

Power Electronics Systems Business Strategies

May 25, 2017
Fuji Electric Co., Ltd.
**Power Electronics Systems
Business Group**

- Review of FY2016
- Changes in Structure and Segments
 - Aim and Structure
 - Specific Initiatives
- FY2017 Management Plan
 - Business Policies
 - Business Plan
 - Priority Measures
 - Capital Investment / Research and Development

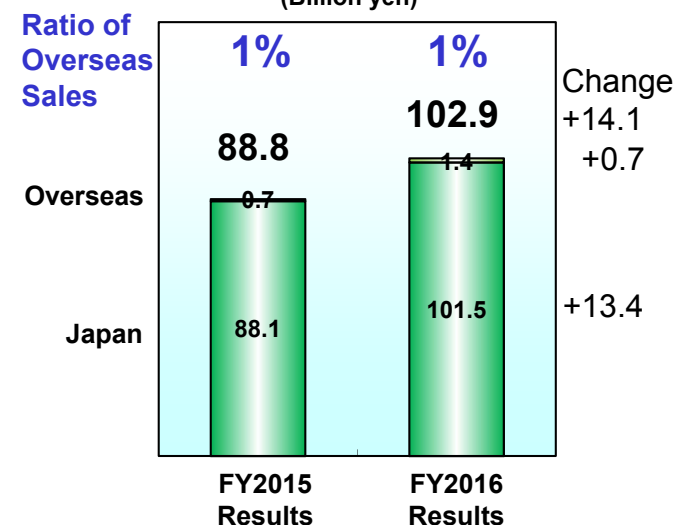
Review of FY2016

Review of FY2016 - Social Engineering Systems

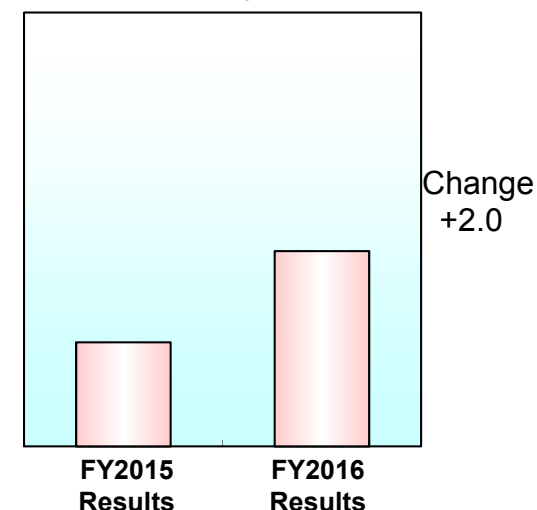
- **Establishment of domestic operating foundations**
 - ✓ Top domestic share for smart meters
Development of production system with production capacity of 3 million units
 - ✓ Strong growth in social information business

- **Challenges**
 - ✓ Growth of overseas operations
 - ✓ Expansion of energy management field operations

Net Sales in Japan / Overseas
(Billion yen)



Operating Income / Operating Margin
(Billion yen)



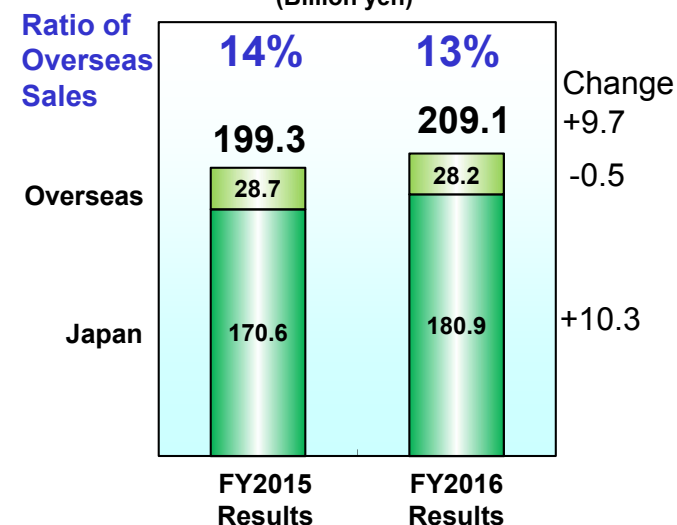
* Figures for net sales and operating income are the sums of figures for the social engineering systems business and the social information business.

Review of FY2016 - Industrial Infrastructure

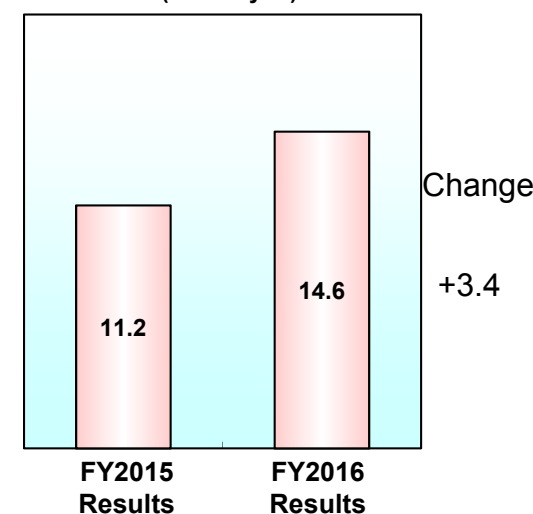
- **Expansion of domestic operations**
 - ✓ Steady incorporation of domestic replacement demand
Substations, etc.
 - ✓ New business launches
Distribution, datacenters

- **Challenges**
 - ✓ Expansion of overseas system operations
 - ✓ Reinforcement of industrial plant operations
Enhancement of system component equipment
(measuring, control)

Net Sales in Japan / Overseas
(Billion yen)



Operating Income / Operating Margin
(Billion yen)



* Figures for FY2015 and FY2016 are prior to the segment reorganization conducted in FY2017. ©2017 Fuji Electric Co., Ltd. All rights reserved.

Review of FY2016 - Power Electronics

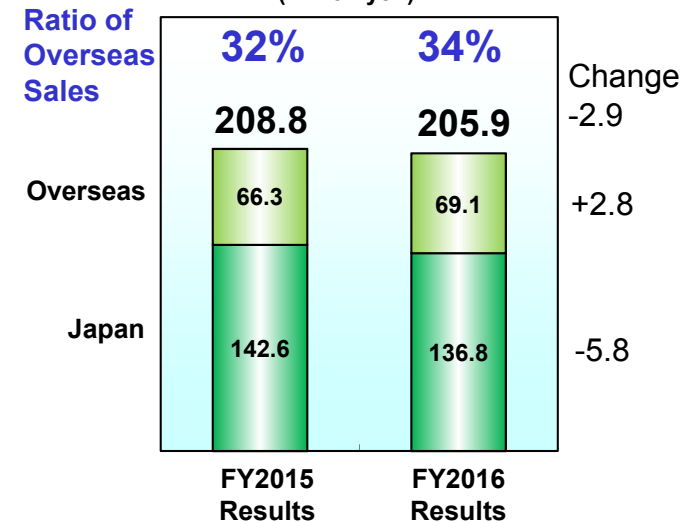
- **Establishment of foundations for business expansion**

- ✓ Growth of domestic share for major components
Low-voltage inverters, servos, industrial motors, UPSs
- ✓ Expansion of overseas operations
Establishment of overseas foundations through M&A activities

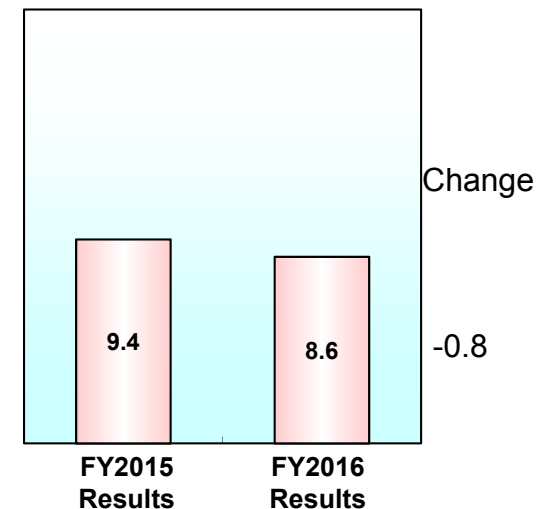
- **Challenges**

- ✓ Creation of greatly differentiated components
Adoption of competitive SiC power semiconductors (Power supplies, electrical equipment for railcars, inverters, servos)
- ✓ Transformation of earnings structure
Standalone components
→ Expansion of motion FA systems

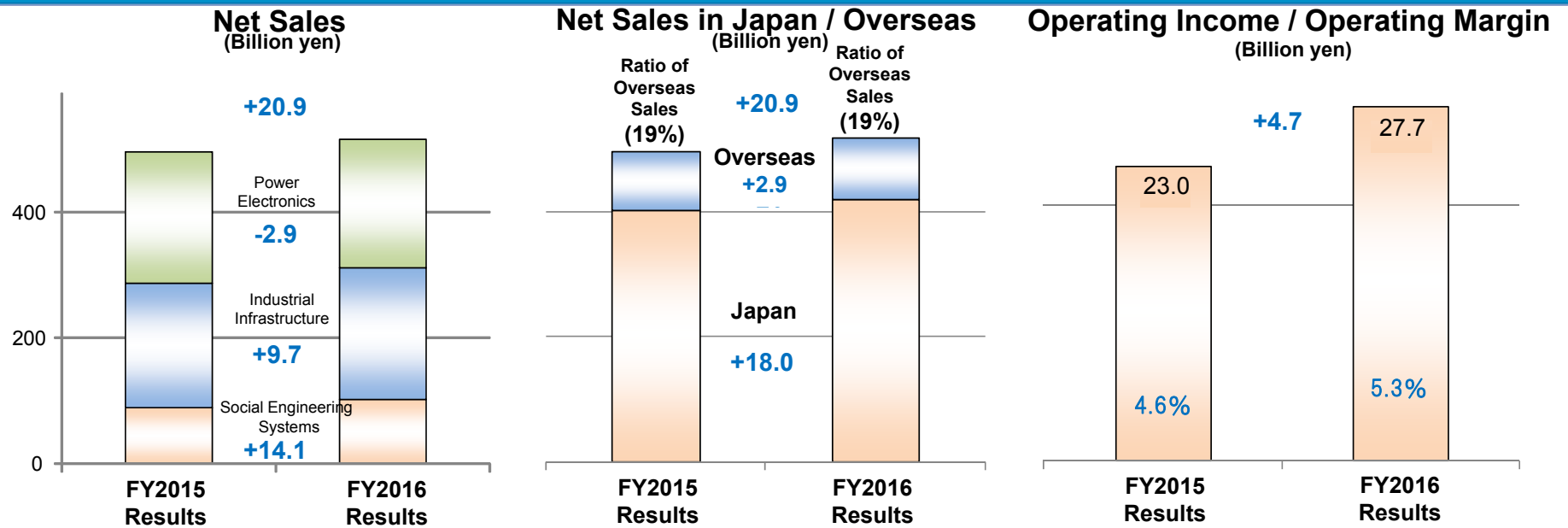
Net Sales in Japan / Overseas
(Billion yen)



Operating Income / Operating Margin
(Billion yen)



