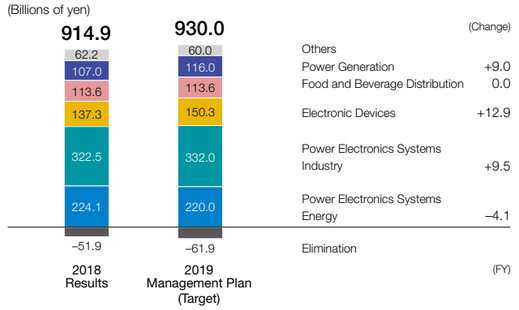
We will target net sales of ¥930.0 billion in fiscal 2019, a year-on-year increase of ¥15.1 billion, while working toward a record-breaking ¥62.0 billion in operating income, an increase of ¥2.0 billion. Companywide performance is expected to be driven by higher sales volumes of inverters, other components, and ship exhaust gas cleaning systems in the Power Electronics Systems Industry segment and of automotive and other power semiconductors in the Electronic Devices segment. During fiscal 2019, capital expenditures and R&D activities will be primarily aimed at the Power Electronics Systems segment and the Electronic Devices segment (namely power semiconductors), both areas where we anticipate growth.

(Billions of yen)	FY2018 Results	FY2019 Management Plan (Target)	Change
Net Sales	914.9	930.0	+15.1
Operating Income	60.0	62.0	+2.0
Operating Margin	6.6%	6.7%	+0.1pt
Net Income Attributable to Owners of Parent	40.3	40.4	+0.1
Financial Indicators			
Net Debt-to-Equity Ratio	0.4 times	0.4 times	—
Equity Ratio	37%	40%	+3pt
ROA	4%	4%	—
ROE	12%	11%	–1pt

Note: Assumed exchange rates for fiscal 2019: ¥105 to the U.S. dollar; ¥123 to the Euro; ¥16 to the RMB

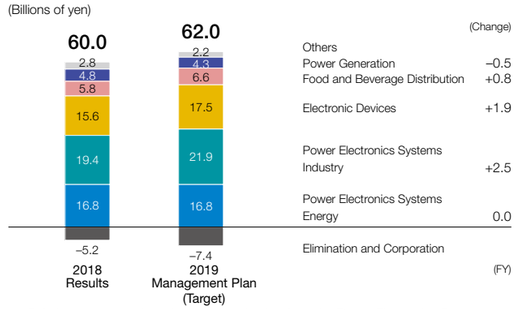
Net Sales

(Billions of yen)



Operating Income

(Billions of yen)

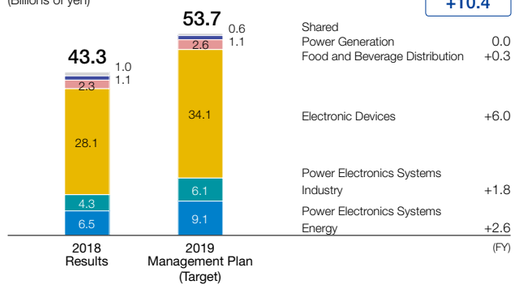


Note: The Power Electronics Systems—Energy Solutions and Power Electronics Systems—Industry Solutions segments have been reorganized to form the Power Electronics Systems Energy and Power Electronics Systems Industry segments from fiscal 2019. In addition, the Power and New Energy segment has been renamed the Power Generation segment. Figures for fiscal 2018 have been restated to reflect these changes.

Plant and Equipment Investment

(Billions of yen)

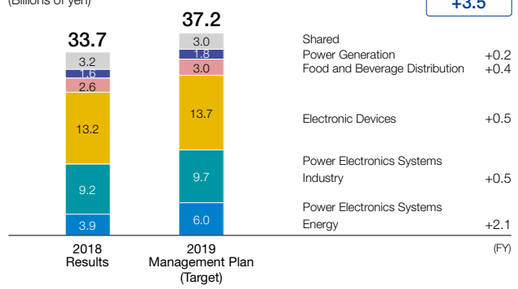
Change +10.4



R&D Expenditures

(Billions of yen)

Change +3.5



Note: Figures for R&D expenditures above have been divided by segment based on theme and may therefore differ from the figures contained in the consolidated financial report for the fiscal year ended March 31, 2019.

Segment	Major Plant and Equipment Investment	Major R&D Expenditures
Power Electronics Systems Energy	Construction of switchgear and controlgear system factories (Thailand)	Global products (transformers, switchgears, etc.)
Power Electronics Systems Industry	Ship exhaust gas cleaning systems, etc.	SiC-equipped power electronics devices, factory automation systems, servo systems, etc.
Electronic Devices	Increased power semiconductor production capacity	IGBTs for electric vehicles, 7th-generation IGBTs (large-capacity series), etc.
Food and Beverage Distribution	—	Vending machines for Chinese and Asian markets, energy-saving and labor-saving store distribution products
Power Generation	—	Service technologies and products

Power Electronics Systems Energy / Industry

The Power Electronics Systems Energy segment, which contributes to the stable supply and optimization of energy, and the Power Electronics Systems Energy segment, which realizes automation and energy saving at factories, operate their businesses under shared policies as Fuji Electric's power electronics systems business. Based on these shared policies, we seek to create competitive components through synergies with our core power semiconductor and power electronics technologies; reinforce systems operations by combining engineering services, optimal control technologies, and IoT technologies; and expand overseas operations.

Priority Measures for Fiscal 2019

Creation of Competitive Components

Fuji Electric will accelerate the development of transformers, switchgears and controlgears, and others to create competitive global products.

Another focus of development is differentiated products equipped with next-generation SiC power semiconductors that contribute to the realization of more efficient and compact equipment. In this area, we are moving ahead with the development of traction converters for railcars.

