

Power Electronics Systems Business Strategies

May 31, 2018
Fuji Electric Co., Ltd.
**Power Electronics Systems
Business Group**

■ Business Overview

■ Review of FY2017

■ FY2018 Management Plan

- Business Policy
- Market Trends
- Business Plan
- Priority Measures
- Capital Investment / Research and Development

Power Electronics Systems

Energy Solutions

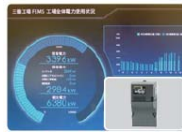
Contribute to consistent supply, optimization, and stabilization of energy

Industry Solutions

Contribute to improved productivity and energy savings with FA and monitoring

Energy management

Energy management Systems Transmission and distribution



Power Supply and Facility Systems

Data centers Plant factories



ED&C components

Power distribution and control equipment



Oil-immersed Transformers



Molded Transformers



Gas Insulated Switchgear (GIS)



Smart meters



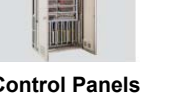
Medium-voltage switchgears and controlgears



Eco-friendly cubicle-type gas insulated switchgears



Uninterruptible power systems (UPS)



Control Panels



Magnetic switches



Molded-case circuit breakers

Factory automation

Assembly and processing equipment Shipping



Process automation

Steel/Non-ferrous Plants Cement Plants



Social solutions

Railcars Radiation Monitoring Systems



Low-voltage inverters Motors Servo systems



Medium-voltage inverters Power conditioning sub-systems (PCS) Gas analyzers



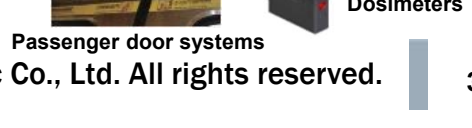
Spool piece ultrasonic flowmeters Pressure Transmitters Laser Gas Analyzers Scrubbers



Programmable controllers HMI Induction furnaces



Drive systems for high-speed railcars Monitoring posts



Passenger door systems Dosimeters

Review of FY2017

Review of FY2017 / Energy Solutions

Energy management

Lower sales due to reduced smart meter sales volumes, improved operating results as cost reductions counteracted lower sales

Transmission and distribution systems

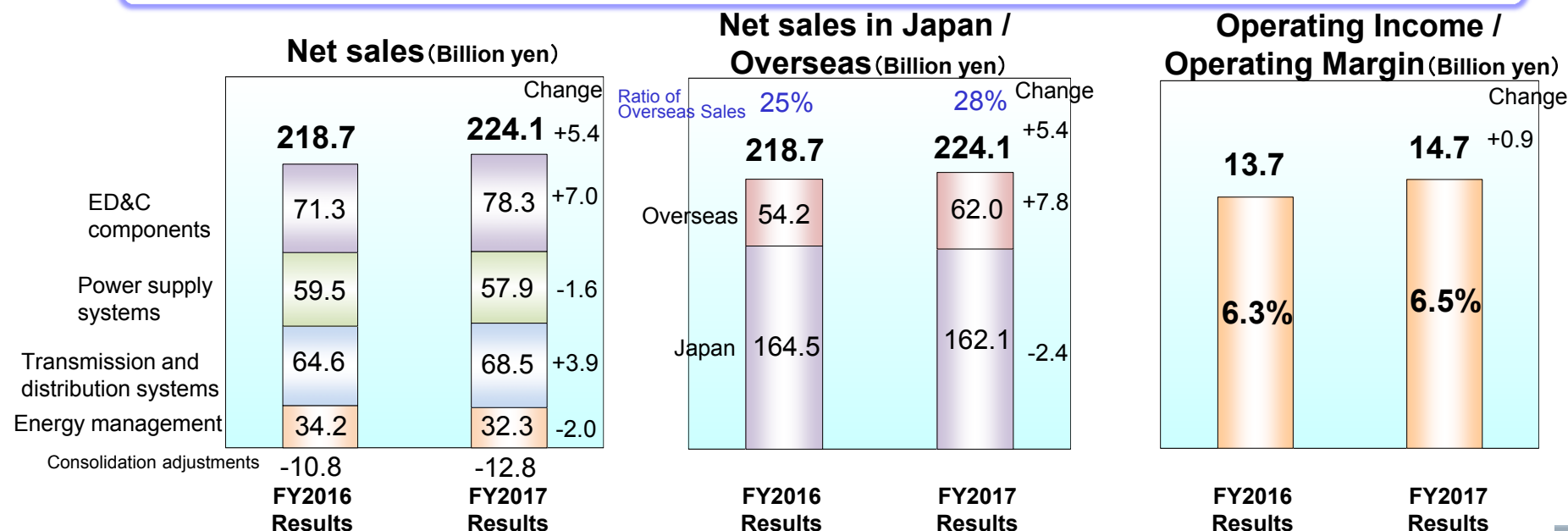
Higher sales as a result of large-scale orders from Asia, worsened operating results due to a less favorable sales mix

Power supply systems

Lower sales due to reduced sales volumes of power conditioning sub-systems, improved operating results as cost reductions counteracted lower sales

ED&C components

Higher sales and improved operating results due to increased demand from machinery manufacturers and semiconductor production equipment manufacturers



* Figures for FY2016 and FY2017 are prior to the segment reorganization conducted in FY2018. ©2018 Fuji Electric Co., Ltd. All rights reserved.

Review of FY2017 / Industry Solutions

Factory automation

Higher sales and improved operating results following increased sales in Japan and China centered on inverters and factory automation components

Process automation

Higher sales and improved operating results because of brisk replacement demand seen in the Japanese market

Environmental and social solutions

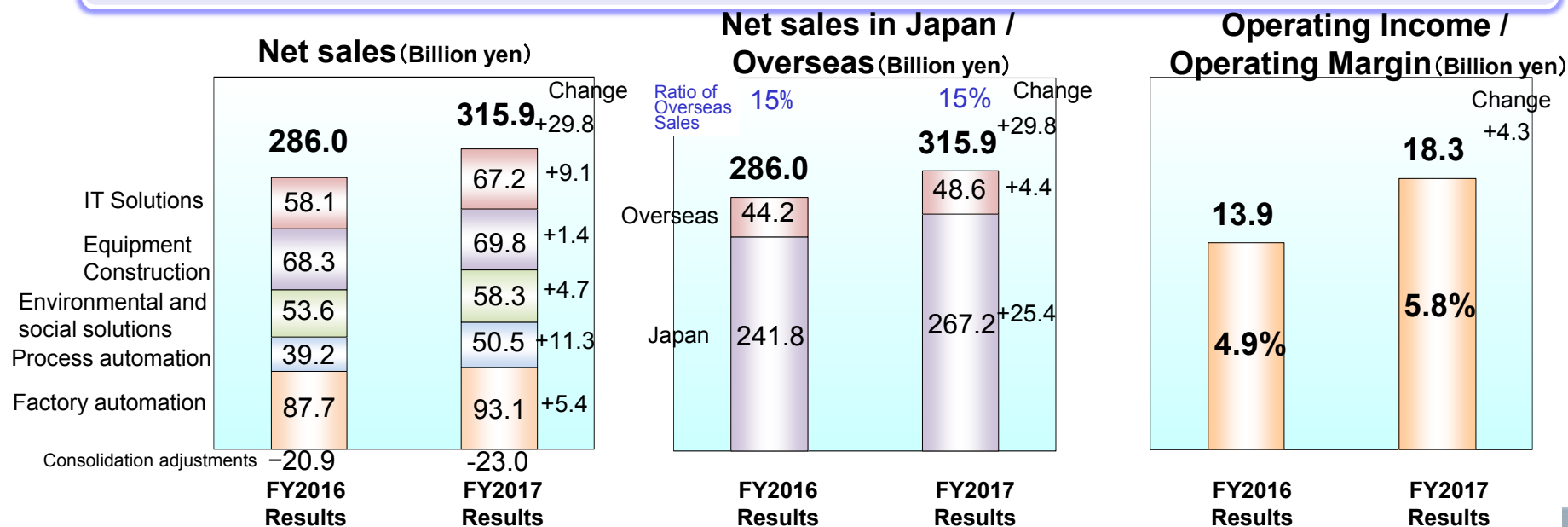
Higher sales and improved operating results supported by increased demand for electrical equipment for railcars in Asia

Equipment construction

Higher sales following strong performance in air-conditioning equipment and electricity and information distribution operations, worsened operating results due to a less favorable sales mix

IT solutions

Higher sales and improved operating results due to increases in orders from the academic sector and the public sector



* Figures for FY2016 and FY2017 are prior to the segment reorganization conducted in FY2018.