Review of FY2016 - Overall



● Establishment of operating foundations

- ✓ Expansion of domestic operations
- ✓ Reorganization and reinforcement of development and mother bases
- ✓ Acquisition of overseas operating foundations through M&A activities

● Challenges

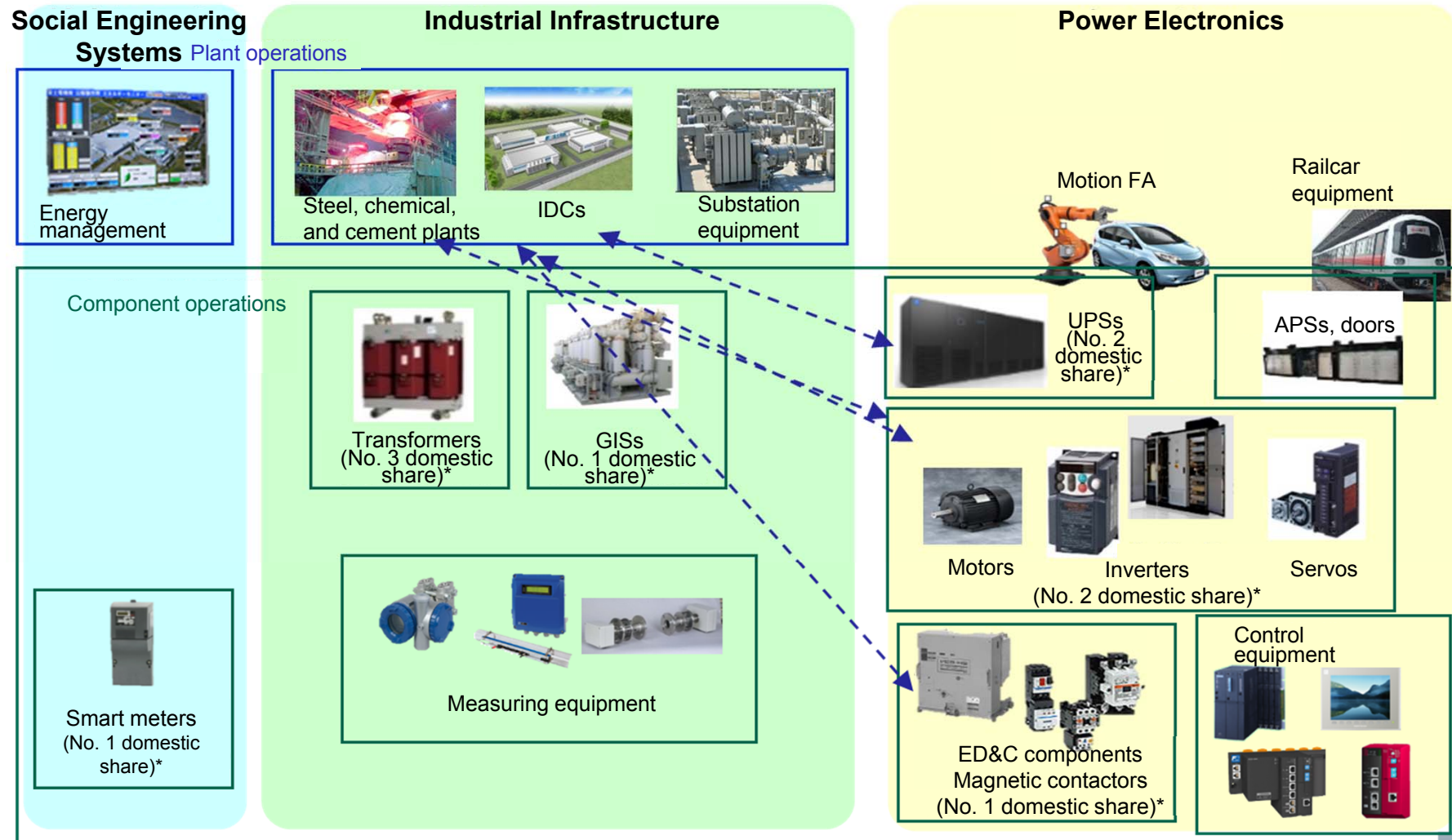
- ✓ Growth of overseas system operations
- ✓ Reinforcement of plant systems

Fully exercise comprehensive strengths of Fuji Electric

Previous Business Structure

Individual reinforcement of business segments → Success in domestic market

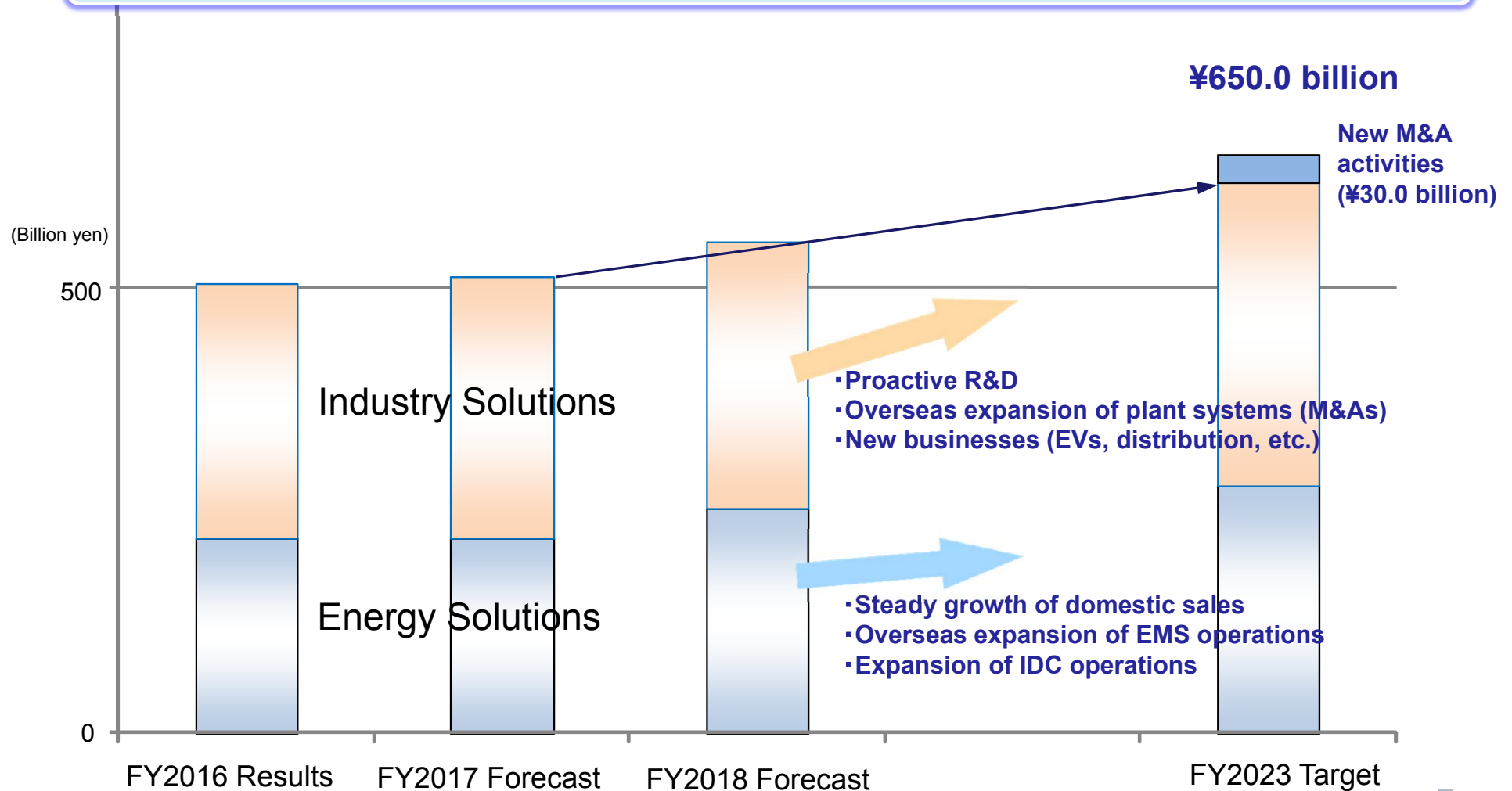
Conversely, separate component and plant operations → Challenges faced in exercising comprehensive strengths of Fuji Electric



* Share information is from FY2016 and is based on Fuji Electric's figures.

Vision for Power Electronics Systems Business

Target net sales of ¥650.0 billion and operating margin of more than 7% in FY2023
Exercise Fuji Electric's comprehensive strength comprised of social engineering systems, industrial infrastructure, and power electronics



Energy Solutions

Contribute to consistent supply, optimization, and stabilization of energy

- Expand EMS operations with smart meters as core (commence overseas expansion in 2017)
- Grow competitive substation system and industrial power supply operations
- Bolster IDC operations centered on differentiated products (SiC-UPSs)

Industry Solutions

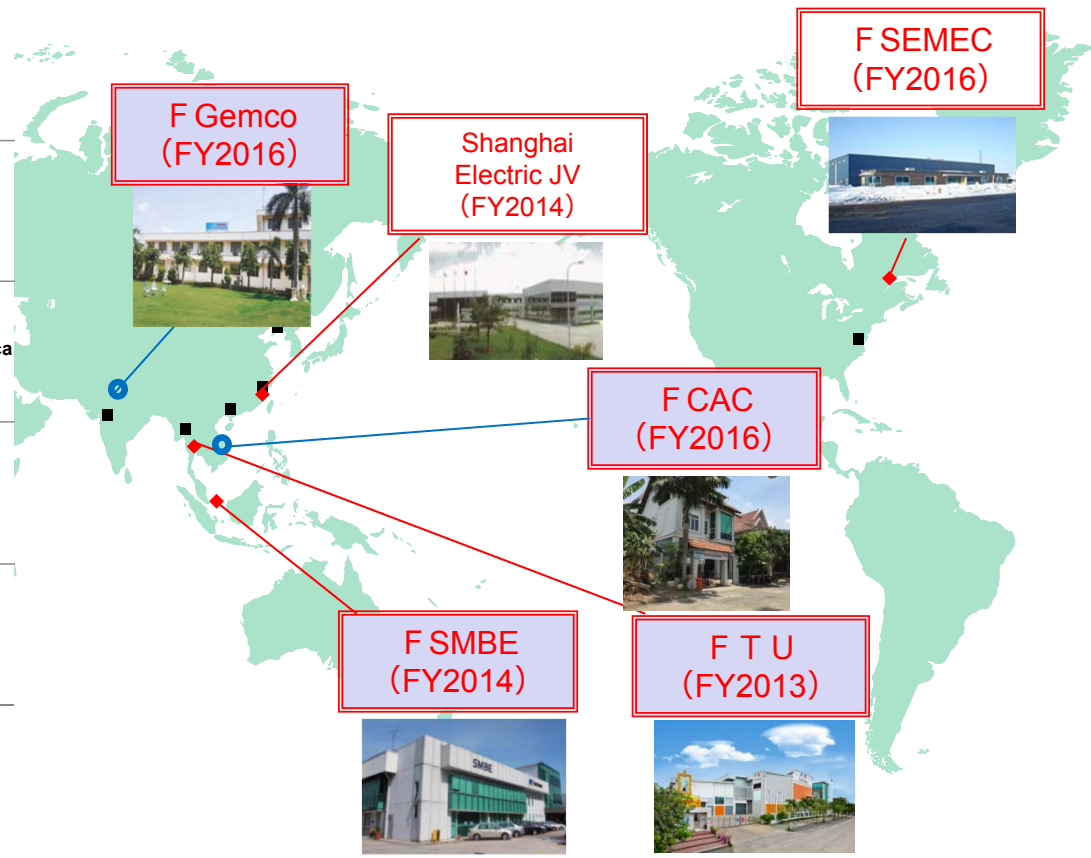
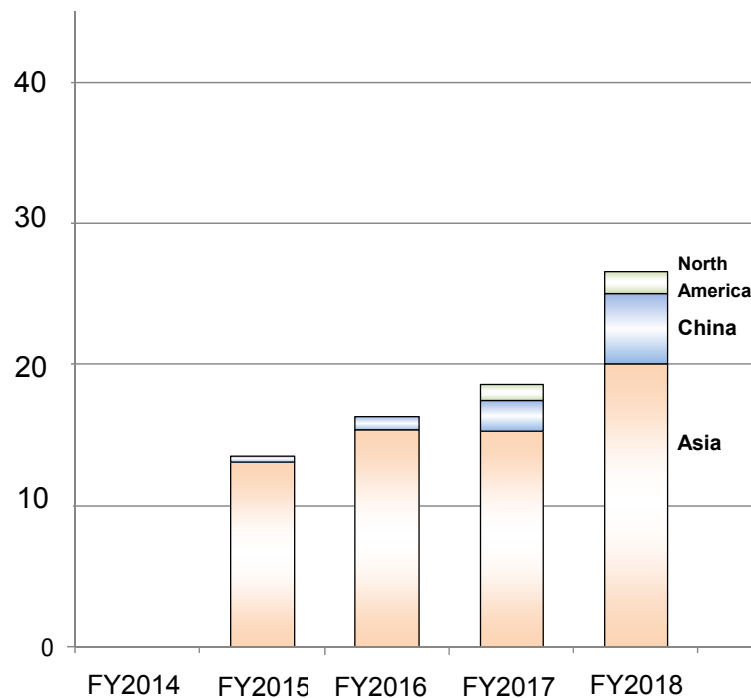
Contribute to improved productivity and energy savings with FA and monitoring