Expansion of Overseas Businesses by Leveraging Systems

Fuji Electric is stepping up development of high-value-added systems that combine standardized product and system bundles with engineering services and IoT technologies.

Acting in accordance with our basic principle of local production and consumption, we will ramp up local design in China and other parts of Asia, move ahead with the construction of switchgear and controlgear system factories at Fuji Electric Manufacturing (Thailand) Co., Ltd., and establish engineering centers. At the same time, we will look to expand overseas operations through partner strategies with affiliates and with companies acquired through M&A activities.

China

We will pursue collaboration with Shanghai Electric Group Co., Ltd., to promote sales of control systems that support stable operation at material factories. At the same time, we will work together with Dalian Bingshan Group Co., Ltd., to expand sales of energy management systems for contributing to energy saving and optimization at beverage factories.

Southeast Asia

Transmission and distribution systems and comprehensive electrical equipment supply operations will be fortified through launches of new products while the sales channels of Fuji CAC Joint Stock Company are used to expand sales of control systems for cement factories.

India

In addition to leveraging the sales channels of Fuji Gemco Private Limited to grow sales of steel plant control systems, we will also seek to expand our power supply operations through the newly acquired Consul Neowatt Power Solutions Pvt Ltd. This company's technologies, manufacturing capabilities, and sales channels will be used to bolster local production and consumption systems in India in order to grow our operations in this market.

Value Created

Stable Supply and Optimization of Energy | Automation and Energy Saving

Customers

Social Infrastructure Field (Power / Telecommunications) | Industrial Field (Assembly Processing / Materials) | Transportation Field

Segment

Power Electronics Systems Energy | Power Electronics Systems Industry

Principal Systems

Substation Equipment / Monitoring and Control Systems

Energy Management Systems

Electricity Storage Control Systems

Power conditioning systems | Power stabilizers

Comprehensive Data Center Systems

Modular data centers

Switchgears and Controlgears

Drive Control / Monitoring Control Systems for Material Plants

Systems for Railcars

Passenger door systems | Drive systems for high-speed railcars

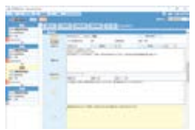
Electric Facility Construction

Operational Information Collection Systems for Assembly and Processing Equipment

Ship Exhaust Gas Cleaning Systems

SOx scrubbers | Laser type gas analyzers | Inverters

Information Network Systems



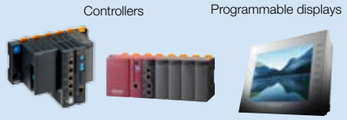
Major Components

Transmission and Distribution / Power Supplies

Transformers | Uninterruptible power systems (UPSs)

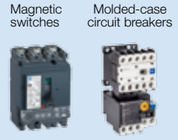
Control Equipment

Controllers | Programmable displays



ED&C Components

Magnetic switches | Molded-case circuit breakers



Drive Equipment

Inverters | Motors | Servo systems

Measuring Instruments

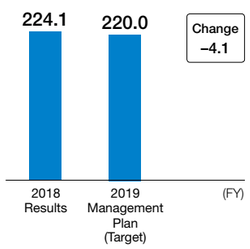
Ultrasonic flowmeters | Gas analyzers

Power Electronics Systems Energy

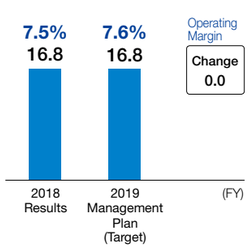
Expand overseas businesses by leveraging proposal bundles for electrical equipment

Executive Officer
Corporate General Manager,
Power Electronics Systems Energy Business Group
Masahiro Morimoto

Net Sales
(Billions of yen)



Operating Income
(Billions of yen)



Awareness of Market Needs

We are seeing continuing renewal investments in the manufacturing industry in Japan due to aged equipment such as substation equipment acquired in the 1970s and 1980s, while a shortage of equipment management engineers among customers is stimulating requirements for equipment orders and efficiency of management. Moreover, with a view to improving energy saving throughout factories and reducing CO_2 emissions from the perspective of growing environmental awareness and restricting energy costs, demand is increasing not only for the introduction of products with a high level of power conversion efficiency, but also for the visualization and optimization of energy throughout factories leveraging energy management systems (EMS).

In the Southeast Asia and Middle East regions, which are experiencing remarkable economic growth, demand for substation equipment and switchgear and controlgear for factories and buildings to stabilize power supplies is increasing amid growing investment in industrial and social infrastructure and demand for electricity.

Strengths of the Power Electronics Systems Energy Segment

The strength of the Power Electronics Systems Energy segment lies in its wide range of products and systems, from instruments that prepare electricity such as transformers and switchboards to instruments that protect equipment from lightning and instantaneous voltage drops, such as uninterruptible power systems and EMS. Moreover, in addition to the expertise on energy saving at Fuji Electric's factories, we possess an extensive delivery track record and engineering experience. At the same time, we are experts in the operation of various factories and facilities, and are able to provide maintenance services that suit user conditions, including the products and systems that underpin power stabilization and optimization in line with customer specifications. In these ways, the ability to offer comprehensive proposal bundles, from a diverse array of products and systems up to and including maintenance services, is this segment's strength.

Priority Measures for Fiscal 2019

We will expand our transmission and distribution systems business and comprehensive electrical equipment business overseas through Asian manufacturing and engineering and capabilities in proposal bundles cultivated in Japan.

Strengthen systems for Asian manufacturing and engineering

We will construct switchgear and controlgear system factories at Fuji Electric Manufacturing (Thailand) Co., Ltd. (FMT), and build a new engineering center in order to consolidate engineering staff, who had previously been dispersed. Through coordination between the engineering center and the technological sales force at sales companies in Thailand, Indonesia, Vietnam, the Philippines, and Singapore, we will expand sales proposals that are custom-tailored to the needs of customers.