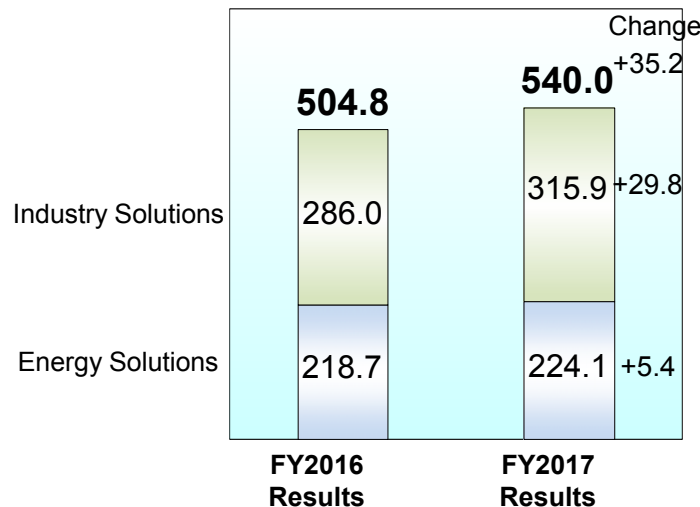
Higher sales and income due to benefits of integrating social engineering systems, industrial infrastructure, and power electronics operations

- ✓ Increase in comprehensive factory electrical equipment orders
- ✓ Steady success in incorporating domestic replacement demand
- ✓ Strong growth and improved profit margins for major components
- ✓ Accelerated progress due to exercising comprehensive development capabilities

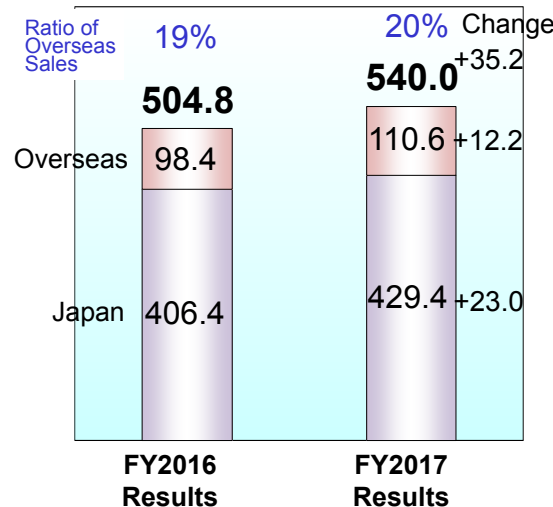
● **Challenges**

- ✓ **Growth of overseas systems operations**
- ✓ **Enhancement of engineering functions**

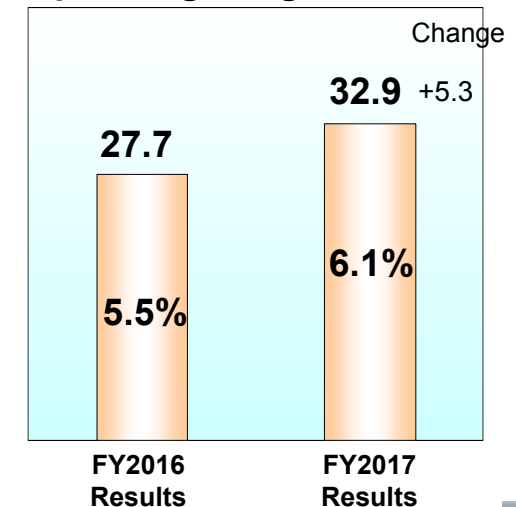
Net sales (Billion yen)



Net sales in Japan / Overseas (Billion yen)



Operating Income / Operating Margin (Billion yen)



* Figures for FY2016 and FY2017 are prior to the segment reorganization conducted in FY2018.

* Figures are the sums of figures for Energy solutions and Industry solutions.

FY2018 Management Plan

Business Policy

1. Create competitive components
2. Enhance systems using competitive components
3. Expand overseas operations by leveraging systems
4. Develop human resources

Expand overseas operations

Social infrastructure (power, telecommunications)



Industrial (materials, assembly)



Distribution, logistics



Energy Solutions

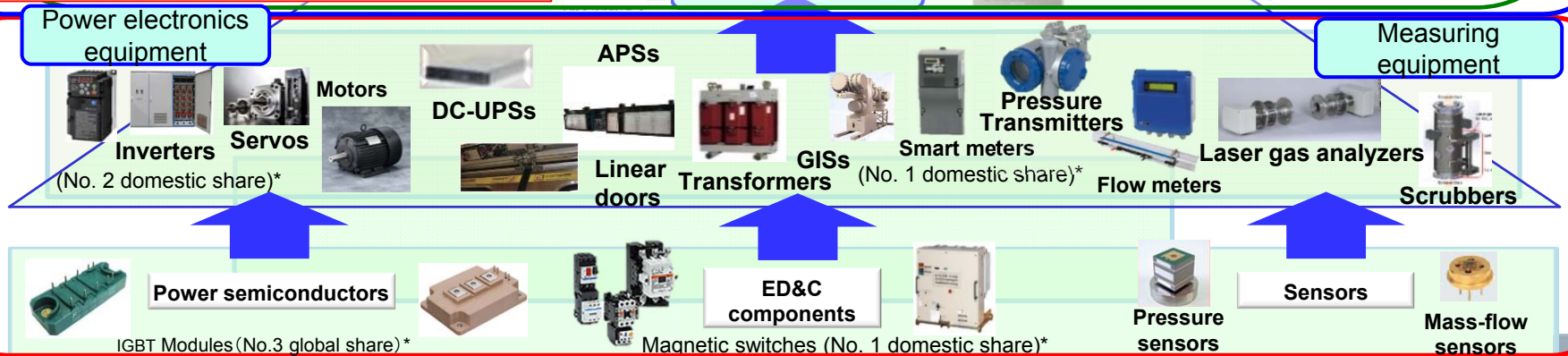
IoT

Industry Solutions

Enhance systems



Create competitive components



*Market share is FY2017 results, and Fuji Electric's estimates.

Changes to Segments and Organizational Structure **Fuji Electric** Innovating Energy Technology

- ◆ **Response to comprehensive factory and equipment orders**
 - Energy management: Consolidation of power supply product and engineering functions
 - Facilities and Power Supplies: Consolidation of power stabilization product and engineering functions
- ◆ **Optimization of global supply chain**
 - Factory automation: Consolidation of components to increase efficiency in areas spanning sales, production, and distribution

Before Change (FY2017)

Segment	Subsegment
Power Electronics Systems —Energy Solutions	Energy Management
	Transmission and Distribution Systems
	Power Supply Systems
	ED&C Components
Power Electronics Systems —Industry Solutions	Factory Automation
	Process Automation
	Environmental and Social Solutions
	Equipment Construction
	IT Solutions



After Change (FY2018)

Subsegment	Main business Area
Energy Management	Power distribution, Smart meters, Industrial substation, Railway substation, Industrial power supplies
Power Supply and Facility Systems	Electrical facilities, Data centers, Uninterruptible power systems(UPS), Switchgears and controlgears
ED&C Components	Power distribution and control equipment
Factory Automation	Inverters, motors, FA components(Servo, Controller), Measuring instruments and sensors, FA systems
Process Automation	Drive control systems, Measuring and control systems
Social Solutions	Transport systems, Radiation monitoring systems
Equipment Construction	Electricity and air conditioning equipment construction
IT Solutions	Information systems

Market trends

- Japan: Favorable capital investment trends centered on the electric machinery and semiconductor industries (up 11% YoY in electric and precision machinery sectors)
- ASEAN: Growth anticipated for substation equipment centered on social infrastructure applications
- China: Brisk investment in production automation and labor saving centered on the assembly industry (automobiles, electronic devices, etc.)
- India: Rise in capital investment in social infrastructure and manufacturing industries stimulated by Make in India movement

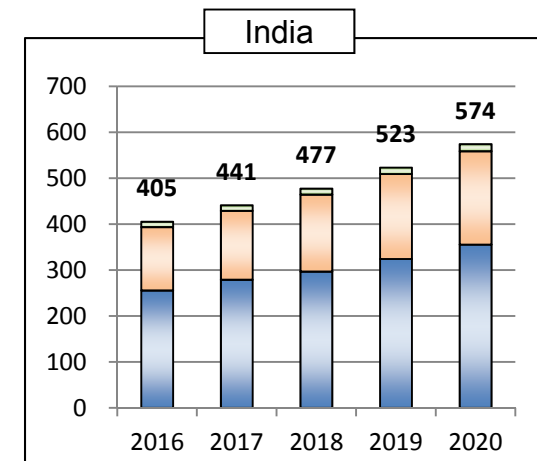
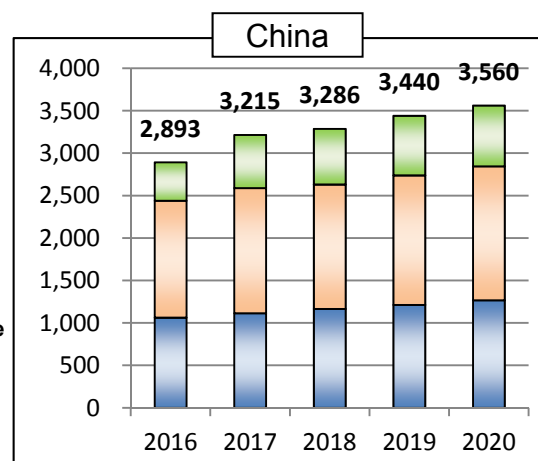
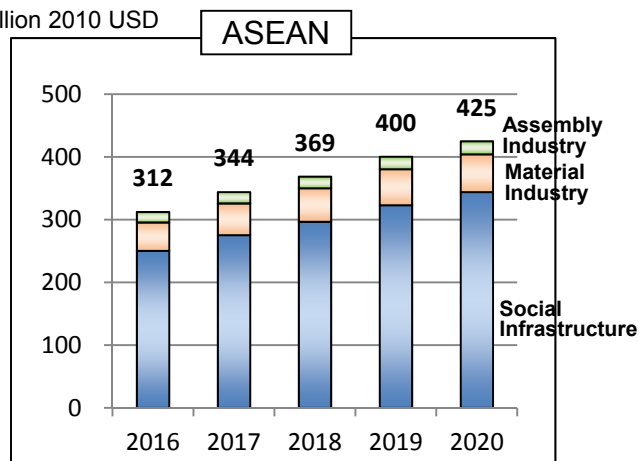
<Real GDP Growth by Region (YoY)>

	Japan	ASEAN Total	ASEAN-5					China	India	NIEs-4	Americas	Europe
			Indonesia	Thailand	Malaysia	Philippines	Vietnam					
CY2017	1.7	5.3	5.1	3.9	5.9	6.7	6.8	6.9	6.4	3.2	2.3	2.4
CY2018	1.0	5.3	5.2	3.5	5.4	6.6	7.0	6.5	7.3	2.9	2.8	2.2

Source: Mizuho Research Institute Ltd. (May 17, 2018), etc.