- Employ differentiated products (SiC inverters, servos) in FA systems and then IoT equipment
- Grow overseas operations for competitive steel and chemical plants (M&A activities)
- Deploy differentiated products (SiC railway inverters, doors) in Japan and overseas
- Expand new businesses (EVs, distribution, plant factories)

M&A Activities

M&A activities advanced in China, other parts of Asia, and North America since FY2014
Acquisition of sales channels and engineering and production bases

(Billion yen)



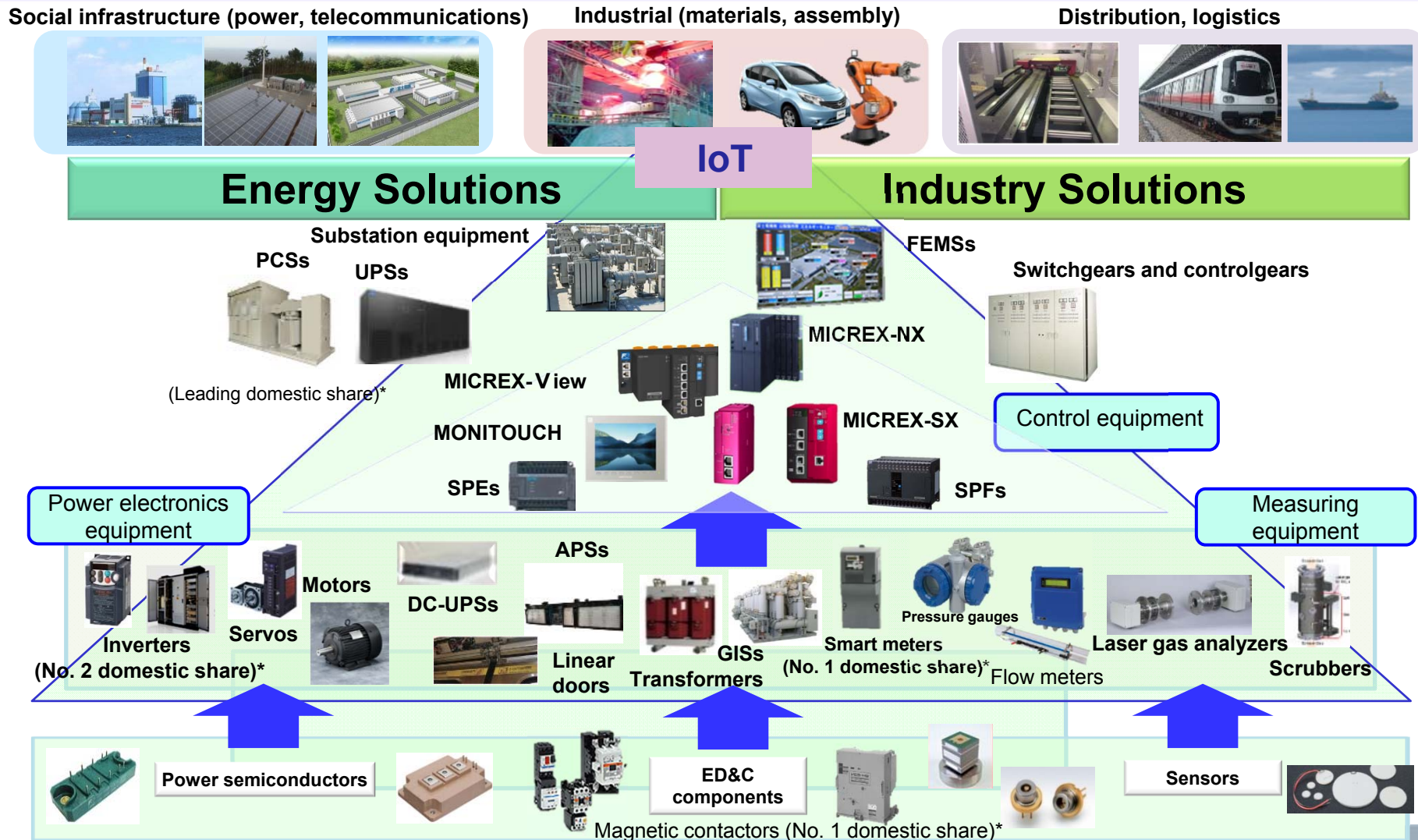
FTU: Fuji Tusco Co., Ltd. F SMBE: Fuji SMBE Pte. Ltd.
F Gemco: Fuji Gemco Private Limited F CAC: Fuji CAC Joint Stock Company
F SEMEC: Fuji SEMEC Inc.

Changes in Structure and Segments

Power Electronics Systems

Fuji Electric's Comprehensive Strengths

- Creation of competitive power electronics components with power semiconductors at their core
- Expansion of overseas operations with systems combining sensor and control technologies



* Share information is from FY2016 and is based on Fuji Electric's figures.

Power Electronics Systems Business Group

Energy Solutions

Energy Management Division

Transmission & Distribution Systems Division

Power Supply Systems Division

Industry Solutions

Factory Automation Systems Division

Process Automation Systems Division

Environment Solution Systems Division

Transportation Systems Division

Cross-Business Organizations

Development Division

Engineering Division

Production Division

After Sales Service Division

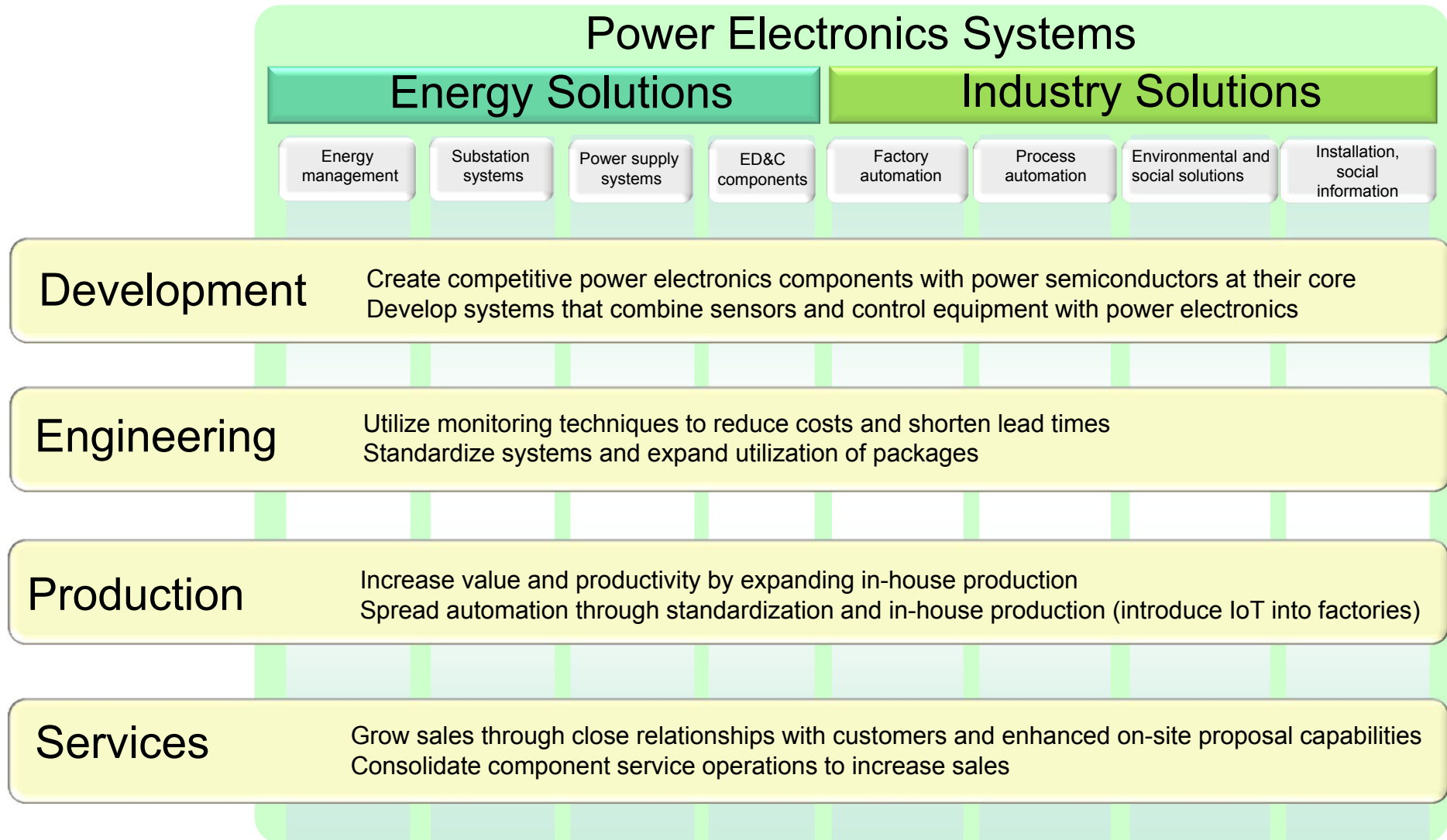
Business Management Division
Asia Pacific Business Strategy Office