Expand the transmission and distribution business by introducing new global products

We will introduce new, price-competitive transformers and switchgear products. In Southeast Asia we will expand our business targeting the electricity and materials fields that combines substation equipment with switchgear and controlgear. Meanwhile, in the Middle East, we will concentrate our efforts on capturing demand for renewals and services among existing substation equipment customers by bolstering sales proposals for equipment malfunction prevention, and lifespan diagnosis services via coordination with local service companies.

Expand the comprehensive electrical equipment business for factories and facilities

Since fiscal 2018 we have strengthened our systems and are growing comprehensive electrical equipment orders for data centers and semiconductor factories centered on Japan. Going forward, we will continue to expand the comprehensive electrical equipment business in Japan and Southeast Asia where we anticipate robust capital expenditure in those industries. The key to strengthening competitiveness is short delivery times and low costs. In order to realize this, we will further promote the standardization of our core products, namely switchgear and controlgear. At the same time, we will begin local production in order to improve our lineup of products that conform to overseas standards.

Expand sales of ED&C components business targeting the power distribution market

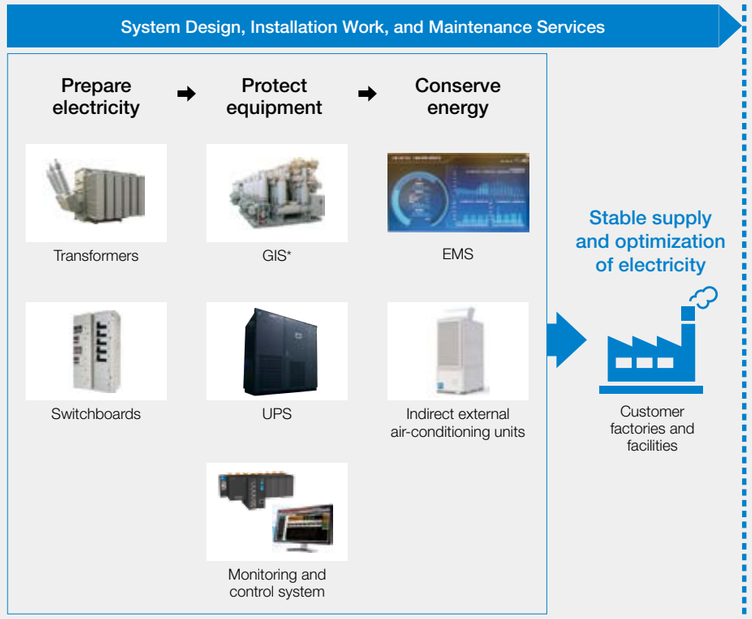
We will expand sales on the back of Tokyo 2020 Olympic and Paralympic Games-related investment by strengthening nomination activities in the power distribution market for buildings and general contractors.

Close-Up

Contributing to the stable supply and optimization of electricity through the comprehensive electrical equipment business for factories and facilities

Fuji Electric contributes to the stable supply and optimization of electricity by performing everything up to and including design, installation work, and maintenance services for electrical equipment at factories and facilities.

Comprehensive Factory and Facility Electrical Equipment Business Model



*Gas-insulated switchgears

Key to success in comprehensive electrical equipment

Initiatives toward standardization of switchgear and controlgear

At our Kobe factory, the mother factory of our switchgear and controlgear business, we have improved the external form, capacity, structure, and circuit design of more than 10,000 high voltage switchgear and controlgear over the past ten years, resulting in standardizing specifications. These efforts are contributing to reductions in standard lead times and enhanced cost competitiveness.

Case Study 1

Data Center of a Foreign Company (Japan)

Realizing early facility construction and energy saving through a wealth of expertise and products

Amid progress in the shift to cloud-based information systems and in anticipation of the expansion of the information and communication technology (ICT) market, foreign data center businesses are increasingly establishing a presence in Japan. Although foreign customers expect shortened construction periods, a shortage of their own engineers at their Japanese bases and lack of progress in procuring materials became an issue.

Fuji Electric shortened the construction period by comprehensively undertaking everything from design of the entire facility up to its construction, combining power distribution equipment, UPSs, emergency power generation equipment, and other equipment to enable a stable power supply. Furthermore, on the operational front, we supported energy saving by providing monitoring and control systems that facilitate the visualization of energy, air-conditioning equipment that utilizes outside air, and UPSs with industry-leading levels of efficiency. We have gained recognition for our track record in Japan and we are now seeing an increase in inquiries overseas, principally in Southeast Asia.

Case Study 2

Oil Tank Factory (Japan)

Realizing energy saving and reliable operations through factory diagnosis and maintenance services

A lack of engineers to implement energy saving throughout the factory was an issue for the customer when renewing their production facilities. We implemented a facility diagnosis by checking the deterioration of all electrical equipment, such as substation equipment, including equipment manufactured by other companies, high voltage motors, inverters inside switchgears and controlgears, and circuit breakers while clarifying recommendations on the timing of the renewal of such equipment. We were awarded a contract that entails everything from replacing existing products with Fuji Electric ones to 24 hours a day, 365 days a year maintenance services, and have thereby contributed to higher than ever energy-saving effects and operational reliability.