<Overseas Capital Investment Trends>

*Billion 2010 USD

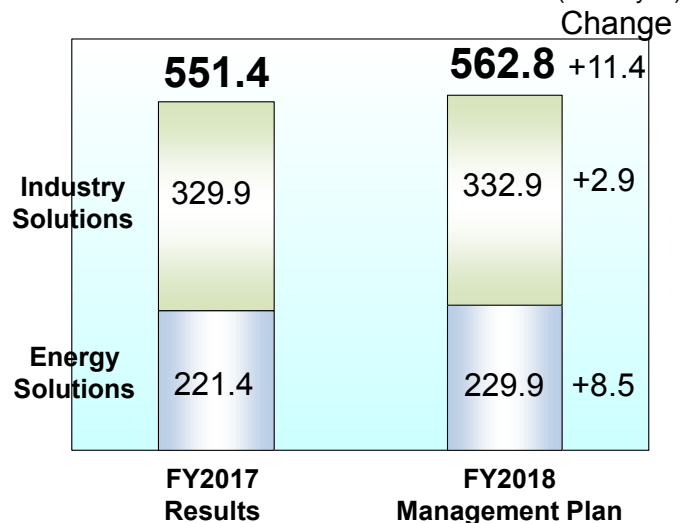


Source: IHS Global Insight (April 2018 Forecast)

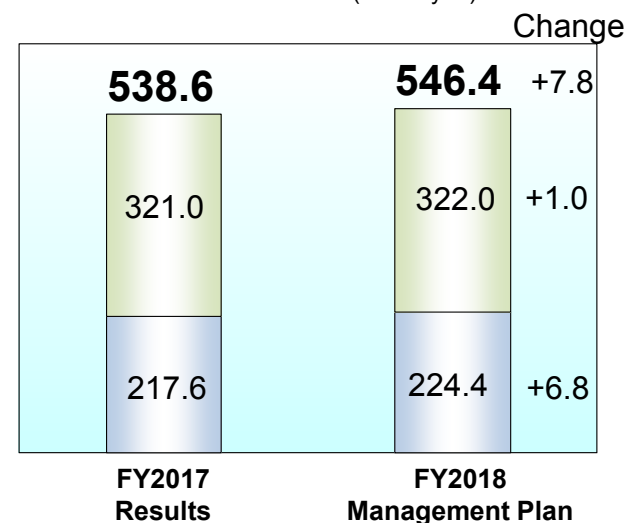
©2018 Fuji Electric Co., Ltd. All rights reserved.

Business Plan—Power Electronics Systems

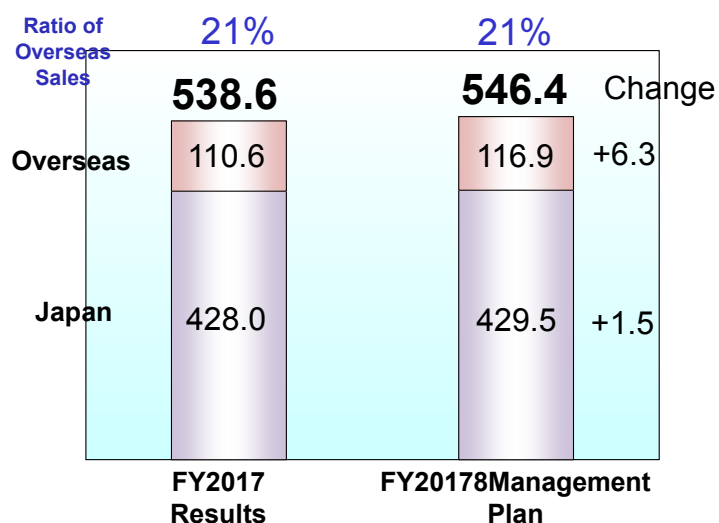
Amount of Orders Received (Billion yen)



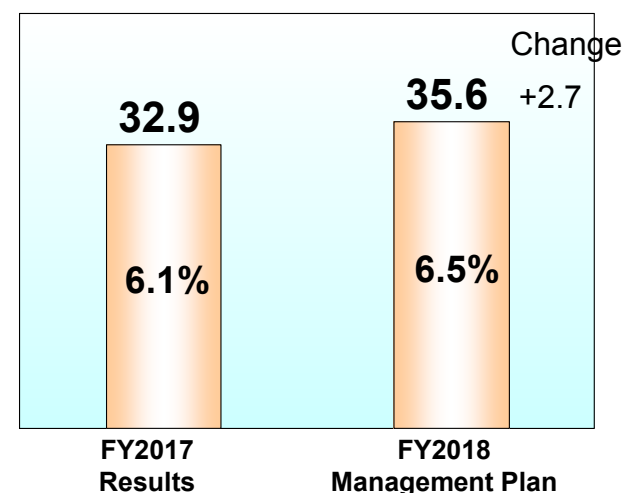
Net Sales (Billion yen)



Net Sales in Japan / Overseas (Billion yen)



Operating Income / Operating Margin (Billion yen)



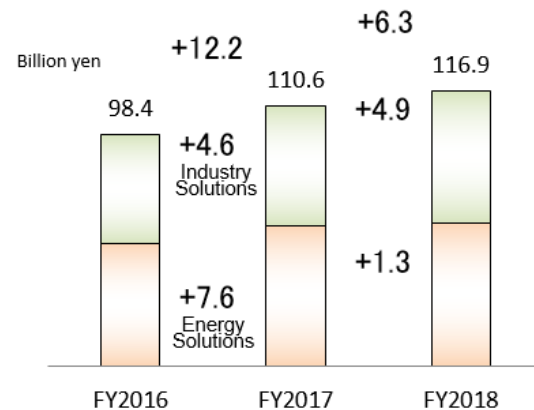
* Figures for FY2016 and FY2017 are prior to the segment reorganization conducted in FY2018.
* Figures are the sums of figures for Energy solutions and Industry solutions.

Priority Measures

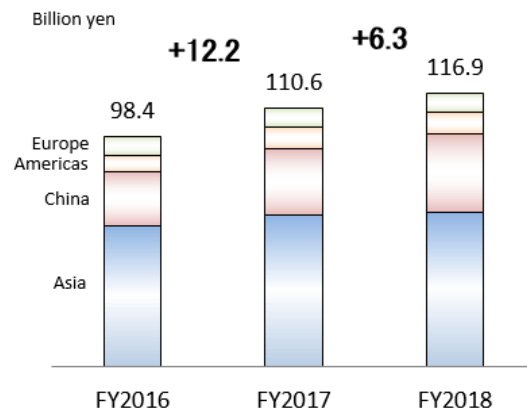
Priority Measures

- Expansion of overseas operations and broadening of component operations into systems field

Breakdown of Overseas Sales



Sales by Region



Priority Measures

- ✓ Utilize overseas engineering companies partnered with or acquired through M&A activities
- ✓ Establish organizations for drafting overseas marketing and business strategies
- ✓ Promote standardization and bundling
- ✓ Develop and introduce global products

Measures by Region

Asia

- ✓ Expand transmission and distribution systems business through enhanced coordination with local bases
- ✓ Acquire plant orders by utilizing equipment bundles targeting steel and cement plants

China

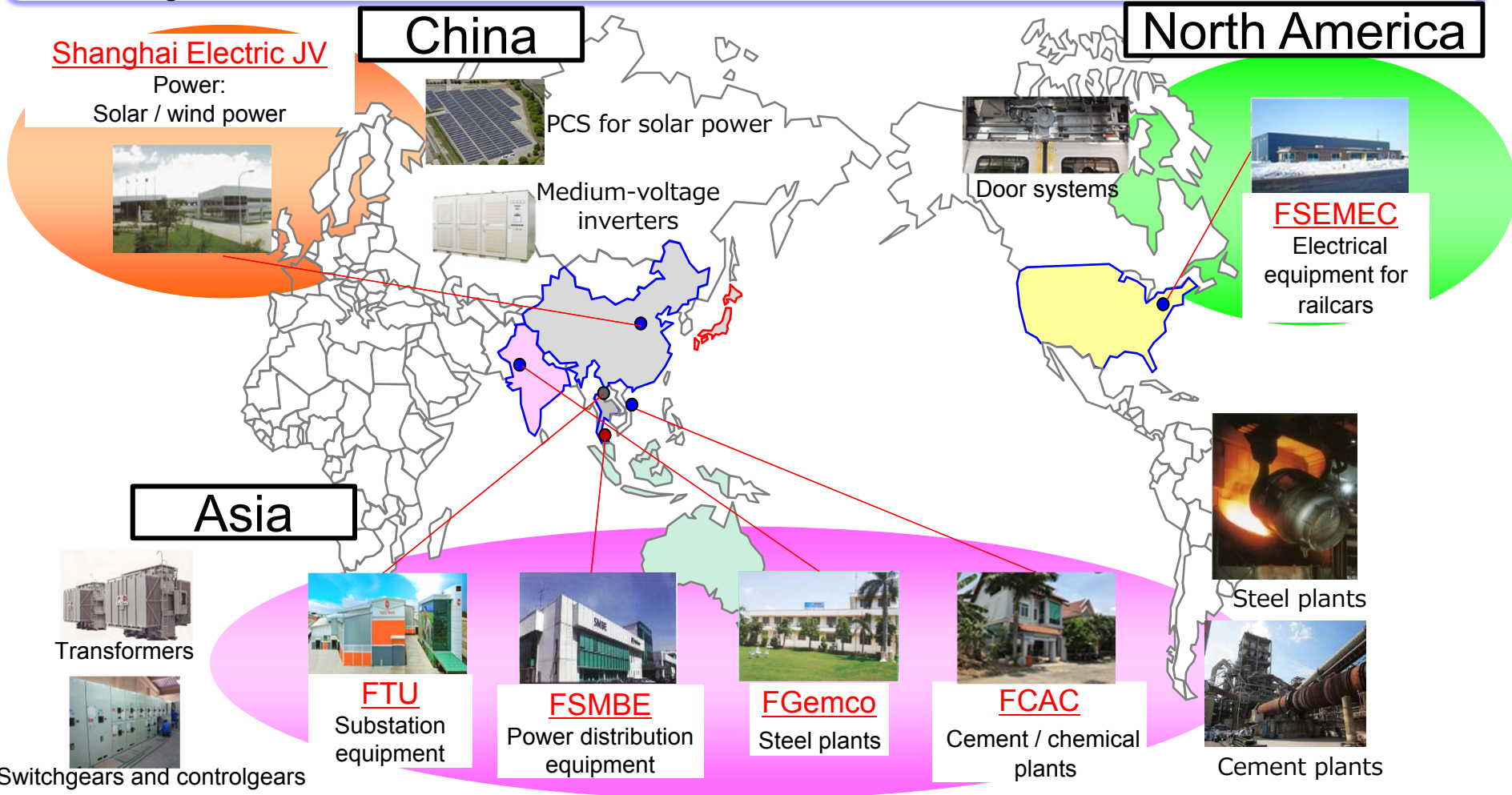
- ✓ Acquire system orders through increased collaboration
- ✓ Expand sales of factory automation systems and motion and servo equipment