Business expansion

- Business responsibility
- Product planning
- New business development
- M&A activity execution and effective utilization

Business linking (including with other segments)

- New product creation
- System standardization
- Optimal global supply chain development
- Lifecycle business expansion
- Domestic and overseas business expansion



Development System

- Create competitive components (power electronics equipment, measuring equipment, control equipment)
- Develop competitive power electronics systems by incorporating IoT and engineering

Development Division

Power Electronics Components Development Center

Inverters, servo amps, EVs
(Development of products for railways and overseas)



UPSs, PCSs, railway equipment,
EV power supplies



Industrial motors, servo motors,
Dedicated motors for railways/EVs



Create differentiated products employing power semiconductors (SiC)

Suzuka Power Electronics Components Development Center



Control and Instrumentation Technology Development Center

PLCs, DCSs, HMIs, NWS



Sensors, measurement systems



Develop IoT products to enhance systems

Tokyo Control and Instrumentation Technology Development Center
+Corporate R&D Headquarters




Development Roadmap - Power Electronics


● Created differentiated SiC-equipped components

* Scheduled launch


Power supplies





FA



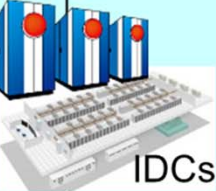

Railway







SiC

		Deploy high-efficiency, compact products	Fully leverage characteristics of SiC			
		~FY2016	FY2017	FY2018	FY2019	FY2020
Energy Solutions	Power supply systems	DC-UPSs	★	System compatibility → 		
		Large-capacity UPSs	★	Expansion of capacity series, measures in focus areas		
Industry Solutions	PA,FA	Hyper premium products	★	Expansion of capacity series	PA 	
		Environmental resistant inverters	★	Expansion of capacity series	System compatibility →	
	Railway	Railway	Shinkansen propulsion systems		Servos	★
		Conventional line train propulsion systems	★	Compatibility with use overseas		
				EV systems		

* PA: Process automation, FA: Factory automation

Development Roadmap - Systems Equipment

- **Monitoring (sensors) and linkage (systems) → IoT development**

Control equipment

NX



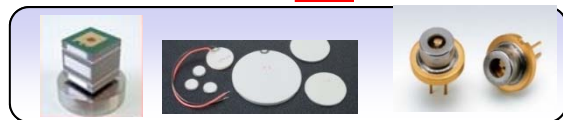
View



SX



Measuring equipment



* Scheduled launch

		~FY2016	FY2017	FY2018	FY2019	FY2020
Energy Solutions	Energy management	Energy center packages			★	Energy usage facilities
		Steam flow meters				
Industry Solutions	Power supply systems	IDC diagnosis packages	★ IDC operation packages			
	PA,FA	FA controllers		★	High-performance controllers	PA
			PA controllers	★		FA
		Robotic sensors		★		
Environment		Robotic sensors			★	Ships
		Laser gas analyzers		★		Plant factories
		Production support controllers			★	

Control equipment

Measuring equipment

● Strengthen plant systems

Competitive components → Enhancement of systems → Overseas expansion of systems operations



Energy supply equipment (energy)



IDCs (power supplies)



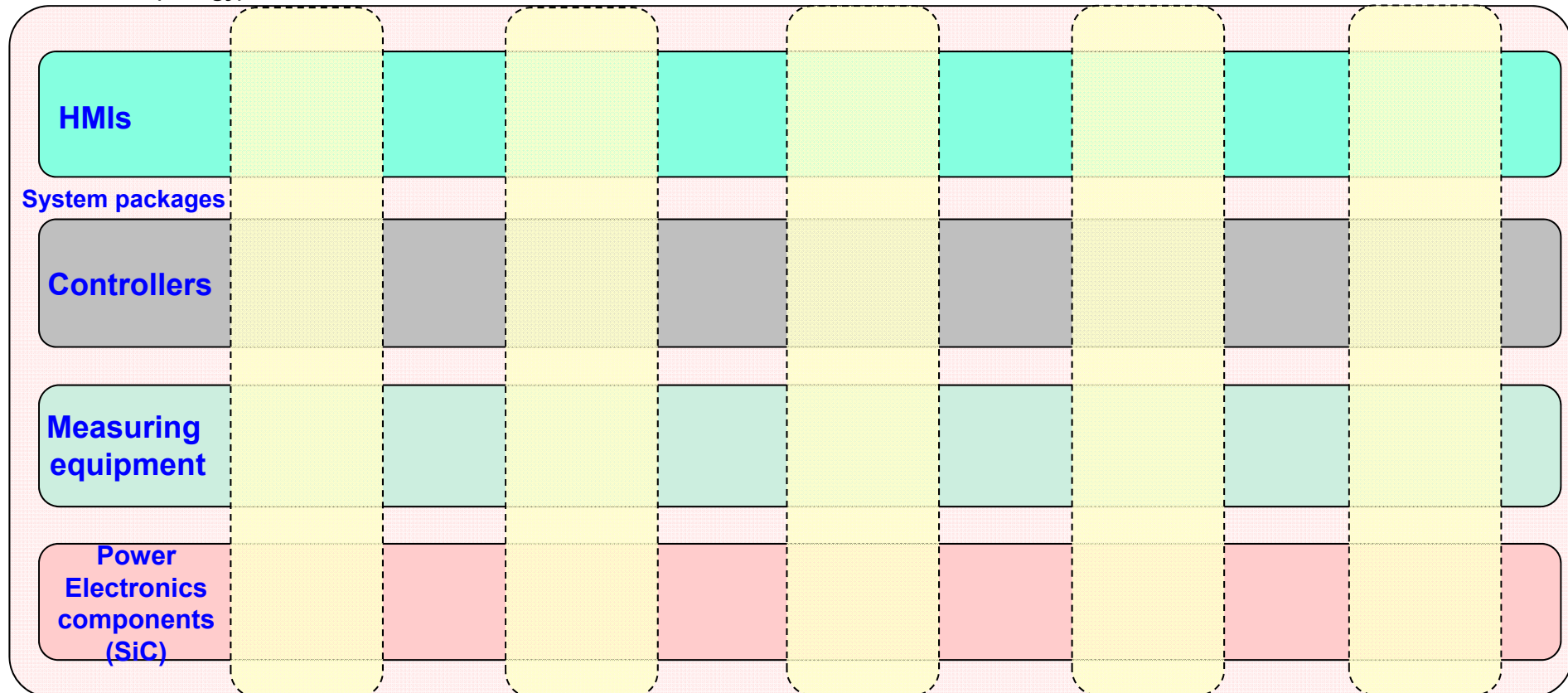
Assembly line equipment (FA)



Steel plants (PA)



Cement plants (PA)



- Expand package development utilizing switchgears and controlgears as key products
- Promote sales of packages (software and hardware) overseas
- Standardize equipment containing switchgears and controlgears, reduce costs, and expand usage of Fuji Electric products

1. Monitoring

Costs, sales channels, manufacturing

2. Creation and implementation of business reinforcement plans

Business strategies, development plans

Standardization, cost reduction, manufacturing (base) strategies

3. Expansion of product lineups

Standardized, low-cost switchgears and controlgears;

IEC standard-compliant switchgears and controlgears

Standardization of equipment containing switchgears and controlgears

4. Overseas expansion

Increased coordination with FCAC by FSMBE, FMT, and FTU

Expanded application of standardization

Switchgears and controlgears



Switchgears and controlgears for IT and instrumentation equipment



Utilize continuous flow processing encompassing everything from sheet metal and coating to assembly tests

Production - Reinforcement of Mother Bases

- Reorganization and consolidation of models manufactured at Kobe and Suzuka factories (completed in FY2016)
→Expansion of in-house production, standardization, and automation (introduction of IoT into factories)

Kobe Factory (Systems)

Model factory for producing complete systems and pursuing increased speed

- Use of continuous flow processing
Engineering, design, procurement, testing, and witness inspection / shipping
One stop operation spanning order receipt to shipping
- Mixed production of switchgears and controlgears



Suzuka Factory (Components)

Model factory for creating new products and pursuing productivity improvements

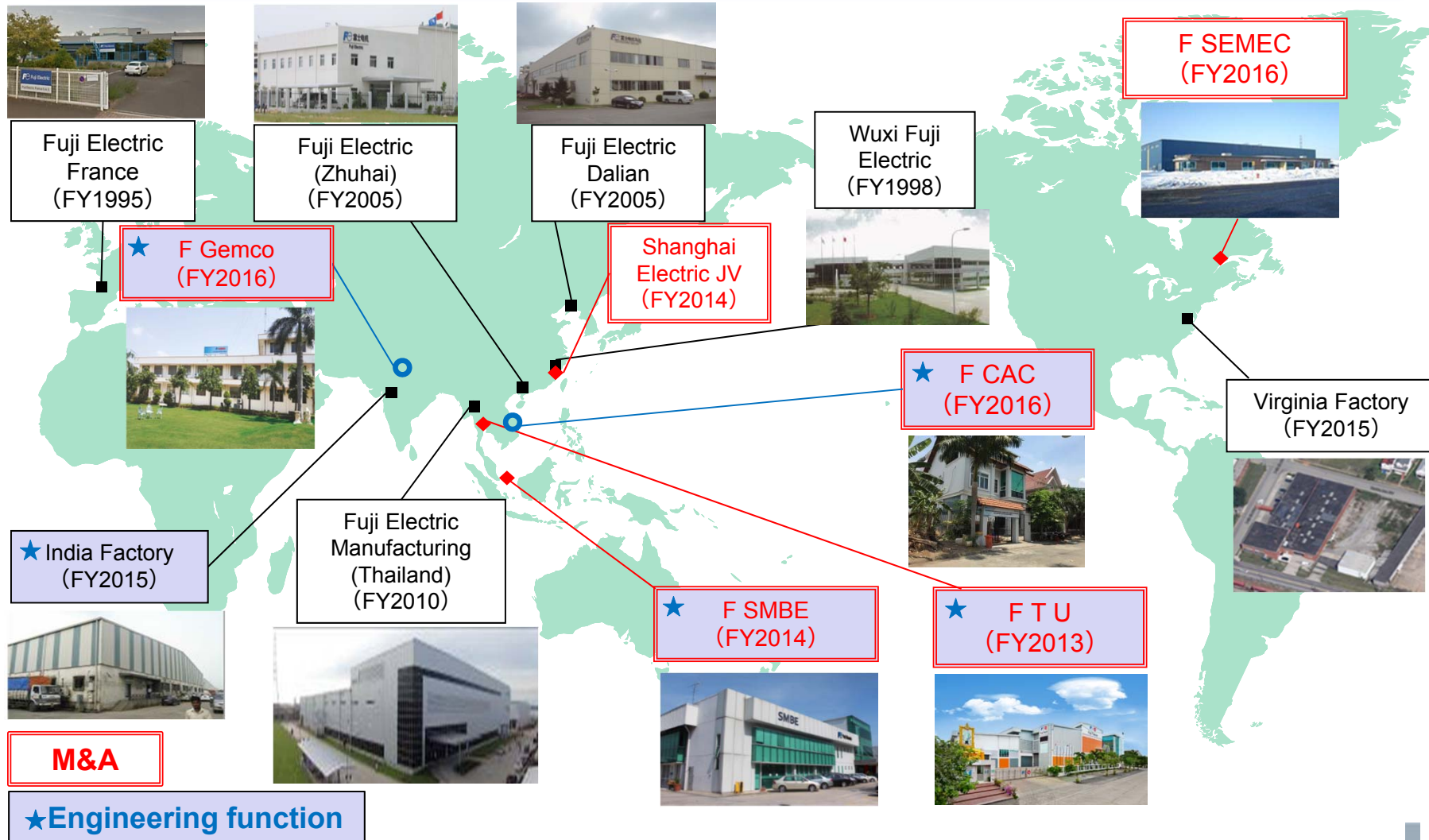
- Creation of high-value-added components
- Pursuit of high levels of productivity and reduced costs
Automation, production technologies, and manufacturing technologies
In-house manufacturing for core technologies