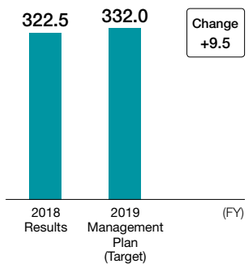
Power Electronics Systems Industry

Expand the systems business through promotion of an overseas partnership strategy

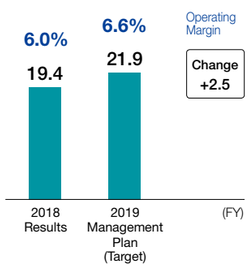
Executive Officer
Corporate General Manager,
Power Electronics Systems Industry Business Group

Hiroshi Tetsutani

Net Sales
(Billions of yen)



Operating Income
(Billions of yen)



Awareness of Market Needs

In the industrial field in Japan, a shortage of labor is stimulating an increase in demand for automation and reducing labor requirements. In addition, initiatives are being stepped up toward heightening competitiveness through production reforms such as the visualization of equipment operating conditions as well as the prediction of equipment defects and analysis of the reasons for such defects. Moreover, renewal and energy-saving investments are continuing due to aged production equipment in the materials field.

In China, we anticipate investment in energy saving driven by environmental measures, and investment in automation and labor saving on the back of a shortage of labor. Meanwhile, we anticipate new and renewal investment in the materials field in Southeast Asia and India.

In the transportation field, such as ships and railroads, making equipment lighter and more compact while reducing environmental impacts is becoming a global issue.

Strengths of the Power Electronics Systems Industry Segment

The Power Electronics Systems Industry segment provides a wide range of products—combining drive equipment, measuring instruments, control equipment, and the Internet of Things (IoT) that facilitate the automation of production equipment and labor saving—to a broad spectrum of customers, from those in the materials field to the assembly field. In particular, the segment's greatest strength is its ability to be the first to introduce to the market competitive power electronics products equipped with our own power semiconductors, the key devices for facilitating energy saving. The extensive lineup of our core product of inverters that are suitable for all industries and a variety of applications is the segment's forte while motion systems combining servo systems and controllers that boast industry-leading levels of control performance have a considerable delivery track record in machine tools, packaging machinery, and other areas. As for steel and cement plants, our drive control systems, monitoring control systems, and other systems have an extensive delivery track record, enabling us to have a deep understanding of the production processes of customer plants. By combining these differentiated products with production floor expertise we are able to establish ideal plants and systems that address the issues of customers.

Priority Measures for Fiscal 2019

We will expand the systems business in China and elsewhere in Asia through M&A activities and a partnership strategy with cooperative companies while setting the business targeting ships to a growth trajectory.

Expansion of the systems business

In China, we will expand a system that facilitates production optimization and energy saving by leveraging Dalian Fuji Bingshan's air-conditioning heating and cooling technologies and equipment and its sales channels while combining inverters, measuring instruments, control equipment, and energy management systems to target beverage plants. Moreover, we will expand sales of drive control systems and monitoring control systems for the materials field by utilizing Shanghai Electric's sales channels. In Southeast Asia, we will leverage the engineering and sales channels of Fuji CAC of Vietnam to promote sales of control systems for cement plants, while in India, we will increase sales of control systems for steel plants centered on Fuji Gemco.

In Japan, we will continue to focus our efforts on capturing renewal demand for aged equipment in the materials field while promoting sales of semiconductor production equipment through the introduction of new servo system products. In addition, we will expand the systems business by providing data collection equipment and analysis and support services utilizing IoT for process assembly such as for automotives.

Expanding ship exhaust gas cleaning systems operations

Fuji Electric will expand its ship exhaust gas cleaning systems operations, business negotiations for which are increasing due to environmental regulations. We will bolster production capabilities and reinforce engineering systems while promoting productivity increases and cost reduction through the introduction of automation equipment. Additionally, we will respond to customer needs by developing large-sized products, with a goal of launching them in fiscal 2019.

Close-Up

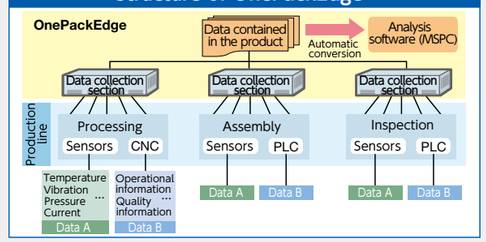
Facilitating productivity and quality enhancements through data collection and analysis of production equipment

Utilization of IoT in order to improve operations and enhance productivity on production floors has been increasing in recent years.

"OnePackEdge," comprising data collection sections and analysis software, supports analysis of the factors of equipment abnormalities and defects by collecting together data including information on temperature, vibration and operation, and quality from production floor sensors and controllers.

We contribute to the early resolution of issues facing customers by providing data collection and analysis in one package.

Structure of OnePackEdge



Data collection section
"OnePackEdge Controller"

Case Study

Automotive Manufacturer (Japan)

Significantly shortening data collection and factor identification time

As data management was conducted departmentally on the customer's production floors, data collection factor identification took a considerable amount of time when problems occurred.

By adopting "OnePackEdge," the amount of time required to collect and aggregate data on the motor rotation speed and current of processing equipment, screw-tightening pressure on assembly equipment, breakdown history, and other issues at the customer's engine factory was drastically reduced. Furthermore, Fuji Electric's proprietary software makes it possible to predict and prevent abnormality occurrences. Therefore, we are contributing to the customer's operational efficiency improvement and quality enhancement.

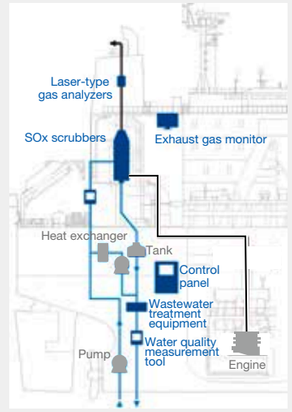
Contributing to the resolution of the environmental problems of ships

The International Maritime Organization will strengthen regulations on sulfur oxide (SOx), a pollutant, in oceans throughout the world from 2020. The running costs of expensive low-sulfur fuels that conform to these regulations has become an issue.