Americas

- ✓ Grow railroad operations by enhancing production capabilities at local bases and expanding sales channels
- ✓ Examine possible M&A activities

Priority Measures—Expansion of Overseas System Operations Fuji Electric *Innovating Energy Technology*

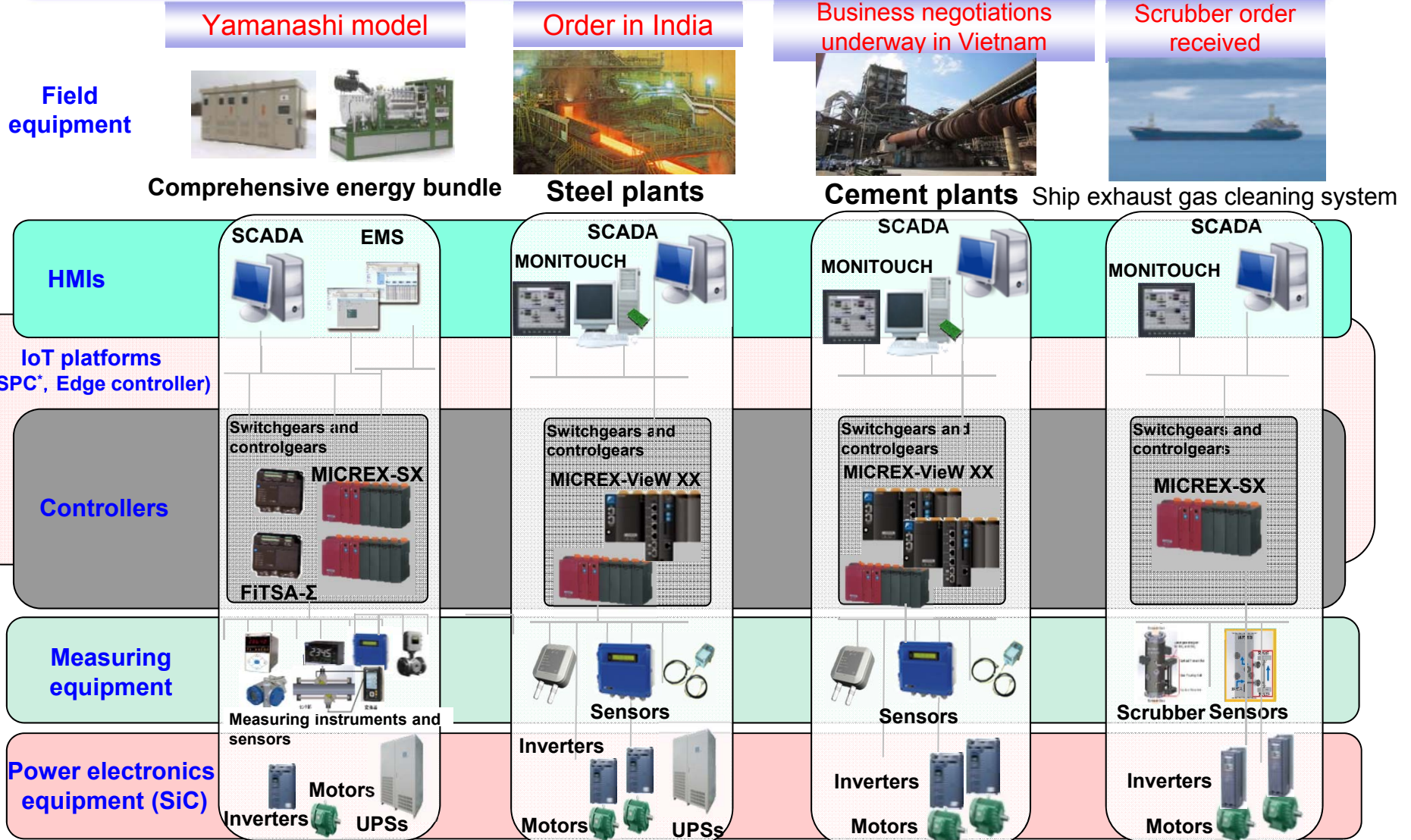
- Focus on strategic industries centered on China and other Asian markets where growth can be anticipated
- Establish cross-business organizations for drafting overseas marketing and business strategies



FTU: Fuji Tusco Co., Ltd. , FSMBE: Fuji SMBE Pte. Ltd.
 FGemco: Fuji Gemco Private Limited , FCAC: Fuji CAC Joint Stock Company
 FSEMEC: Fuji SEMEC Inc

Engineering—Standardization and Bundling

- Select 12 systems: IoT + Equipment combinations + Switchgears and controlgears + Engineering



*MSPC: Multivariate Statistical Process Control Tool (Diagnosis and Analysis Tool)

Initiative Examples—Energy Supply Systems

- Provision of comprehensive bundles packaging Yamanashi model with offerings including lifecycle support
 - Focus on five industries (assembly processing, semiconductors, food processing facilities, etc.) in future business development



Solar power generation systems



Fuel cells



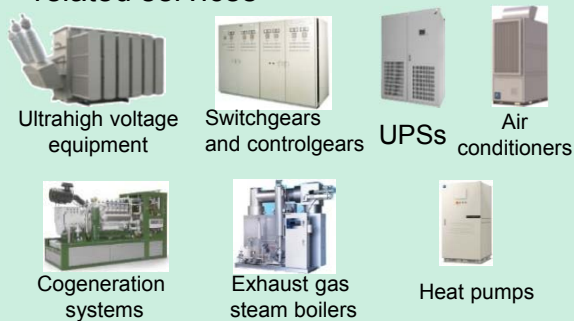
Cogeneration systems

Visualization and optimization of energy

Yamanashi Factory (100% powered by in-house generation)

Heat and Power Supply Systems

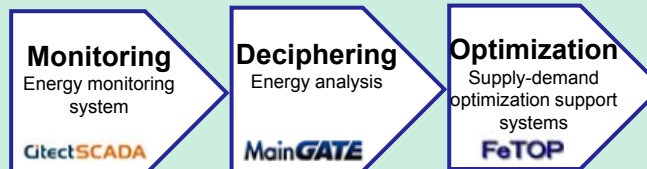
Comprehensive engineering bundles packaging everything from manufacturing and procurement of heat and power equipment to installation and ancillary system-related services



Power stabilization

Energy Management Systems

Introduction of optimal energy supply-demand control systems supported by energy management and analysis support
Realization of stabilize supply and energy savings



Energy supply-demand optimization

**Productivity improvement
Energy conservation**

Maintenance / Services

Provision of services spanning entire lifecycle through comprehensive maintenance and service packages



24-hours-a-day call centers



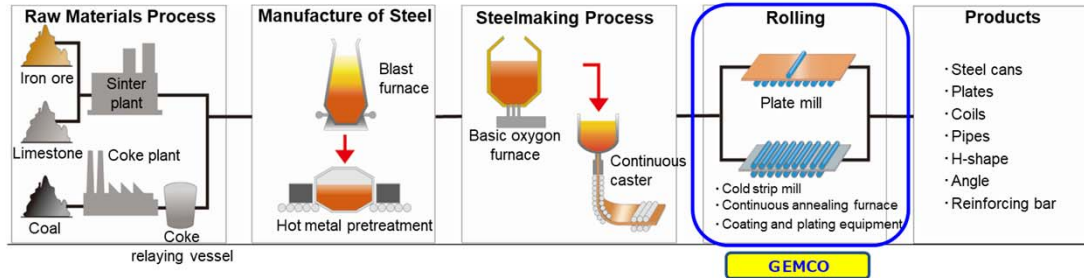
Maintenance proxy services

Equipment management outsourcing

Initiative Examples—Steel Plants

Development of bundles leveraging FGemco sales channels and FE product and system expertise

Standardized Bundles for Steel Rod and Rolling Applications



Development of Systems, Switchgears and Controlgears Based on Catalogs

FE Fuji Electric *Innovating Energy Technology*

Industry solutions | Process automation

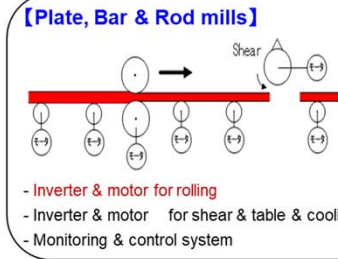
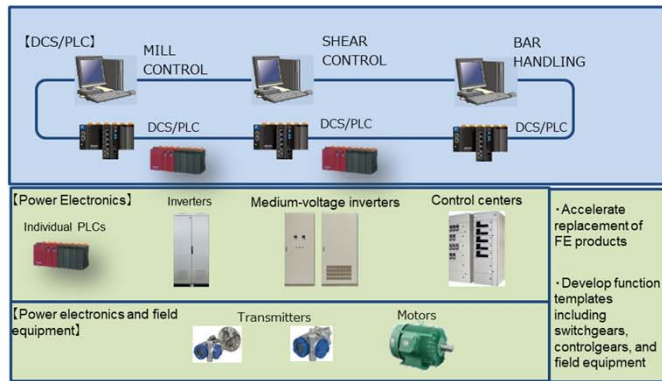
Optimal control with high-reliability systems
High-speed Control Systems for Metal Plants

Stable operation through optimal electric equipment, and optimal monitoring and control.

