

FY2023 Medium-Term Management Plan Power Electronics Systems Business

June 20, 2019

Masatsugu Tomotaka

Senior Managing Executive Officer

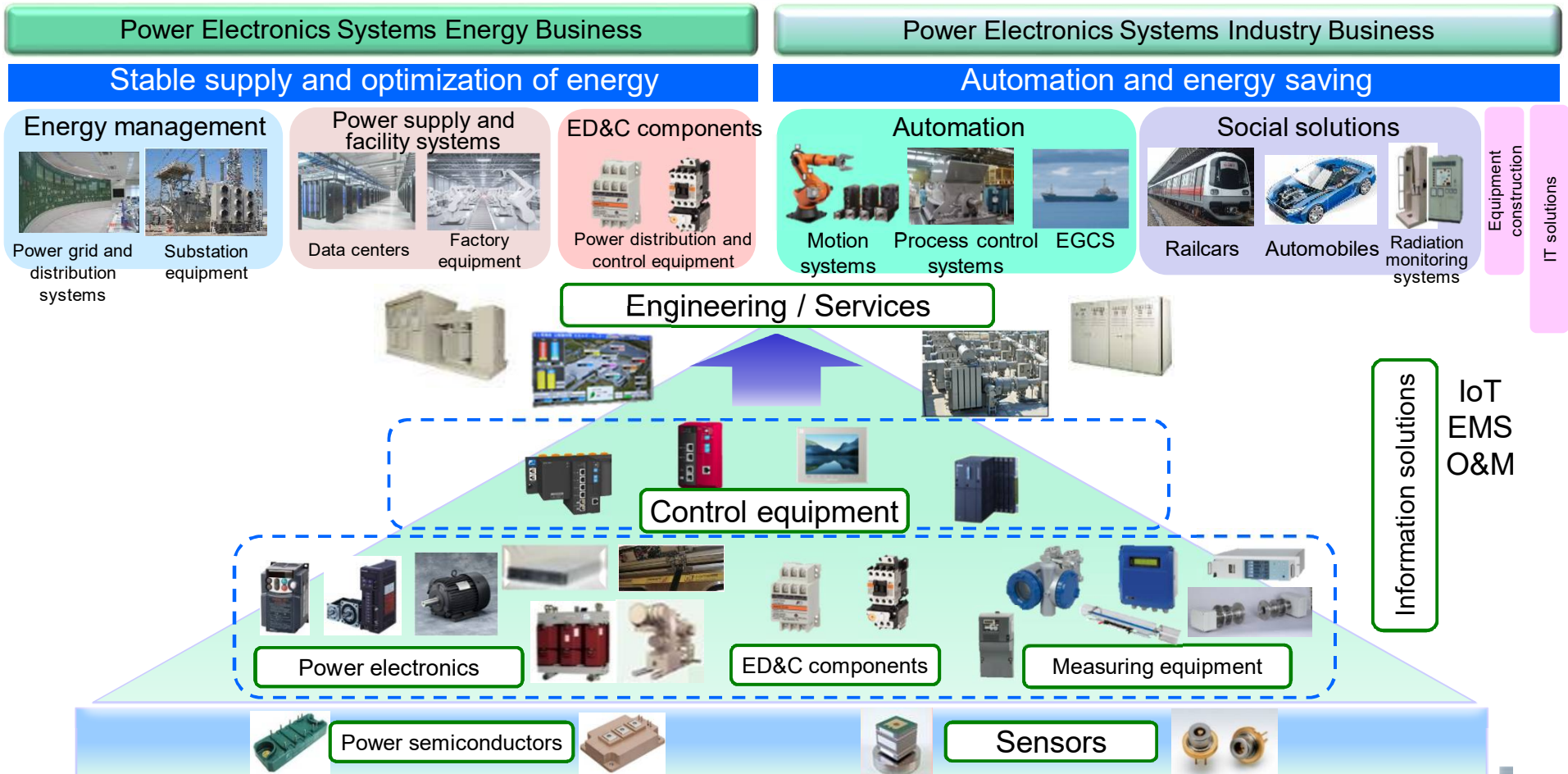
In charge of Power Electronics Systems Business

Fuji Electric Co., Ltd.