Production

- Local Production and Consumption System

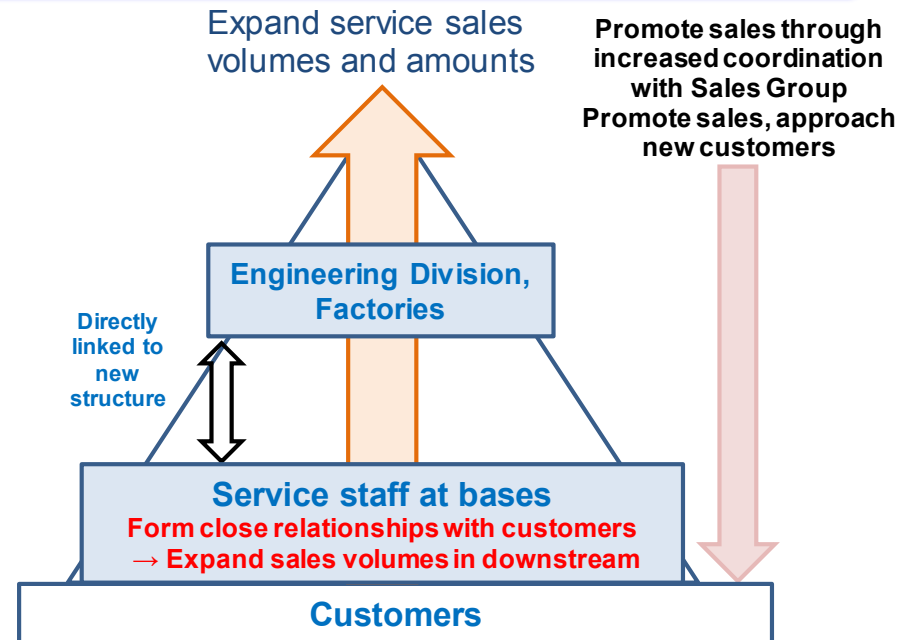
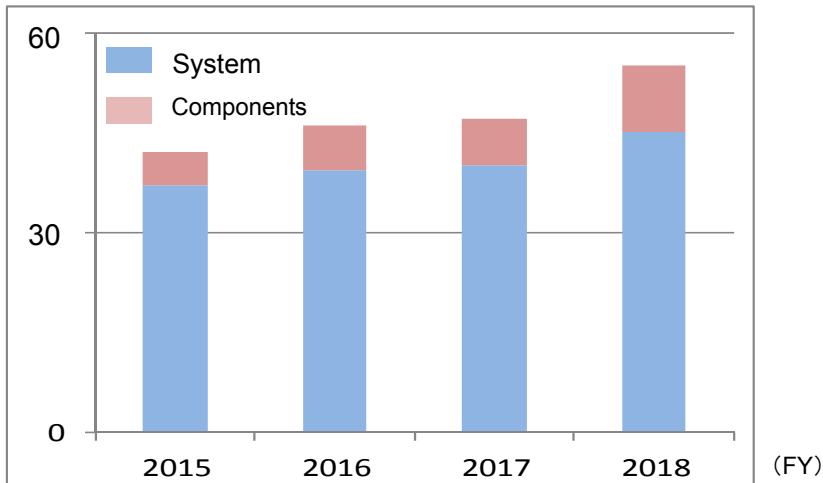
- Expand operations in Asia through acquired companies (manufacturing + engineering)
- Identify benefits of local production and consumption system



Services - Plant Systems

- Expand domestic service businesses and provide lifecycle support to customers
 - Form close relationships with customers and expand sales in downstream areas
 - Enhance facility maintenance proposal capabilities and step up efforts to incorporate replacement demand
- Develop foundations for expanding operations in Asia (UPSs, transformers, VCBs)

Service Sales Forecasts (Billion yen)



- Cross-selling activities
Propose measuring equipment inspection to power supply customers and otherwise encourage customers to utilize other models
- Sales activities during maintenance inspections
Propose function improvements, upgrades, and parts purchases
- Collaboration with sales distributors
Make proposals to customers together with sales distributors

Services—Components

- Integrate consultation venues for all components (consolidate technical service centers) and improve customer service
- Accelerate efforts centered on technical service centers to grow sales and encourage customers to switch to Fuji Electric

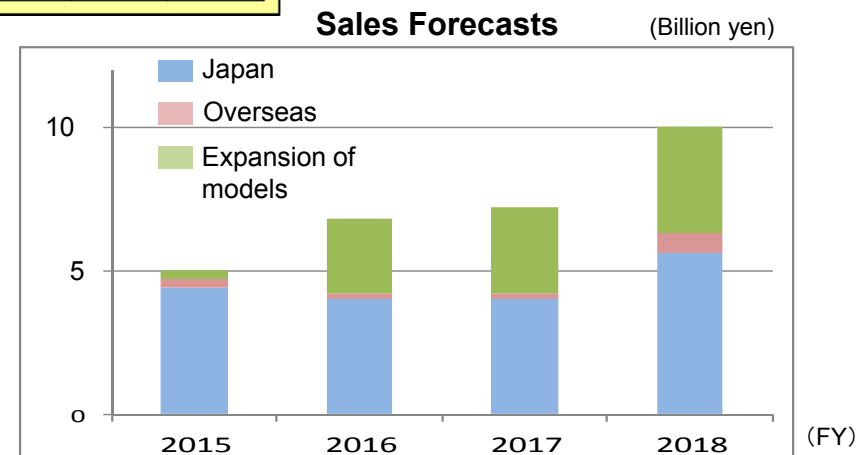
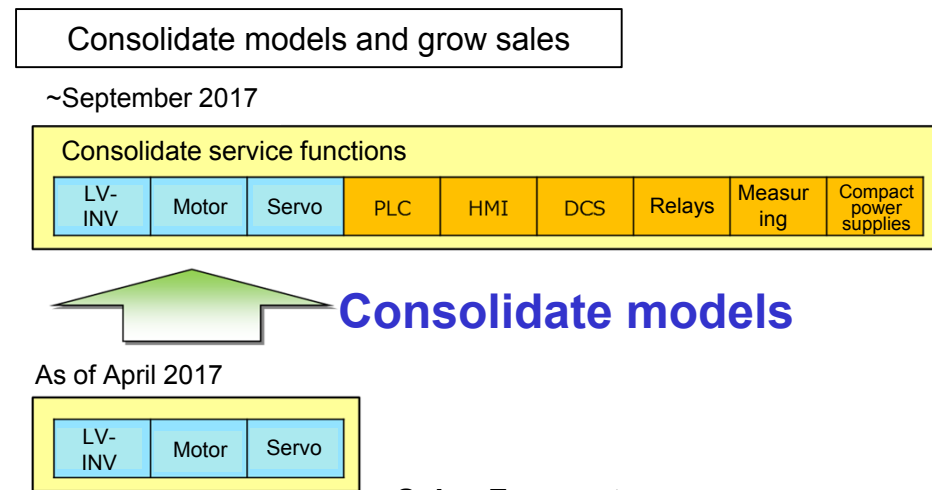


10,000 consultations per month

- Improved customer service
- Strengthened marketing capabilities from analyzing technical consultations
- Sequentially expansion of models handled

Response rates: 72% prior to establishment
→ **97% after establishment**

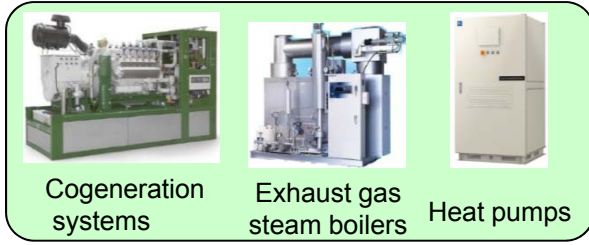
*LV-INV :Low Voltage Inverters



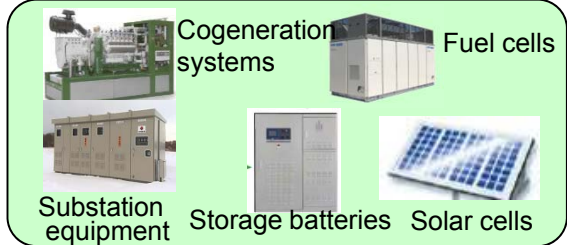
Initiative Examples - Energy Management

- Realize optimal energy management and operation with competitive components and systems

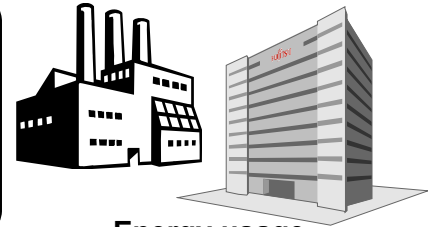
Field equipment



Heat management equipment



Energy supply equipment

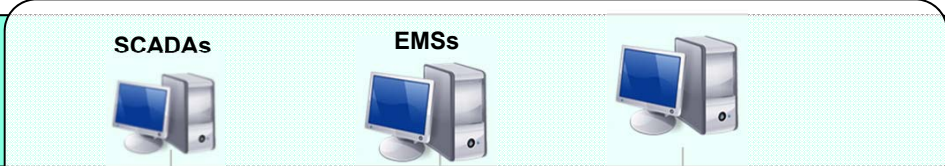


Energy usage facilities

Comprehensive facility management

Energy center solutions
(optimal energy supply-demand control)

HMIs

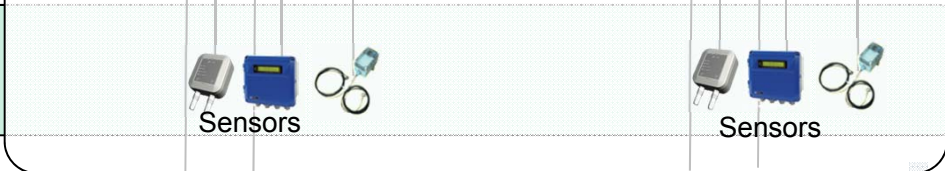
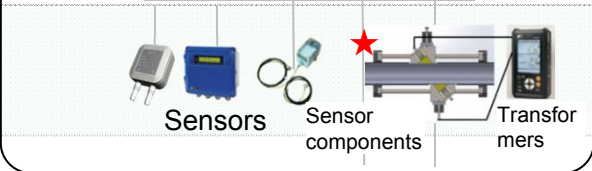