Our solutions provide optimal systems based on the standard packages for iron and steel plants and non-ferrous metal plants that Fuji Electric has developed with expertise cultivated over many years.

[Benefits]

- Introduction of highly reliable electrical equipment
- Coexistence with high-speed control and monitoring control
- Reduction of specific energy consumption through efficient usage
- Stable operation and reduced maintenance

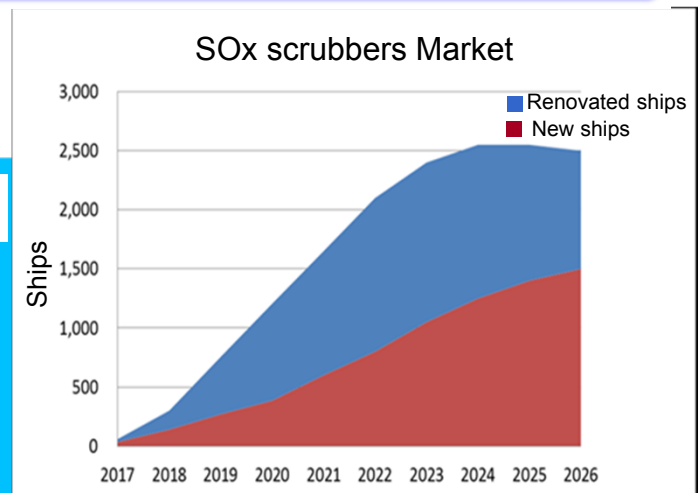
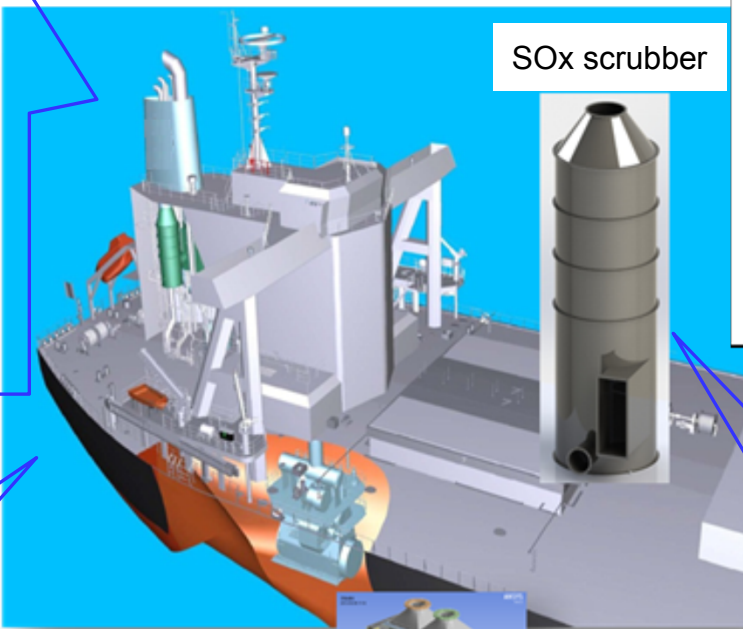
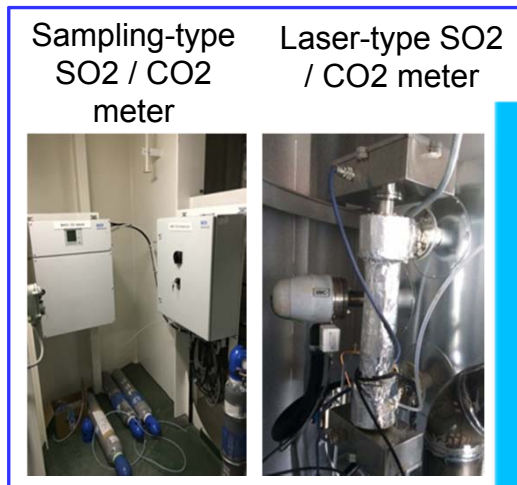


Standard packages	Components	Target facilities
Master controls Speed and tension control Diameter calculation and correction Automatic deceleration Load sharing Elongation control High-speed drive control	HMI Controllers Motors Drives	Converter furnace Wire rod / Steel bar-mill Continuous annealing furnace Surface treatment equipment
Individual controls Handling Mode setting Ancillary equipment control Continuous single dimension control		
Overall controls Weld point tracking Data control		
Human machine interface (HMI) Display and settings Alarm management		
Level 2 (L-2) systems Display and settings Process data in (PDI) and process data out (PDO) management		

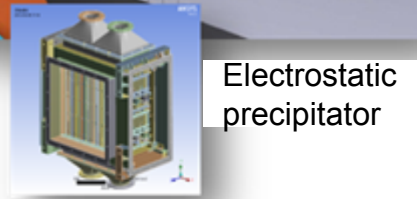
- Robust steel demand projected in Asia
6.1% CAGR in ASEAN region, 7.6% CAGR in India (2017–2023)

- Acquire 8 plant orders through FGemco
- Expand scope of operations and bundles from steel plants in India and cement plants in Vietnam

- Address general water SOx regulations to be instituted 2020
- Orders received for 10 units in FY2017, double this level targeted in FY2018



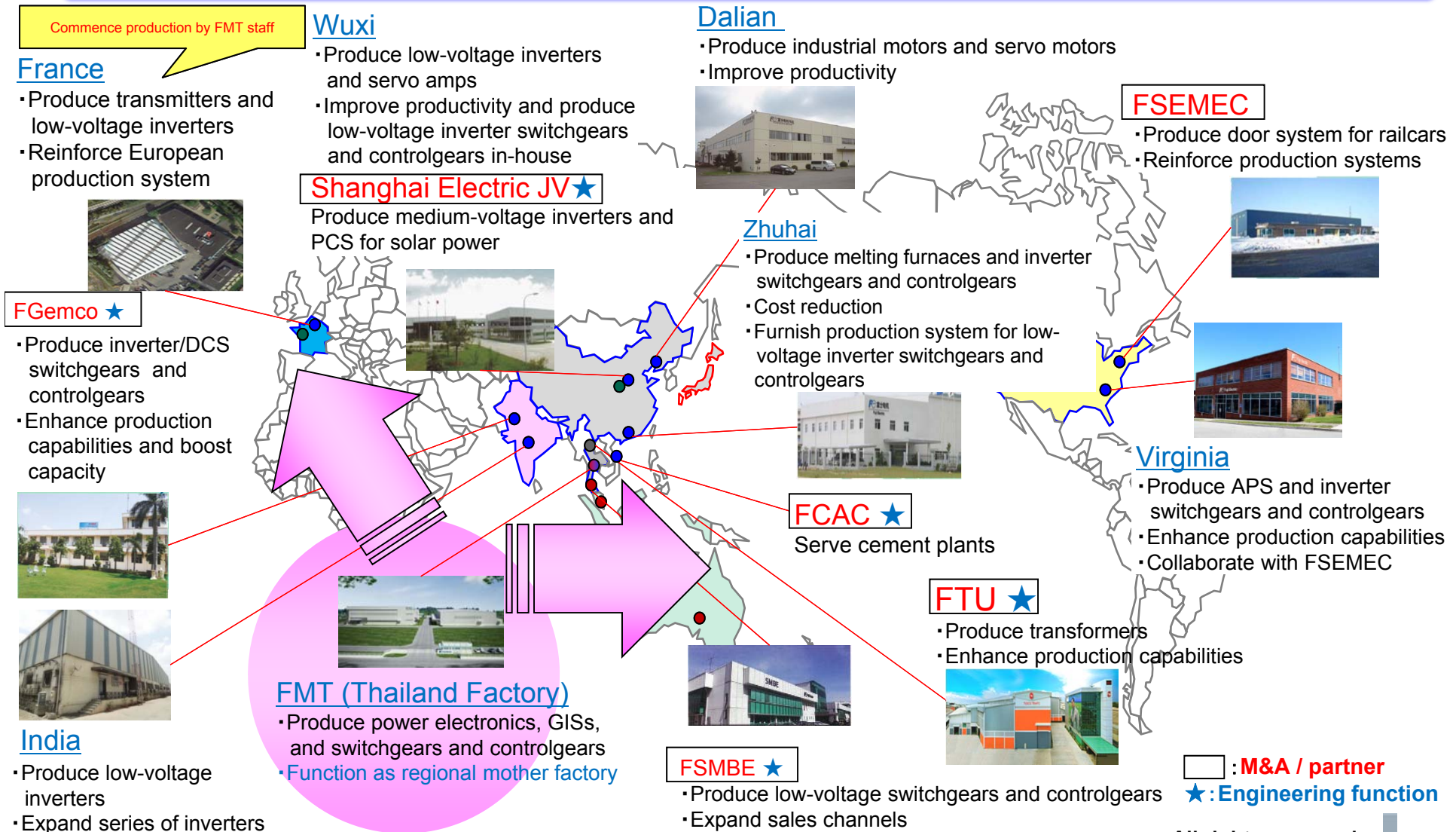
Approx. 2,500 ships per year leading up to 2025