Power Electronics Systems Business Overview / Business Policy

Power electronics systems support the energy and environment fields

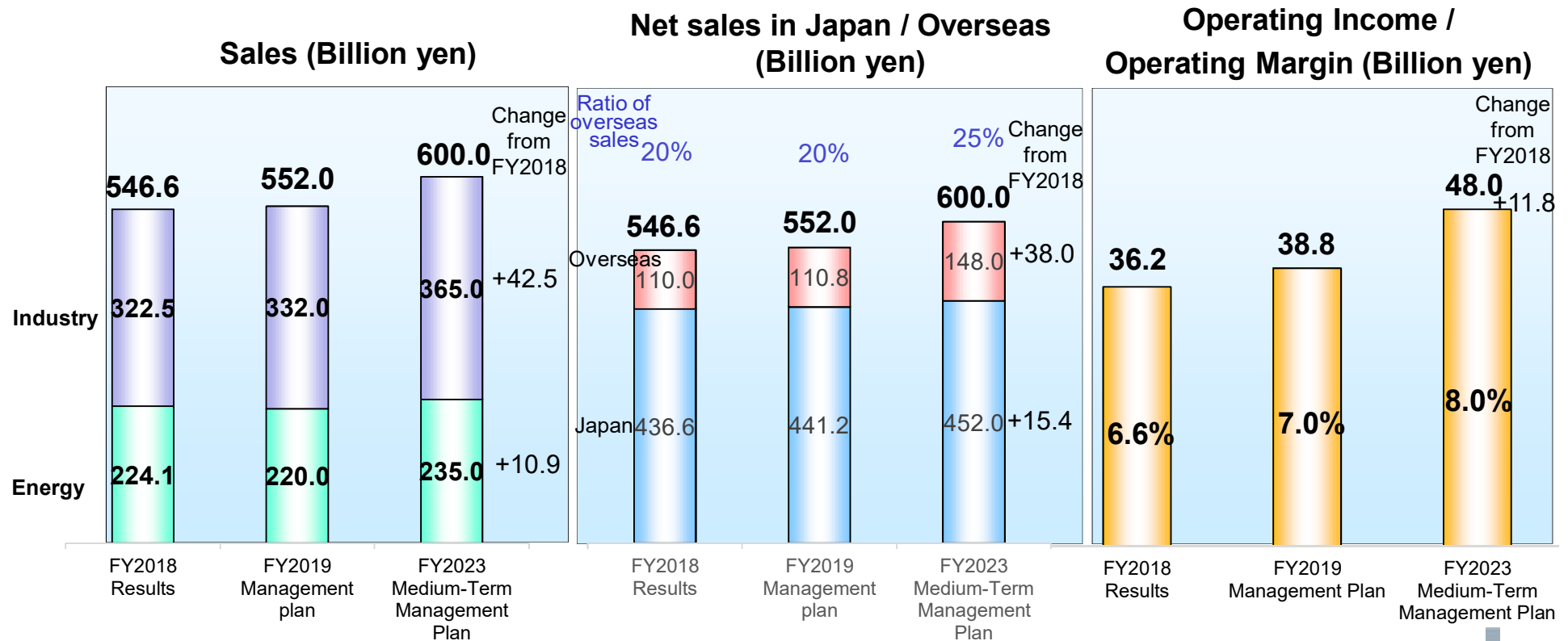
- Contribute to the creation of responsible and sustainable societies through our innovation in energy and environment technology
- Create Competitive Components - Enhance Systems Using Competitive Components - Expand Overseas Operations by Leveraging Systems



Power Electronics Systems Business Plan

Priority Measures

- Create competitive components
- Expand operations in China and other parts of Asia
- Expand information system business operations using IoT
- Expand new businesses by commercialization of differentiated products
 - vessel systems, railcars and railway substations