IoT platforms



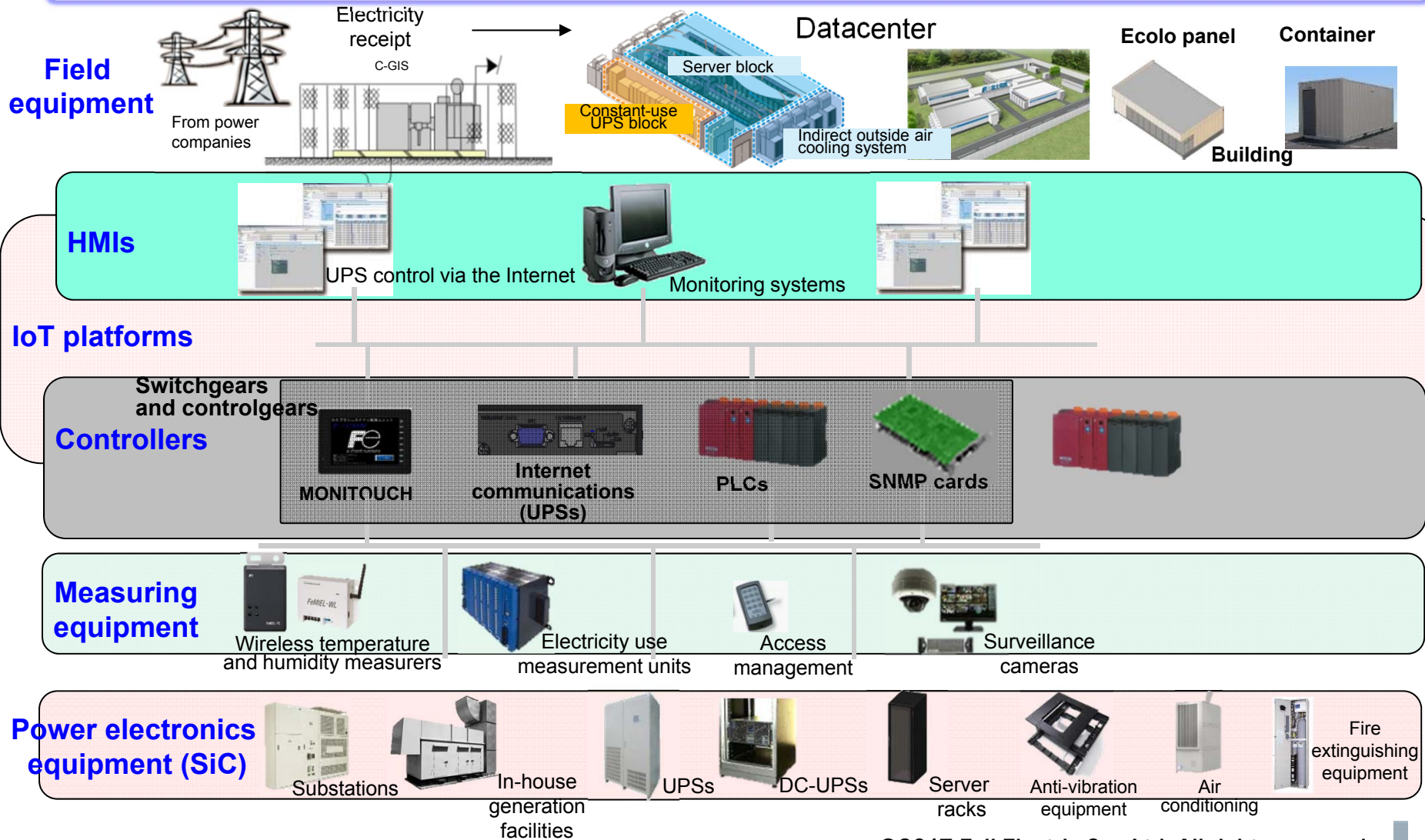
Controllers

Measuring equipment



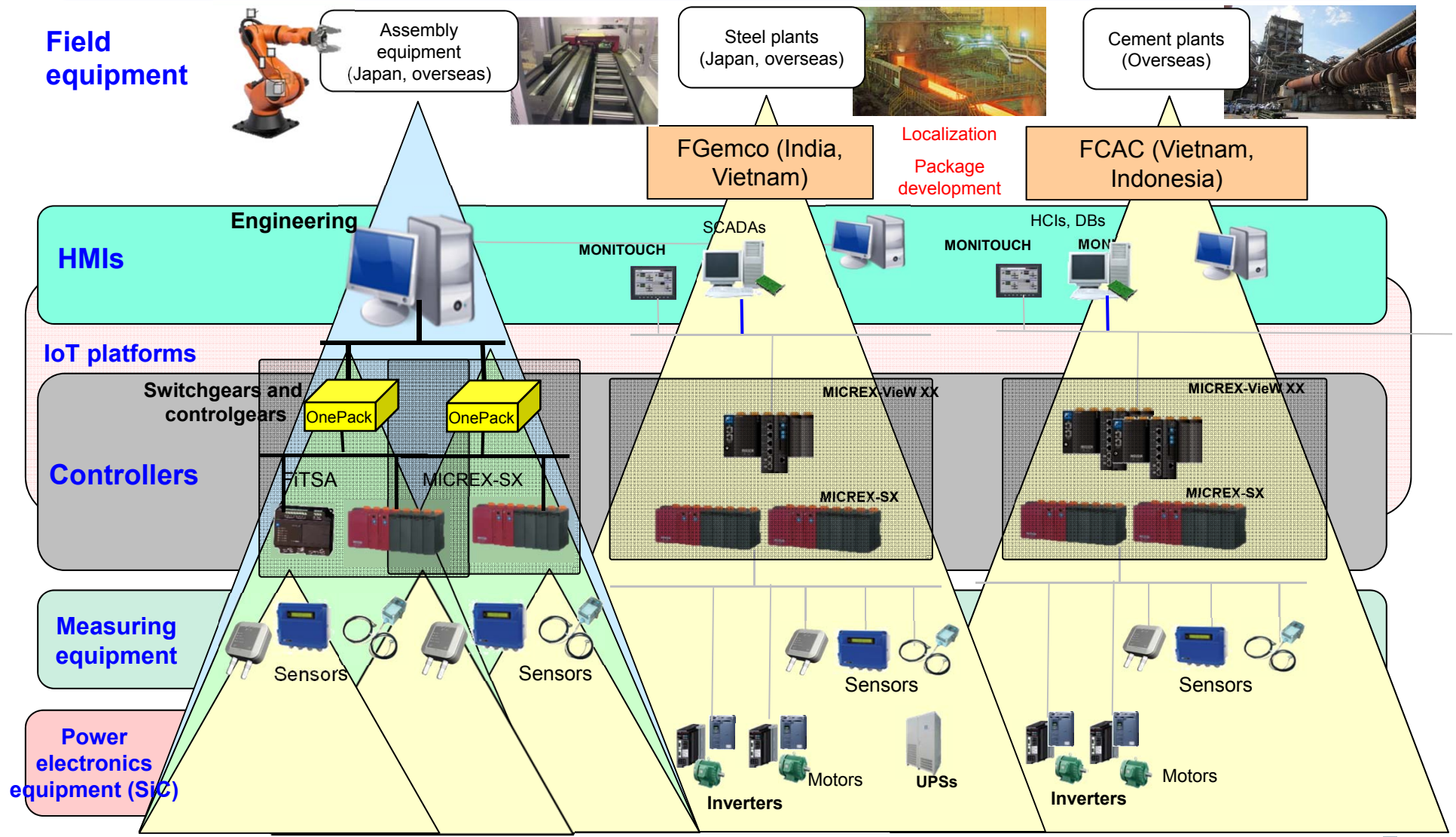
Initiative Examples - Power Supply Systems

- Differentiate operations with competitive components for realizing stable and highly efficient electricity supply and optimal air conditioning
- Development of system packages for IDCs
- Introduction of SiC-equipped platform products (module UPSs, DC-UPSs)



Initiative Examples - Factory and Process Automation Fuji Electric *Innovating Energy Technology*

- Expand overseas operations with competitive systems packaged with competitive components



Initiative Examples—New Businesses

- Utilize Company technologies to create and provide new value in response to customer needs
- Develop foundations for new businesses

Distribution

- Acquire ongoing orders from newly approached customers
- Promote transportation solutions
- Deploy IT equipment monitoring know-how (China, home delivery, etc.)
- Expand in-house production



(Photograph provided by Fives Intralogistics K.K.)



Ultra low-temperature freezer (-55°C)



Low-temperature distribution center

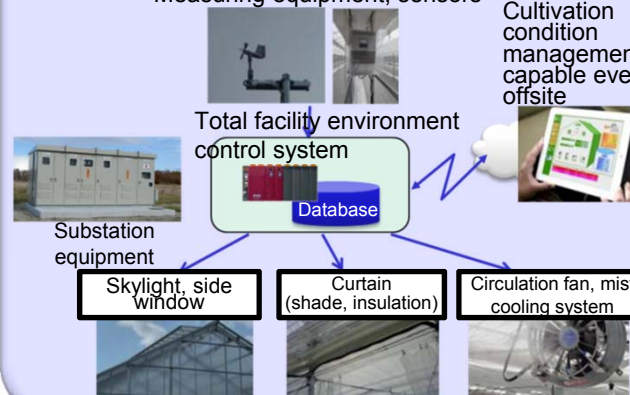
Plant Factories

- Improve earnings capacity by deploying EPC product packages and IoT services
- Acquire expertise through product and technology verification



Measuring equipment, sensors

Cultivation condition management capable even offsite

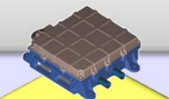


Automotive Power Electronics

Create unrivaled automotive products by utilizing power device and power electronics technologies



Automotive power electronics components



Motor drive control technologies



Power supply circuit control technologies



Power device technologies (RC-IGBT, SiC)