* EGCS: Exhaust gas cleaning system for ships

Overseas production bases

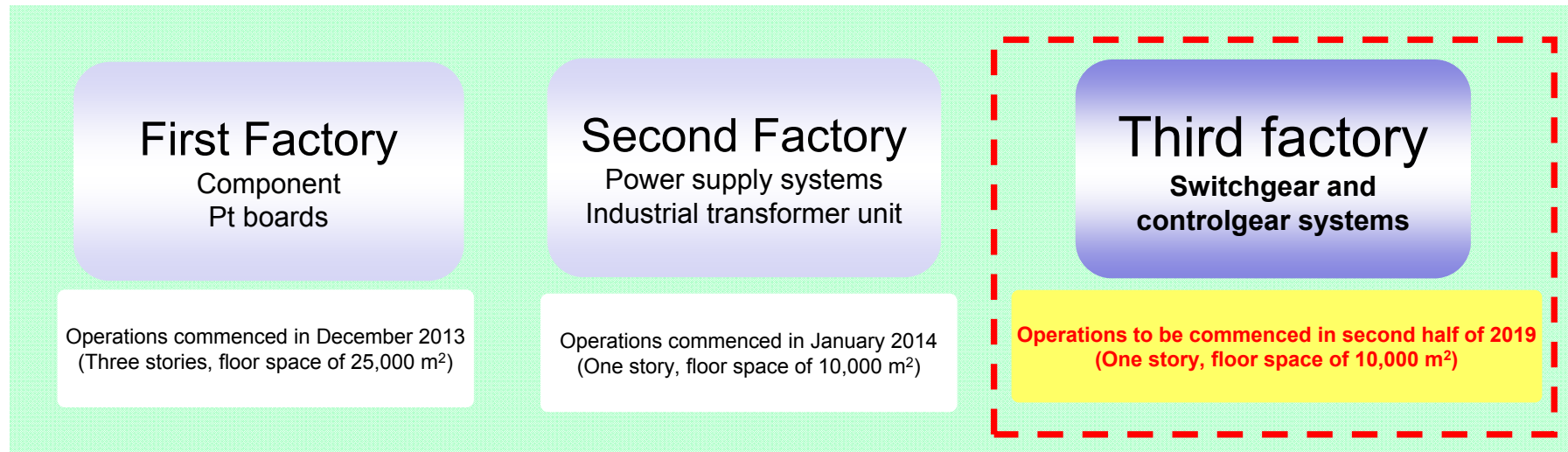
- Expand local production and consumption
- Have FMT support manufacturing and engineering at Asian bases as mother factory



FMT: Fuji Electric Manufacturing (Thailand) Co., Ltd.

Reinforcement of FMT (Thailand Factory)

- System factory construction planned to respond to growth of Asian market



- Bolster production capacity of power control equipment
- Reduce costs through in-house processing of sheet metal
- Strengthen switchgear and controlgear system business through coordination FSMBE



First factory



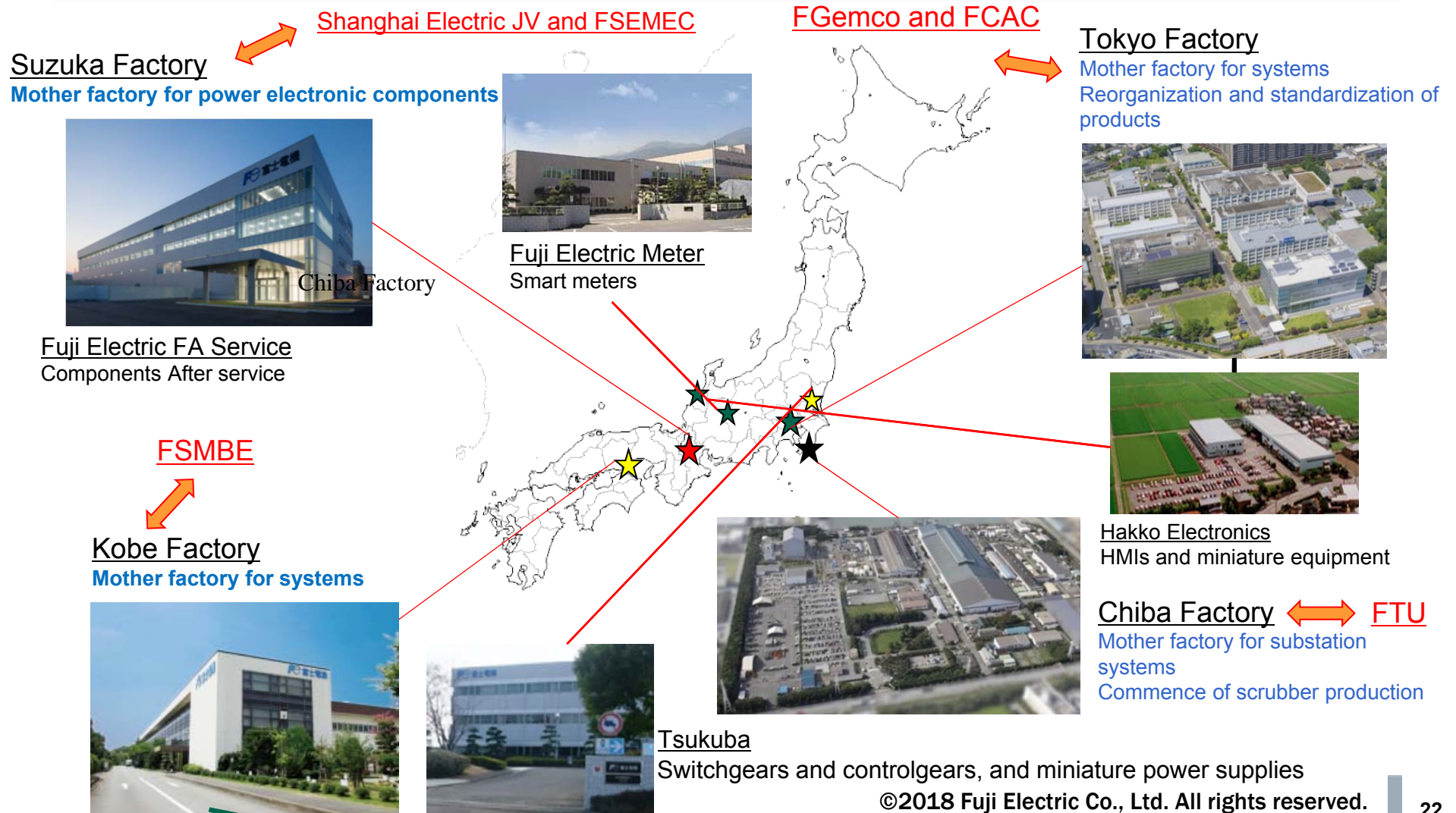
Switchgears



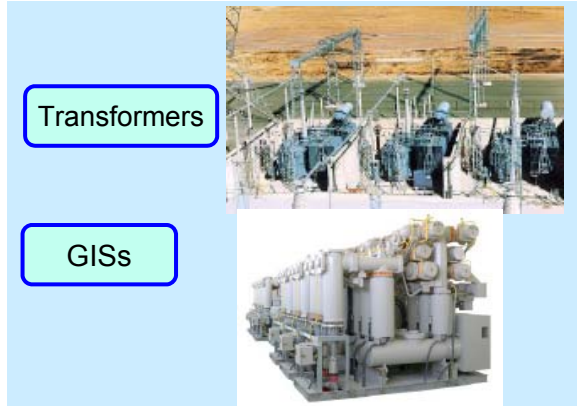
Switchgear and controlgear production

Domestic production base / Stepping up coordination with overseas bases

- Provide education for engineers at overseas bases and companies acquired through M&A activities
- Improve production technologies (standardization, in-house production, automation, IoT)
 - Deploy technologies at overseas production bases



● Commercialize competitive components → Rollout globally



★Planned launch (commercialization timing)

		~FY2017	FY2018	FY2019	FY2020
Energy Solutions	Energy management	Transformers		★	
		Power transformers (miniature, lightweight)	Expanded series		
		GISs	★		
		Global GISs	Higher voltage compatibility		
Industry Solutions	Factory automation	PCS for solar power		★	
		Assembly-style systems	Expanded capacity		
	Centralized systems (miniature)	★	Higher voltage compatibility		
	Process automation	Industrial electric-heating products (melting furnaces)		★	
		Global specifications	Expanded capacity		
			Compatibility with systems development		

● Commercialization of differentiated SiC-equipped components

★Planned launch (commercialization timing)