Fuji Electric offers ship exhaust gas cleaning systems that enable the continued use of current fuel. We provide SOx scrubbers that reduce sulfur oxide in exhaust gas by mixing sea water with exhaust gas to create a chemical reaction, and a combination of gas analyzers that measure the constituent concentration of SOx scrubbers and exhaust gas in real time as well as inverters and controllers for managing a feed pump that draws seawater in an optimal manner.

In these ways, Fuji Electric's ship exhaust gas cleaning systems are helping customers to adhere to air pollution regulations.

System structure (Fuji Electric provides blue areas)



Exterior of scrubbers

Internal structure of scrubbers

Case Study

Shipbuilder (Japan)

Limiting required loading space through the world's smallest scrubbers

The customer was planning to equip medium-sized new ships with SOx scrubbers in order to conform to regulations but securing cargo space had become an issue.

Fuji Electric's scrubbers are the world's first scrubbers for ships to adopt cyclone technology in their internal structure. By securing the retention time of exhaust gas inside scrubbers, we have heightened the cleaning effect of scrubbers on SOx, and realized the world's smallest scrubbers, at 50% of the volume of those of other companies, thereby contributing to a reduction of the loading space required for scrubbers on customer ships. We are creating new business as a result of our compact-sized scrubbers, which are suitable for both new and existing ships and make placement easy to consider, and providing optimal systems.

Electronic Devices

Increase automotive sales by expanding our power semiconductor production capacity

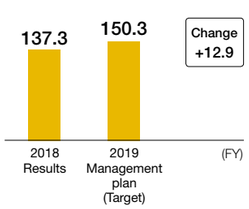
Managing Executive Officer
Corporate General Manager,
Electronic Devices Business Group

Toru Housen

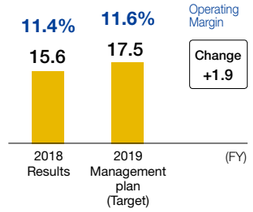
Business Areas

- Semiconductors
  (Industrial and automotive fields)
- Magnetic disks

Net Sales
(Billions of yen)



Operating Income
(Billions of yen)



Awareness of Market Needs

Demand in the industrial and social infrastructure fields is increasing for power semiconductors that fulfill the role of energy saving with high levels of conversion efficiency and power control. This demand is driven by increasing energy demands and environmental regulations such as global warming countermeasures.

In the industrial field, the adoption of renewable energies such as wind power and solar power is proceeding centered on China and Europe, while demand for inverter air-conditioning units is growing in China. Over the medium and long term, we forecast that investments in production floor automation with the aim of solving labor shortages and enhancing productivity will result in growing demand for machine tools and robots.

The driver of growth going forward will be the automotive field. We anticipate demand throughout the world for power semiconductors for motor control inverters which are necessary for electric vehicles (EVs).

Strengths of the Electronic Devices Segment

The strengths of the Electronic Devices segment are in technologies that enable the commercialization of IGBT modules that contribute to increasing the efficiency, miniaturization, and reliability of power electronics by combining cutting-edge IGBT chip technologies with package technologies possessing high heat dissipation and high levels of reliability. We are promptly meeting market needs and providing ideal products for a variety of applications through collaboration with our power electronics systems business.

Priority Measures for Fiscal 2019

Launching mass production of new products for automotive applications

We are moving ahead with the development and mass production of Reverse-Conducting IGBT (RC-IGBT) chips and 4th-generation direct liquid cooling modules and we will provide these products to customers throughout the world. We will bolster specification incorporation activities that conduct proposals at the customers' product design stage and provide new products that meet customer needs. Through these efforts we will aim for further customer acquisition. By continuing to provide full support after specification incorporation, we will heighten the value of Fuji Electric products.

Boost sales of 7th-generation IGBT for industrial applications

We will aim to boost sales by bolstering product lines that combine 7th-generation IGBT chips that reduce losses by approximately 30% more than before and 7th-generation IGBT modules, which boast high levels of heat dissipation and reliability. We will achieve differentiation by creating a lineup of high-capacity products not provided by other companies that can be easily applied to equipment.

Targeting air conditioners, where there are calls for further energy saving, we will respond to customer needs by expanding our lineup of products for large, rather than compact models.

Accelerate improvements to manufacturing capabilities

In order to grow sales, we are implementing appropriate equipment investments in a timely manner. In chip manufacturing (front-end processes), we are increasing 8-inch chip production equipment centered on our Yamanashi Factory, while for module assembly (back-end processes), we are augmenting capacities for production bases in Japan and overseas that are accelerating local production and consumption.

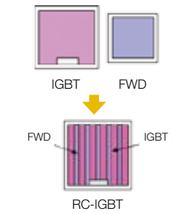
Close-Up

RC-IGBTs that realize miniaturization and high levels of reliability

One of Fuji Electric's strengths is its RC-IGBT. RC-IGBTs were adopted by the automotive industry and are currently being deployed horizontally in industrial fields.

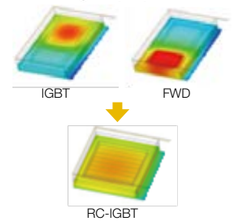
By using an RC-IGBT that arranges two types of semiconductor with differing functions—an IGBT and a free-wheeling diode (FWD)—alternately in a straight line on a single chip, it is possible to realize significant miniaturization when compared with arranging an IGBT and an FWD in two separate chips. A high level of reliability is realized as a result of dispersal of the heat generated during operation.