FY2017 Management Plan

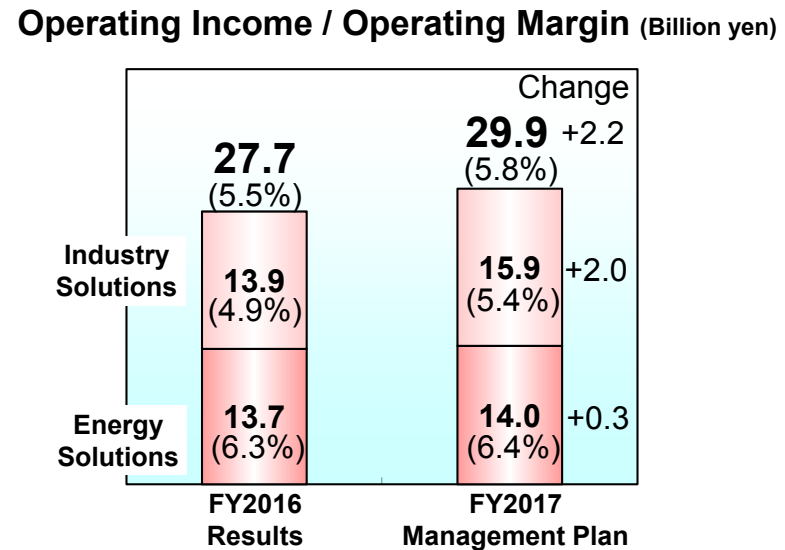
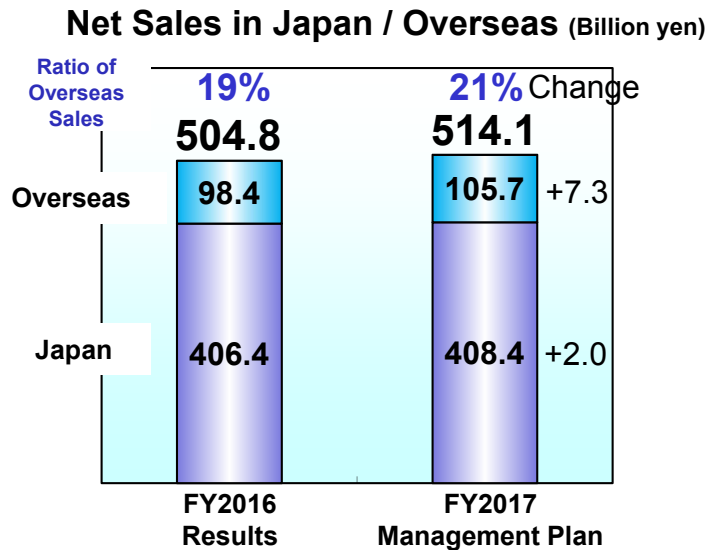
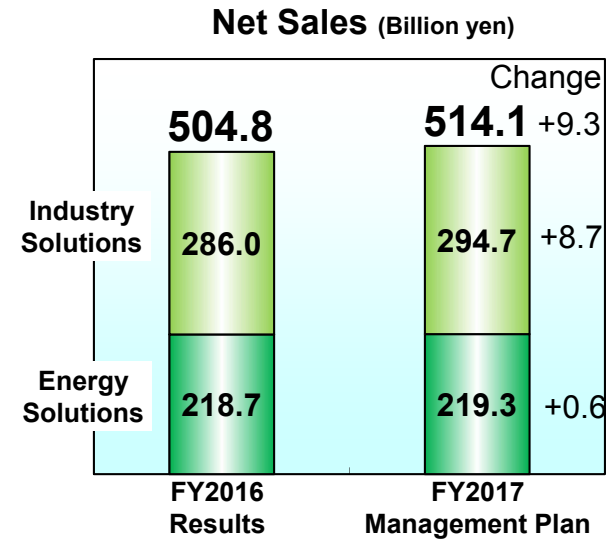
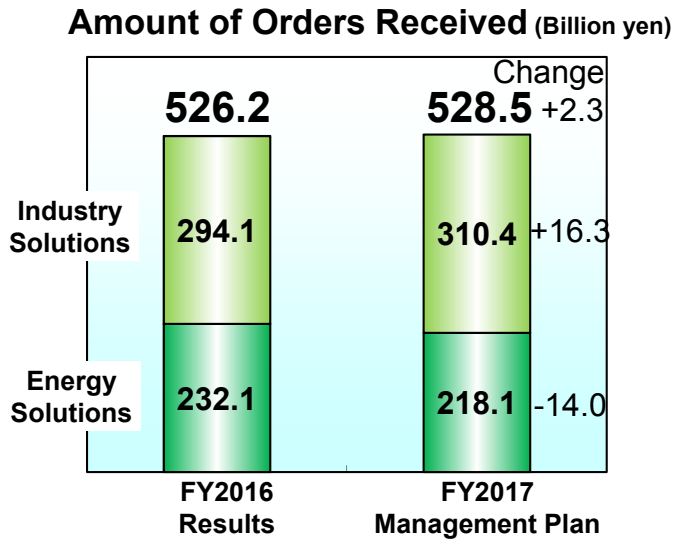
1. Establish foundations for new power electronics systems organization
2. Create competitive components
3. Enhance systems using competitive components
4. Expand overseas operations by leveraging systems
5. Develop human resources

FY2017 Establish solid foundations for new power electronics systems organization

FY2018~ Expand power electronics systems business overseas

FY2023 Achieve targets

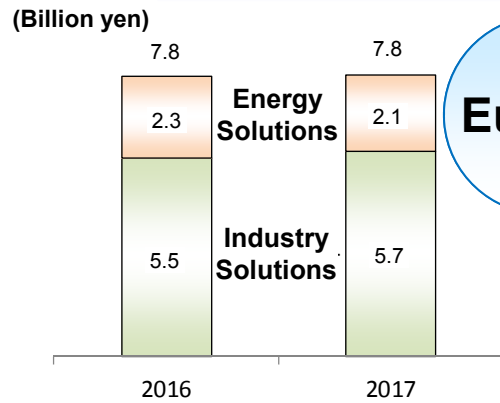
1. Create competitive components
 - Strengthen components by consolidating development systems and reinforcing mother factories
2. Enhance systems using competitive components
 - Utilize system monitoring techniques to reduce costs and shorten lead times
 - Reduce total costs by standardizing systems and developing packages
3. Expand overseas operations by leveraging systems
 - Expand operations in Asia and North America through acquired companies (FSMBE, FTU, FCAC, and FGemco in Asia, FSEMEC in North America)
4. Grow service businesses
 - Provide customers with lifecycle support from frontline staff
5. Develop human resources
 - Reform attitudes



*Figures for FY2016 have been restated to reflect organizational restructuring conducted in FY2017.

Priority Measures - Expansion of Overseas Operations

- Expand systems operations in Asia and railway and power supply operations in North America
- Exercise benefits of M&A activities on a global scale

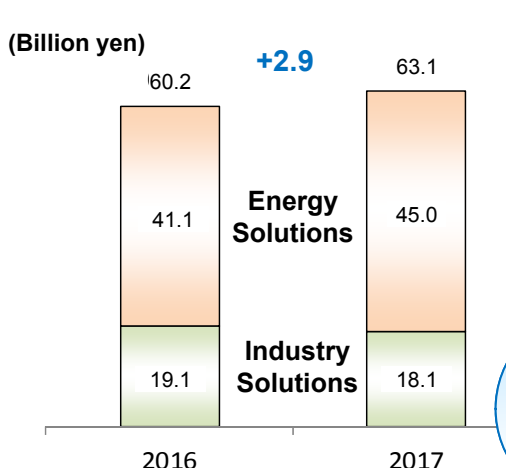


Europe

Europe
Industry Solutions: Coordinate inverters and servos

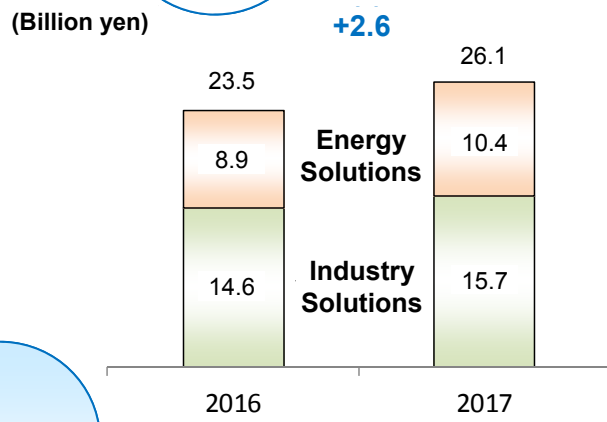
China

China
 • Energy Solutions: Expand IDC operations
 • Industry Solutions: Develop operations of joint venture with Shanghai Electric and shift to FA and motion fields



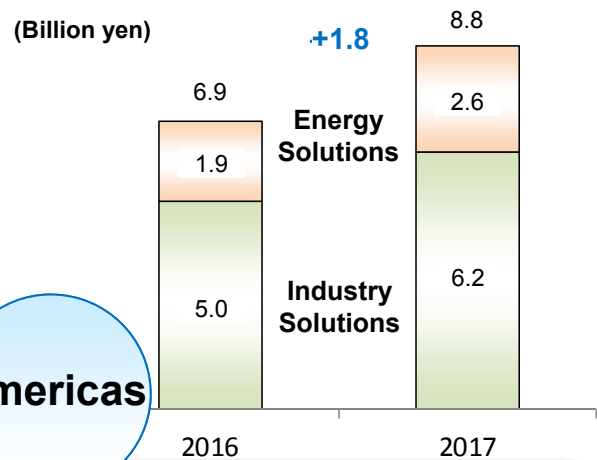
Asia

Asia
 • Energy Solutions: Expand operations of FSMBE and FTU
 • Industry Solutions: Develop operations of FGemco and FCAC



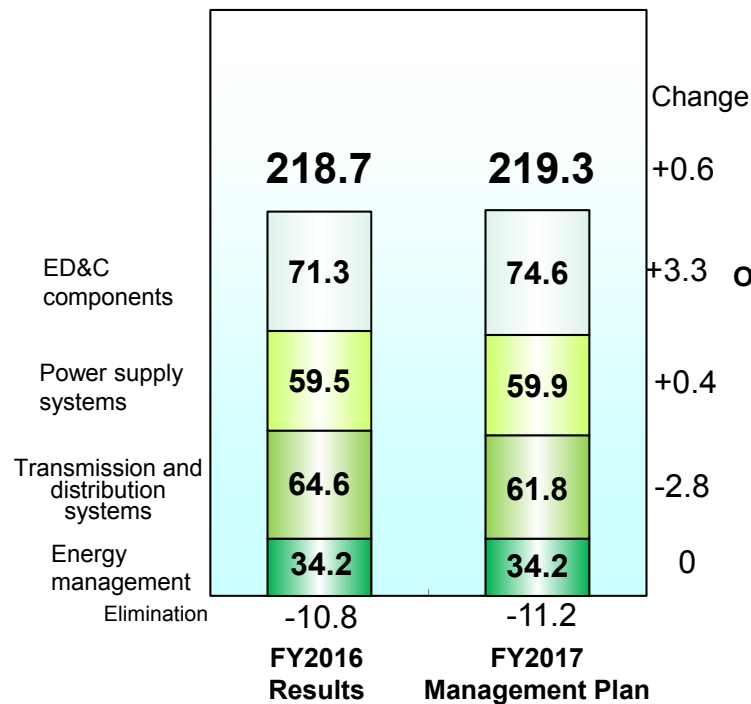
Americas

Americas
 • Energy Solutions: Expand UPS operations
 • Industry Solutions: Develop railway operations and business of FSEMEC