Substation equipment



Factory automation



Social solutions



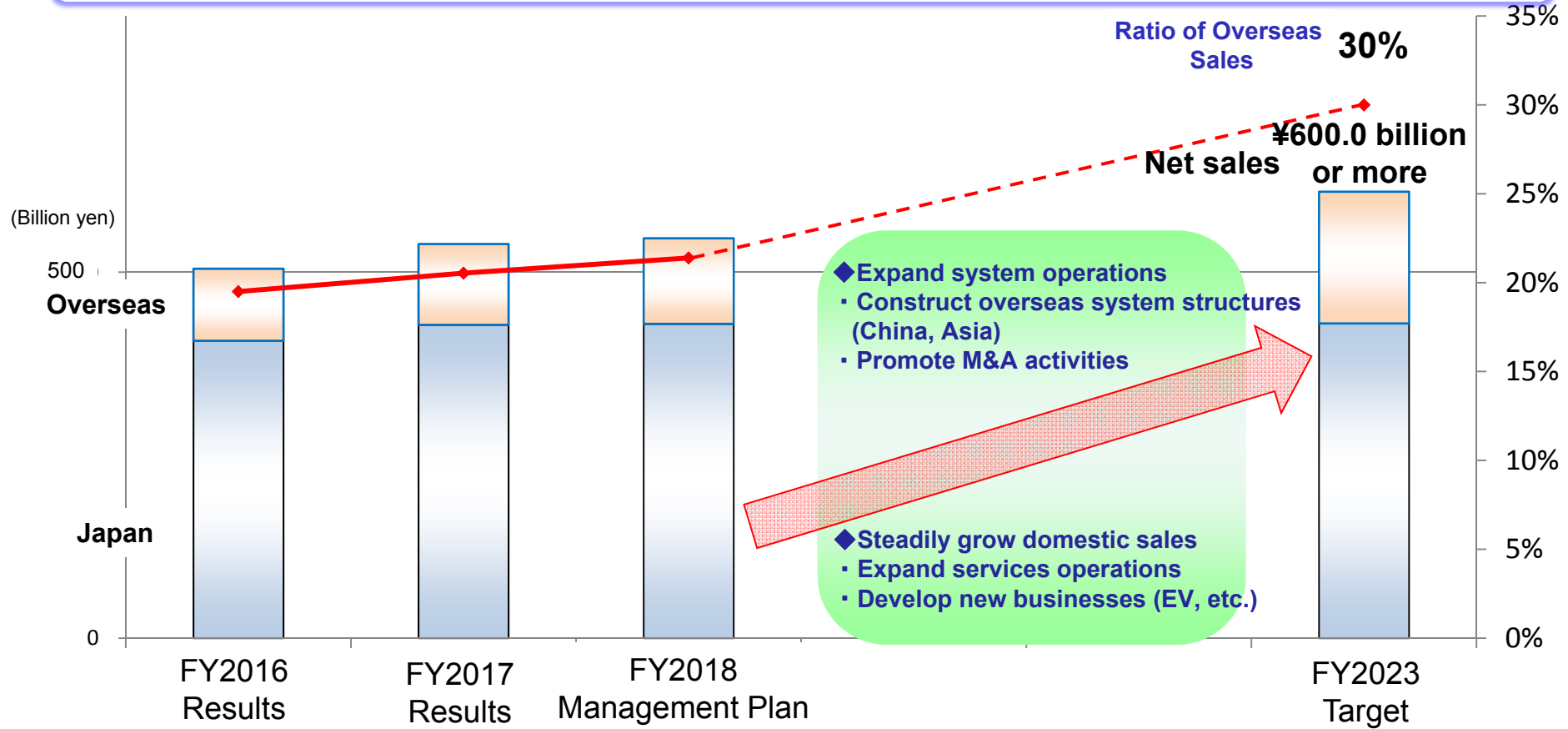


SiC

		~FY2017	FY2018	FY2019	FY2020
Energy Solutions	Energy management				★
		Railway ground power units			
Industry Solutions	Factory automation			★	
		Hyper premium inverters		Expansion of high-capacity series	
	Process automation			★	
		Highly durable inverters		Expansion of high-capacity series	
		DC-UPSs (industrial)		System compatibility	
Social solutions	Social solutions				★
		Shinkansen propulsion systems			
		Conventional train propulsion systems		Overseas specifications	
				EV systems	

Vision for Power Electronics Systems Business

Target net sales of ¥600.0 billion or more in FY2023
Exercise comprehensive strength of Fuji Electric



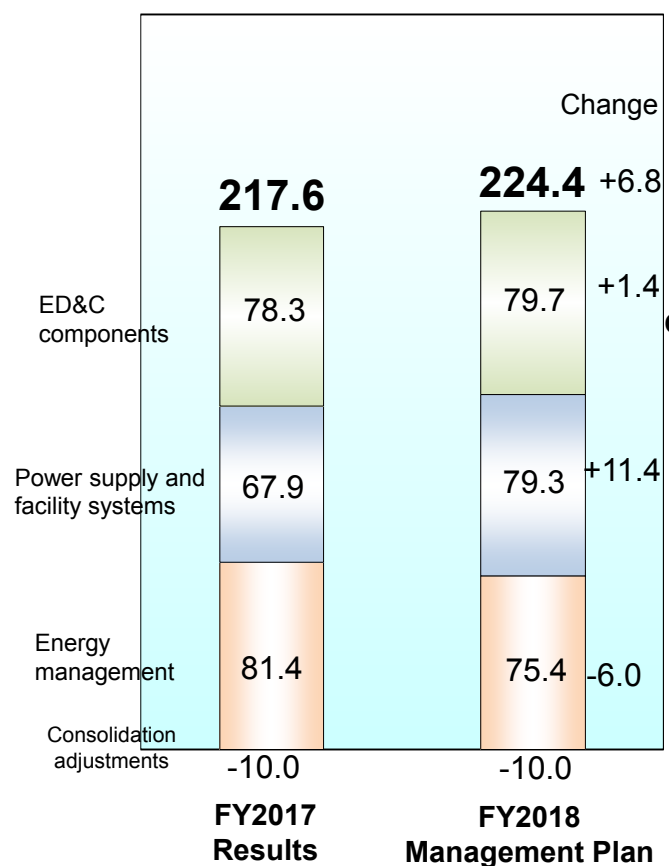
- ◆ Expand system operations
 - Construct overseas system structures (China, Asia)
 - Promote M&A activities
- ◆ Steadily grow domestic sales
 - Expand services operations
 - Develop new businesses (EV, etc.)

- Develop foundations for new power electronics systems business structure
- Strengthen systems and increase orders
- Reinforce overseas engineering systems
- Expand overseas system operations

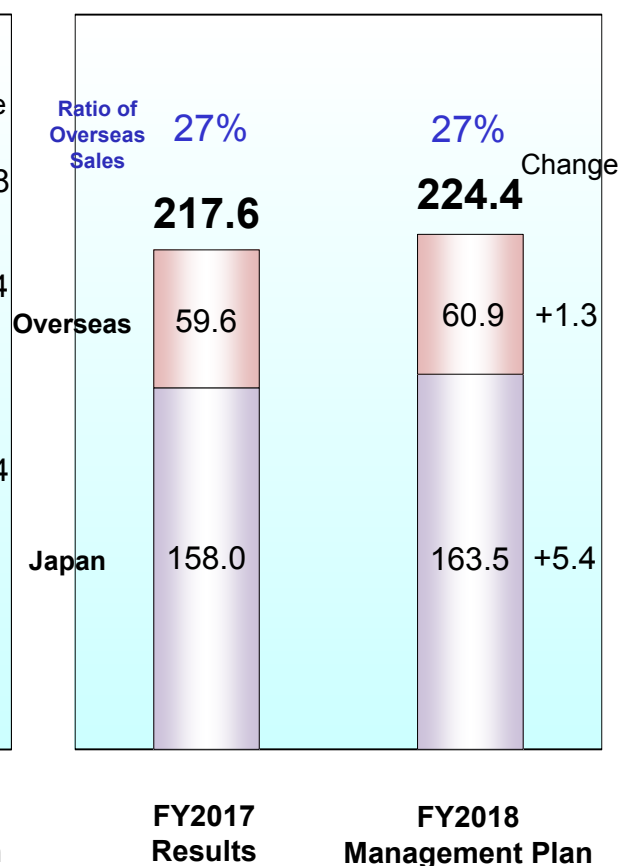
Energy Solutions

Business Plan—Energy Solutions

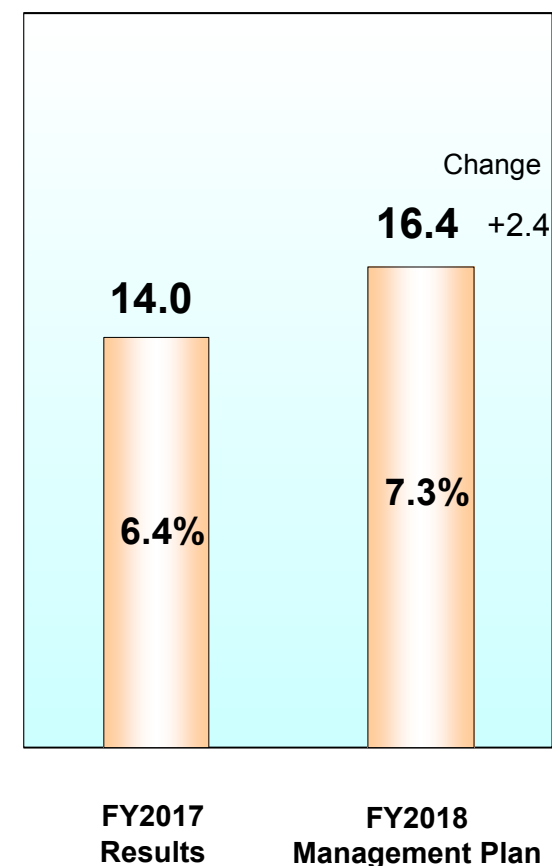
Net Sales by Subsegment (Billion yen)



Net Sales in Japan / Overseas (Billion yen)



Operating Income / Operating Margin (Billion yen)



*Figures for FY2017 have been restated to reflect organizational restructuring conducted in FY2018.