Configuration of an RC-IGBT



25% reduction of chip area*

Temperature distribution during chip operation



33% reduction of increases in chip heat*

* Figures derived by comparing IGBT and FWD with RC-IGBT under certain assumed conditions

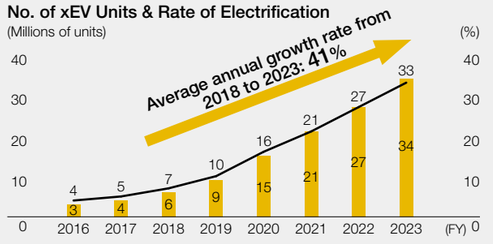
Contribute to reducing the environmental impact of EVs and enhance driving distance

In order to improve environmental impact reductions and driving distances for EVs and hybrid electric vehicles, for which we anticipate an increase in demand, there is a need for smaller, lighter, and highly reliable mounted components.

In order to meet that need, Fuji Electric provides direct liquid cooling modules for inverters for motor control applications, which are essential to electrified vehicles (xEVs).

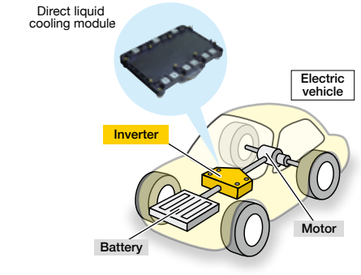
A direct liquid cooling module is equipped with an RC-IGBT and uses a direct cooling structure that has higher heat dissipation performance than prior products, realizing smaller size, lighter weight, and a high level of reliability.

No. of xEV Units & Rate of Electrification
(Millions of units) (%)



Source : IHS2018

Electric Vehicle (EV)



Realizing higher levels of efficiency and more compact size of power conditioning systems for wind and solar power generation

The introduction of renewable energies such as wind and solar power is proceeding in order to realize a low-carbon society. Power conditioning systems (PCSs), an apparatus for stabilizing power, are needed for wind and solar power generation, while power semiconductors, which convert power efficiently, are indispensable.

The 7th-generation IGBT products offered by Fuji Electric are thinner than previous models. The combination of a chip that reduces power loss through the application of Fuji Electric's micro-machining technology and a module with enhanced heat dissipation properties by applying newly developed materials, realizes highly efficient energy conversion and enhances levels of output electric power density*. As a result, more efficient and compact PCSs can be realized.

In order to expand use of 7th-generation IGBTs, we will reinforce specification incorporation activities at our design centers throughout the world, targeting PCS manufacturers. Going forward, we will aim to increase sales by expanding our lineup of high-capacity products not provided by other companies.

*Power density per unit

PCS (photograph on left) and 7th-generation IGBT module (Prime PACK™ 3) for renewable energy applications

Prime PACK™ 3 is a registered trademark of Infineon Technologies AG.

Food and Beverage Distribution

Expand vending machine business in China and Southeast Asia and bolster lineup of labor and energy saving solutions for stores

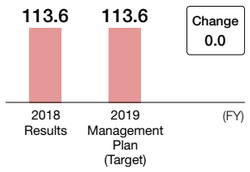
Executive Officer
Corporate General Manager,
Food and Beverage Distribution Business Group

Yasuhiro Takahashi

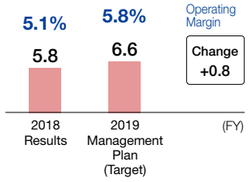
Business Areas

- **Vending machines**
  Beverage vending machines, vending machines for food and other goods
- **Store distribution**
  Store fixtures and equipment, automatic change dispensers

Net Sales
(Billions of yen)



Operating Income
(Billions of yen)



Awareness of Market Needs

In Japan, customers such as beverage manufacturers, convenience stores, and supermarkets are promoting low-labor, energy-efficient operations in response to social issues such as global warming and labor shortages stemming from the shrinking workforce.

Overseas, growing automation needs, such as those arising from the attention surrounding low-labor convenience stores employing cutting-edge technologies, are expected to stimulate increased demand for vending machines in Fuji Electric's focus market of China. As for Southeast Asia, where markets are still taking shape, market participation by major beverage manufacturers is contributing to higher vending machine needs centered on Thailand.

Strengths of the Food and Beverage Distribution Segment

The strengths of the Food and Beverage Distribution segment include its industry-leading share for vending machines as well as the technological prowess that it has cultivated through the development of freezers and refrigerated showcases for stores. These strengths are centered on the segment's automation, heating and cooling, and currency identification technologies, which will be indispensable strengths in the growing labor saving and energy saving markets.

Fuji Electric began developing its vending machine business in overseas markets a step ahead of the rest of the competitors. In China, our first Dalian factory commenced operations in 2003 as a joint venture with a local partner, and we established a sales and service company in 2018. Our development and production systems in China were reinforced in 2016 with the construction of the second Dalian factory, which was equipped with state-of-the-art automation equipment.

In Southeast Asia, a vending machine operator company was created in Thailand in 2016 and a vending machine production and sales company in Indonesia was acquired from Kubota Corporation in 2017. These two bases are playing a central role in our efforts to explore these markets.

Priority Measures for Fiscal 2019

Based on an accurate understanding of customer needs, the Food and Beverage Distribution segment is expanding its vending machine business in China and Southeast Asia and bolstering its lineup of labor and energy saving solutions for stores.

Expand vending machine business in China and Southeast Asia

The items sold in vending machines vary greatly between country and region. Fuji Electric is enhancing its vending machine lineup based on the local needs seen in the markets it serves. For example, operational know-how such as combining the favored temperatures and displays of offerings (beverages, foods or other goods), e-money compatible machines, and the development of machines with internal structures compatible with various container shapes.

Furthermore, the Company is engaged in the development of operation systems that support efficient vending machine operations for customers lacking such know-how in China and Southeast Asia in order to encourage local beverage manufacturers to enter into the vending machine market.