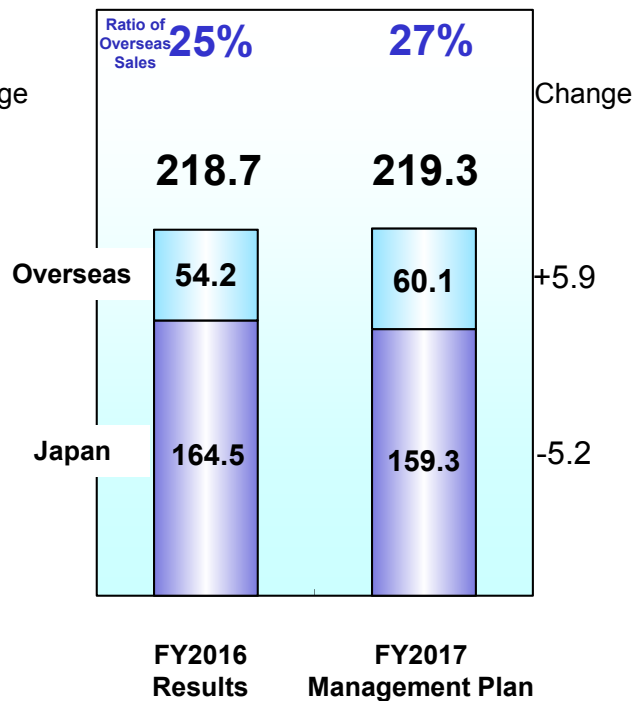


Business Plan - Energy Solutions

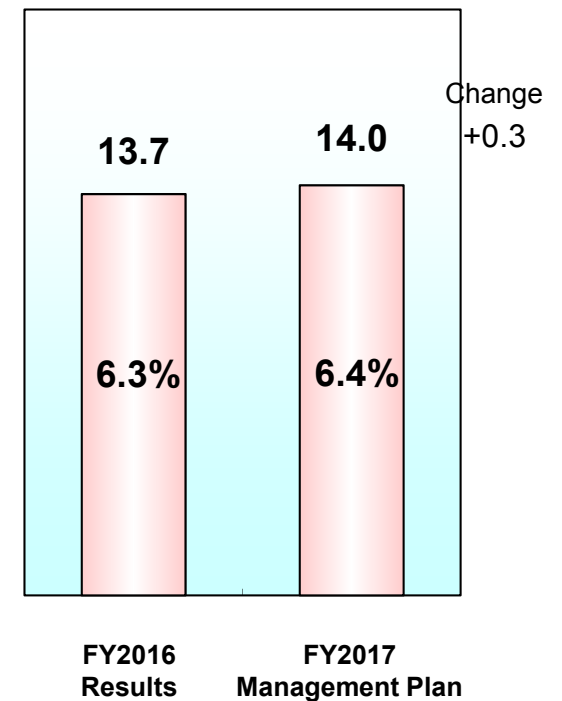
Net Sales by Subsegment
(Billion yen)



Net Sales in Japan / Overseas (Billion yen)



Operating Income / Operating Margin
(Billion yen)



Energy management

- Introduce next-generation smart meters
- Commence overseas development of EMS operations

Transmission and distribution systems

- Incorporate domestic replacement demand
- Enhance manufacturing and engineering capabilities in Asia

Power supply systems

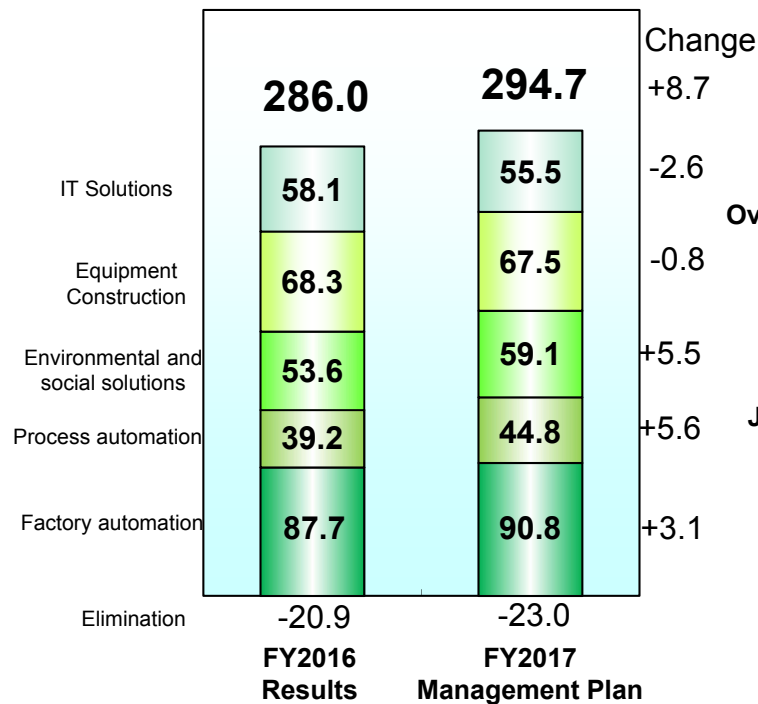
- Reinforce data center business
- Introduce differentiated products (SiC-UPS) into domestic and overseas markets

ED&C components

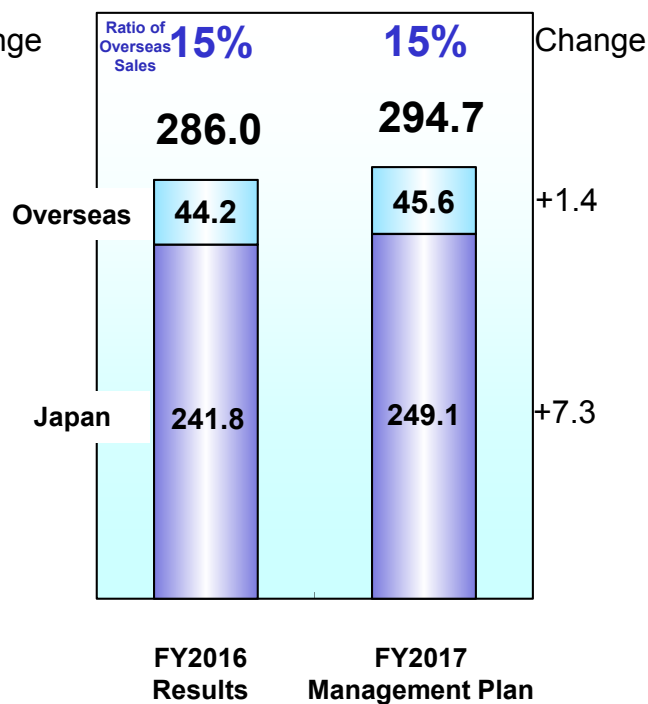
- Capture domestic construction demand

Business Plan - Industry Solutions

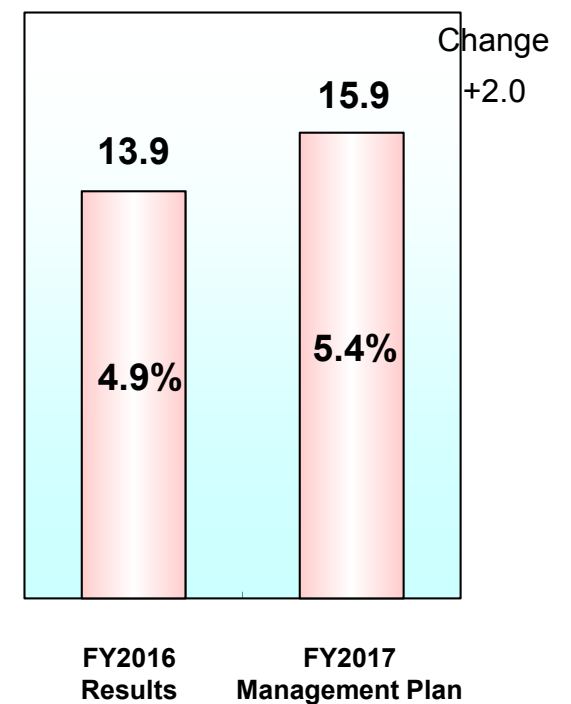
Net Sales by Subsegment
(Billion yen)



Net Sales in Japan / Overseas (Billion yen)



Operating Income / Operating Margin
(Billion yen)



Factory automation

- Expand factory automation systems business (Automotive fields in China and Japan)

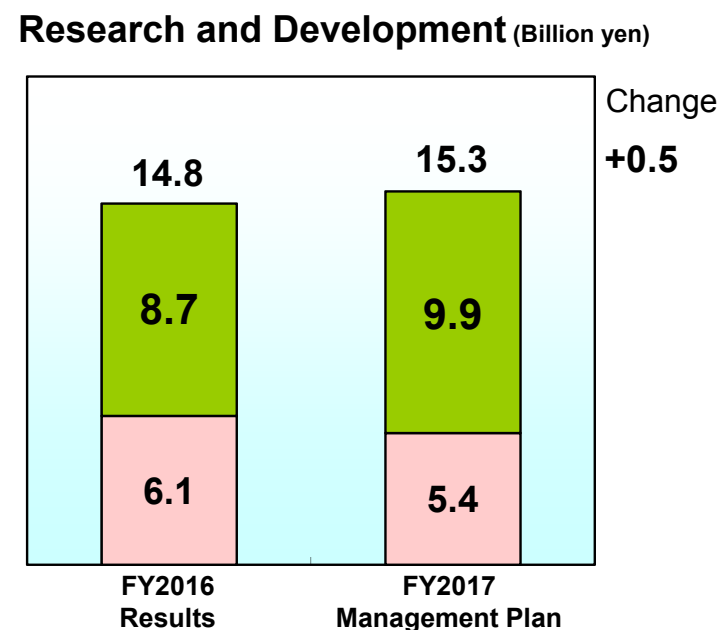
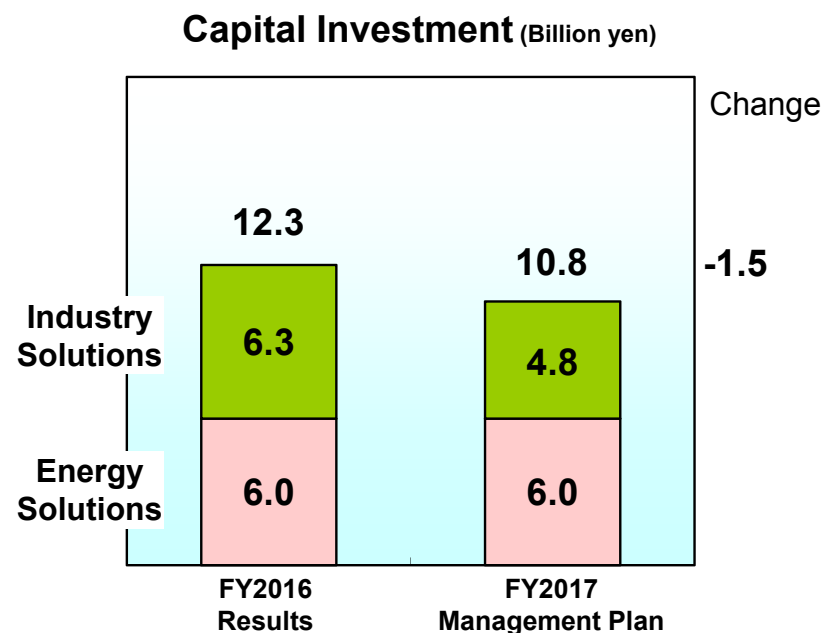
Process automation

- Capture domestic replacement demand
- Leverage engineering subsidiaries (Vietnam and India) to reinforce overseas operations

Environmental and social solutions

- Expand sales to the logistics industry
- Accelerate development of new transportation systems

Capital Investment / Research and Development



Energy Solutions

- Smart meter production facilities

Industry Solutions

- Factory rationalization and automation

Energy Solutions

- Electricity distribution and storage systems

Industry Solutions

- SiC-equipped power electronics devices
- FA systems and motion and servo equipment
- Field equipment and systems compatible with IoT

* 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.

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