Energy management

- Increase bundled EMS orders
- Expand transmission and distribution system operations in Asia

Power supply and facility systems

- Grow comprehensive factory electrical equipment orders
- Strengthen engineering functions in Asia

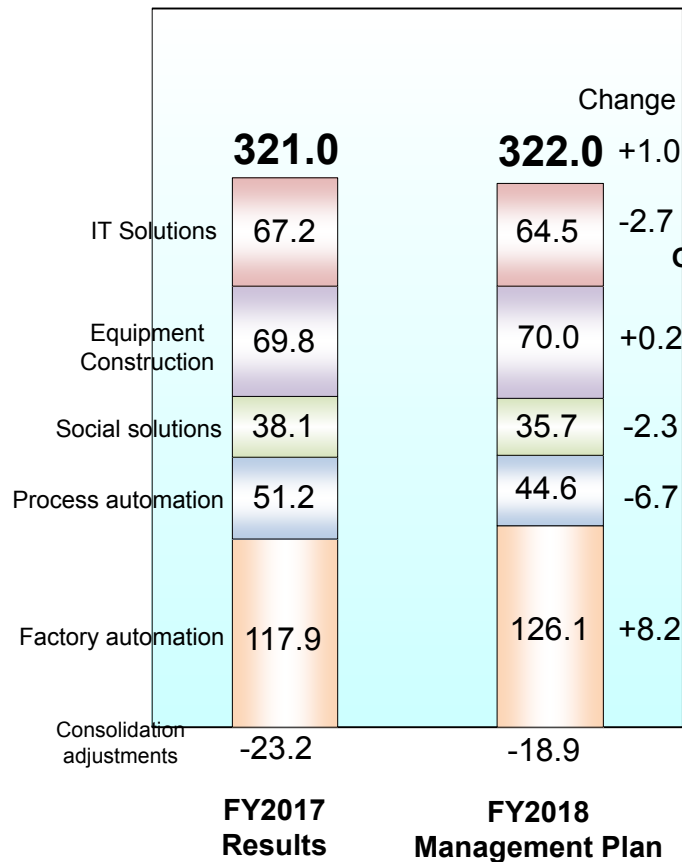
ED&C components

- Incorporate domestic construction demand

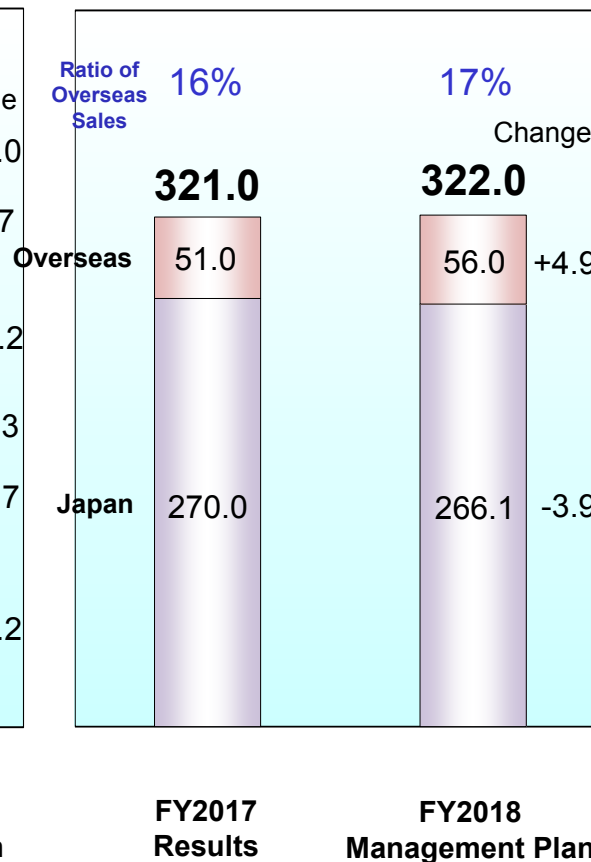
Industry Solutions

Business Plan—Industry Solutions

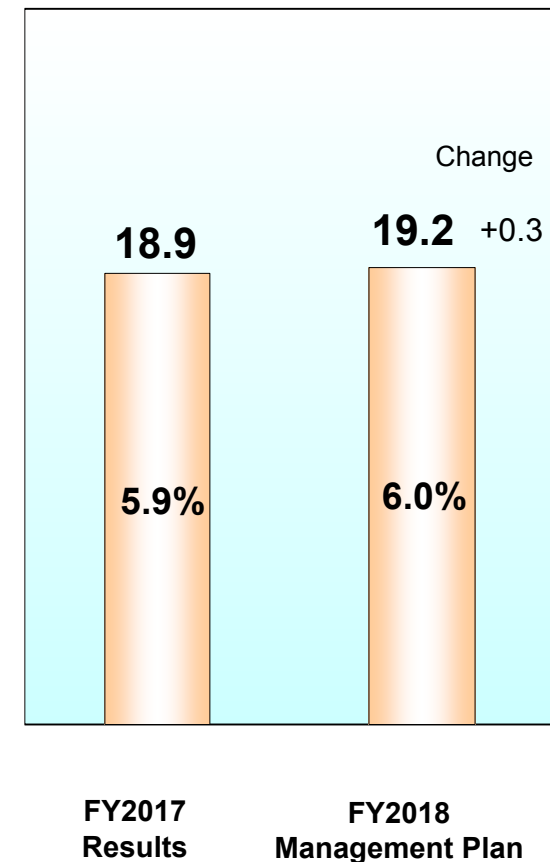
Net Sales by Subsegment
(Billion yen)



Net Sales in Japan / Overseas (Billion yen)



Operating Income / Operating Margin
(Billion yen)



*Figures for FY2017 have been restated to reflect organizational restructuring conducted in FY2018.

Factory automation

- Introduce global products for China and other Asian markets
- Expand factory automation systems business

Process automation

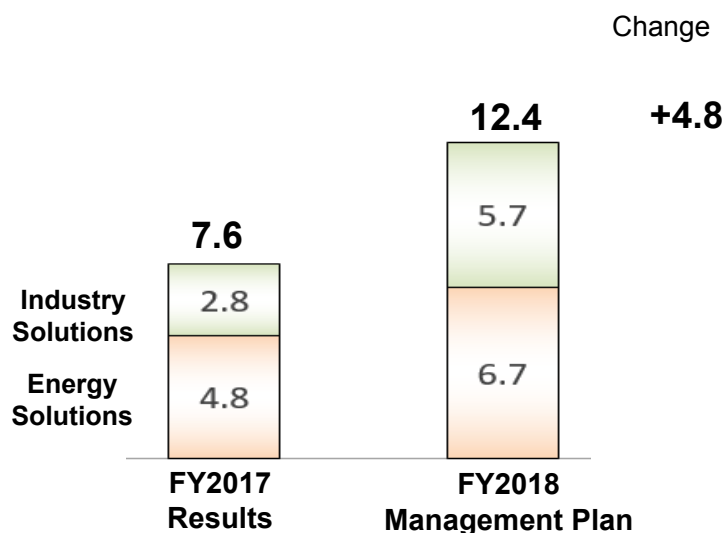
- Capture demand for new and replacement systems stemming from recovery in domestic capital expenditure
- Increases bundled plant system orders from Asia

Social solutions

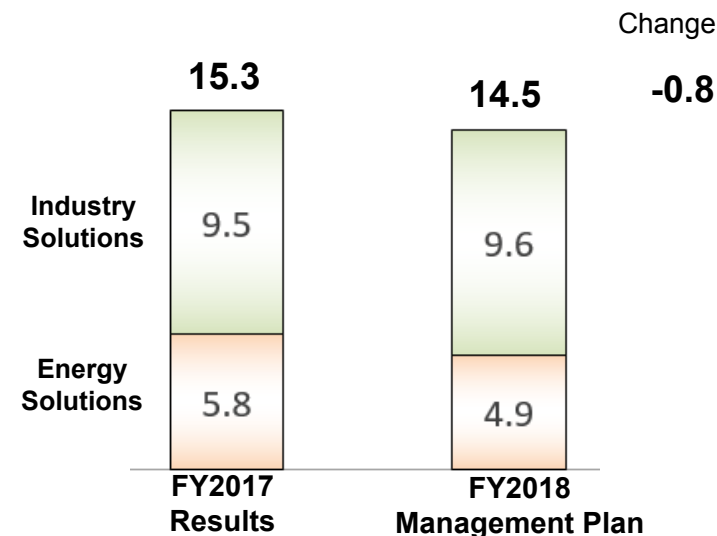
- Accelerate development of new railroad system products

Capital Investment / Research and Development

Capital Investment (Billion yen)



Research and Development (Billion yen)



- ◆ New building at Thailand Factory
- ◆ Energy Solutions
 - Upgrades to transmission and distribution system production facilities
- ◆ Industry Solutions
 - Factory rationalization and automation

- ◆ Energy Solutions
 - Global transformers
- ◆ Industry Solutions
 - SiC-equipped power electronics systems
 - FA systems and motion and servo systems
 - Field devices and systems compatible with IoT
 - Automotive power electronics and electrical equipment for railcars

* R&D expenditure figures above represent expenditures that have been allocated to segments based on theme and may therefore differ from figures contained in consolidated financial reports

1. Statements made in this documents or in the presentation to which they pertain regarding estimates or projections are forward-looking statements based on the company's judgments and assumptions in light of information currently available. Actual results may differ materially from those projected as a result of uncertainties inherent in such judgments and assumptions, as well as changes in business operations or other internal or external conditions. Accordingly, the company gives no guarantee regarding the reliability of any information contained in these forward-looking statements.
2. These documents are for information purpose only, and do not constitute an inducement by the company to make investments.
3. Unauthorized reproduction of these documents, in part or in whole, is prohibited.