Bolster lineup of labor and energy saving solutions

In the Food and Beverage Distribution segment, we are developing store management systems that respond to customers' labor and energy saving needs with functions for managing product inventories, achieving traceability, and optimizing store environments.

We are also bolstering our lineup of other products that help alleviate labor shortages. These products include dual stores / 2Way vending machines that enable convenience stores to be converted into vending machine depots during the nighttime hours as well as automatic change dispensers that simplify the cash handling processes needing to be performed by store staff.

Close-Up

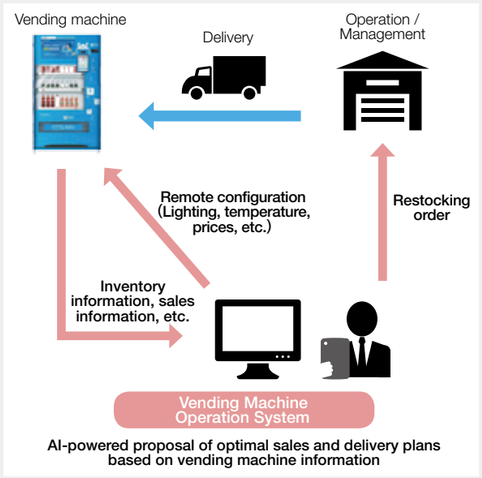
Supporting efficient vending machine operations for customers with AI

Many vending machine business operators in China lack know-how.

Issues faced in this market include losses of sales opportunities due to depleted stock as well as slow progress in streamlining delivery routes. Improving investment returns through efficient operations will be key to promoting the spread of vending machines going forward.

Capitalizing on the technologies and know-how Fuji Electric boasts as a leading manufacturer in the domestic market, we are moving ahead with the development of a system that uses artificial intelligence (AI) to support vending machine operations. Areas in which this system is applicable include the formulation of the necessary sales and delivery plans and the demand projections for items sold in vending machines.

By packaging AI-powered operation systems with vending machines, Fuji Electric seeks to drive the expansion of vending machine markets by creating frameworks for maximizing customer earnings.



AI-powered proposal of optimal sales and delivery plans based on vending machine information

Contributing to labor and energy savings at stores

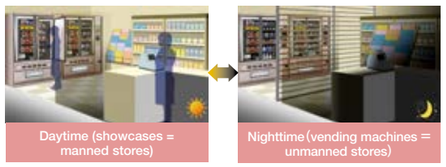
Realizing store labor savings with vending machine automation technologies

In the store distribution business, there is a rising need for the automation technologies that Fuji Electric has fostered through the development of vending machines. We are thus seeing a rise in the introduction of self-service cash registers using Fuji Electric's automatic change dispensers as well as vending machine convenience stores.

Fuji Electric is also proposing a new store model for stores that have difficulty securing nighttime staff. In this model, we create dual stores / 2Way vending machines that reduce labor requirements and improve consumer convenience by functioning as showcases during the day and vending machines at night.

Automatic change dispenser

Vending machine convenience store



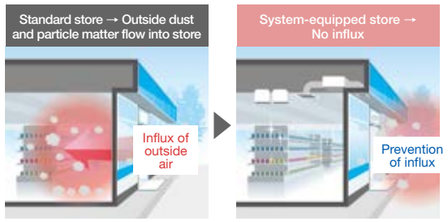
Dual stores / 2Way vending machines

Reducing air-conditioning energy consumption and influx of dust and particle matter through store air pressure control

Fuji Electric has developed and launched a new system for controlling the air pressure inside of stores.

This system uses sensors to control the balance of air intake and exhaust by ventilation fans and other equipment to prevent influxes of outside air when automatic doors are opened or closed. Furthermore, the system realizes a 10% reduction in energy consumption by lowering the burden placed on air conditioners while also cutting particle matter influx by 30%, thereby decreasing the amount of cleaning work needing to be done by employees.

This system has won great praise from customers for its ability to contribute to labor and energy savings in stores.



- **10% reduction in energy consumption**
- **30% reduction in particle matter influx**

Note: Figures based on a verification test

Power Generation

Fully leverage cultivated power plant strengths to shift to renewable energy and after-sales businesses

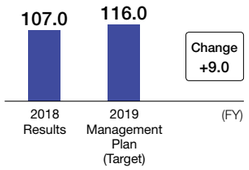
Executive Officer
Corporate General Manager,
Power Generation Business Group

Tadao Horie

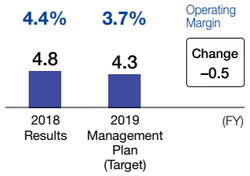
Business Areas

- **Renewable and new energy**
  Geothermal power, hydro power, solar power, wind power, fuel cells
- **Thermal power**
- **Nuclear power-related equipment**

Net Sales
(Billions of yen)



Operating Income
(Billions of yen)



Awareness of Market Needs

Since the adoption of the Paris Agreement, an international framework for combating climate change, there has been a strong global push to realize a low-carbon society. This push has stimulated structural reforms in thermal power businesses in Japan and overseas.

Against this backdrop, it can be expected that use of renewable energy that does not emit greenhouse gases will spread. At the same time, demand is growing on a global scale for the improvement of generation efficiency through replacements of and upgrades to aging generation facilities.

Furthermore, decommissioning has been decided or is being considered with regard to several nuclear power plants in Japan. This situation is expected to drive the growth of the decommissioning system market going forward.

Strengths of the Power Generation Segment

The Power Generation Segment boasts a diverse lineup of products encompassing thermal power, geothermal power, hydro power, solar power, and wind power generation equipment; nuclear power-related equipment; and fuel cells. We also have an extensive track record of delivering such power generation facilities to a wide range of power generation business operators through engineering, procurement, and construction (EPC) and other arrangements.

Fuji Electric has more than half a century of experience in the thermal and hydro power fields, and we have maintained the top global share of deliveries of geothermal power generation equipment since 2000. In addition, we have participated in numerous solar power EPC projects as the number of such projects grew rapidly following the introduction of feed-in tariff schemes. In nuclear power-related equipment, we have developed a track record with regard to fuel transport and radioactive waste material treatment facilities.

The plant engineering experience and the insight and expertise gained through this experience are valuable assets of the Power Generation segment.

Priority Measures for Fiscal 2019

The Power Generation segment has begun overhauling its previous business structure, which was centered on thermal power generation. By fully leveraging its cultivated power plant strengths, Fuji Electric is shifting its business portfolio toward renewable energy and after-sales businesses.

Expand renewable energy orders

Fuji Electric aims to expand renewable energy orders through the provision of high-value-added solutions. In the wind and solar power fields, we will contribute to stable electricity quality and energy supplies by making excellent use of the various technologies related to control and electricity storage. Meanwhile, in the geothermal power field, we are bolstering our lineup of binary geothermal power offerings that make use of the heat emitted from existing facilities as we seek to help quickly bring geothermal power plants on stream.

Expand after-sales businesses

In its after-sales businesses, Fuji Electric is shifting its focus from inspections and repairs to proposal-based services. In the thermal and geothermal power field, we boast extensive insight and experience as a power generation equipment manufacturer that is knowledgeable in everything from structures to materials. Leveraging this foundation as well as the technologies of the specialized after-sales service company acquired in the United States in fiscal 2015, we aim to expand orders for onsite and quick delivery after-sales services to improve power generation efficiency and to extend equipment lifespans. As for hydro power, our efforts will be focused on responding to the robust replacement demand by contributing to customers' businesses and to reductions in environmental impacts through such means as improving efficiency and mitigating oil leak risks.

Reinforce and expand decommissioning system operations

Centered on fuel transport and radioactive waste material treatment facilities, areas where it has a developed track record, Fuji Electric is taking steps to reinforce and expand its domestic decommissioning system operations. Looking specifically at radioactive waste material treatment facilities, we are enhancing our proposal capabilities with the aim of spreading application of the SIAL® cutting-edge solidification technology, which has a track record overseas.

Close-Up

Contributing to expanded use of renewable energy through binary geothermal power

Since delivering the first geothermal power generation facility to be put to practical application in Japan in 1960, Fuji Electric has proceeded to supply 82 geothermal power turbines around the world with a combined generation capacity of 3.2 GW. Principal examples of Fuji Electric-supplied facilities include one of the world's largest flash-cycle*1 turbines as well as one of Japan's largest binary*2 turbines.

Demand for binary generation technologies is rising above the demand for flash-cycle technologies as binary technologies allow for power generation to be performed using hot water or low-temperature steam, thus bringing the potential to expand the scope of geothermal power generation businesses.

Fuji Electric is advancing the development of equipment that realizes high-efficiency generation using smaller heat sources. We also package geothermal systems as decentralized power sources in bundles tailored to provide the ideal response to customer needs in order to reduce the amount of expenses and time required for installation. In addition, we develop portable systems to enable equipment to be more easily reused in case a heat source is depleted.

In this manner, we are committed to contributing to the spread of renewable energy by providing these solutions for heightening the profitability of customers' power generation operations.

*1 A generation method in which geothermal steam directly turns turbines
*2 A generation method in which low-temperature steam or hot water is used to heat and evaporate organic mediums with low boiling points so that the resulting steam can turn turbines

Flash-cycle

Nga Awa Purua Geothermal Power Station
(140 MW generation capacity, New Zealand)

Binary generation

Takigami Binary Geothermal Power Station of
Idemitsu Oita Geothermal Co., Ltd.
(5.05 MW generation capacity, Oita Prefecture, Japan)

Upgrading hydro power generation facilities to contribute to higher efficiency and reliability and lower costs

Fuji Electric has been involved in the hydro power field longer than any other area of power generation. Over our many years of involvement in this field, we have delivered 431 hydro power generation facilities to power companies and private generation business operators in Japan with a combined generation capacity of 4.8 GW.

Hydro power has continued to support the economic growth of Japan as a reliable, low-cost base load power supply. As existing hydro power facilities age, demand is growing for scrap and build*1 projects.

For example, we installed a turbine designed using state-of-the-art 3D flow analysis technologies at the Akiha No. 1 Power Station and were thereby able to boost this facility's generation capacity from 45.3 MW to 47.2 MW.

One strength of Fuji Electric in this field is its turbine output adjustment technologies. Previously, it has been common for output adjustment to be performed using hydraulic servos for turbines with medium to large output capacities and electric servos for small-capacity turbines. However, Fuji Electric is leading the industry as it was among the earliest to realize the practical application of hybrid servo systems that maintain the cost benefits of electric servos while being applicable to a wider range of turbines.

The upgrade at the Akiha No. 1 Power Station enabled us to refine this system while employing a proprietary design*2 that utilizes backup facilities under normal operating conditions in addition to during main equipment failures. This design realizes the same level of performance as a conventional system with less than half the equipment.

The reduction in the number of parts not only increased the reliability and ease of maintenance of the system, but also contributed to significantly lower initial and running costs.

*1 Projects in which aged, inefficient facilities are decommissioned and replaced with new facilities to improve efficiency
*2 Joint patent held with Electric Power Development Co., Ltd.

Akiha No. 1 Power Station of Electric Power Development Co., Ltd.
(47.2 MW, Shizuoka Prefecture, Japan)

Hybrid servo system