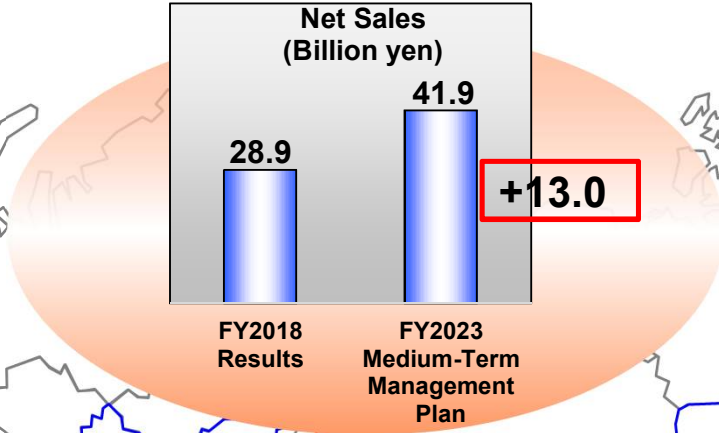


Expand Operations in China and Asia

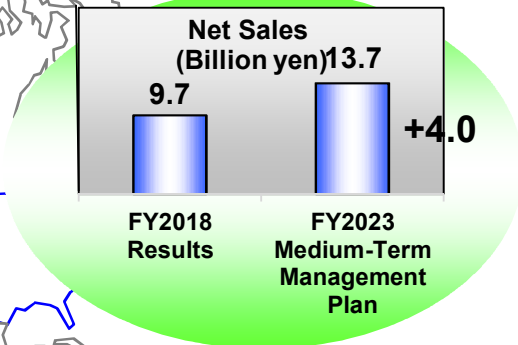
Expand systems business by utilizing global products and sales channels of M&A

China

Expand system business by utilizing collaboration (Fuji Shanghai Electric JV, Dalian Fuji Bingshan JV, etc.)

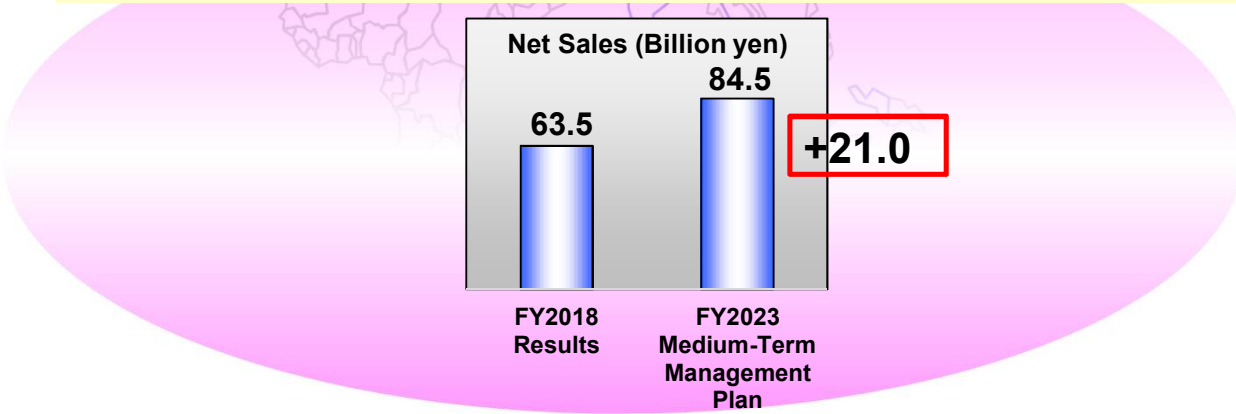


North America



Asia and India

- Expand global products, expand local design, local production and local consumption
- Expand systems business by utilizing M&A sales channels (CN, FGEM, FCAC)



Maintain systems to increase production of railcars

Expand Partner Businesses in China

Establish a regional based type business system centered on Wuxi factory



Form a locally rooted service system

Sales and engineering

Reinforce collaborative partner business



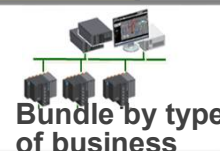
Wuxi



**Regional mother factory
Engineering base**

Drive & process control / global products

Reinforce system sales

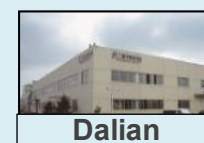


Induction furnaces



Overseas production base

Manufacturing cooperation

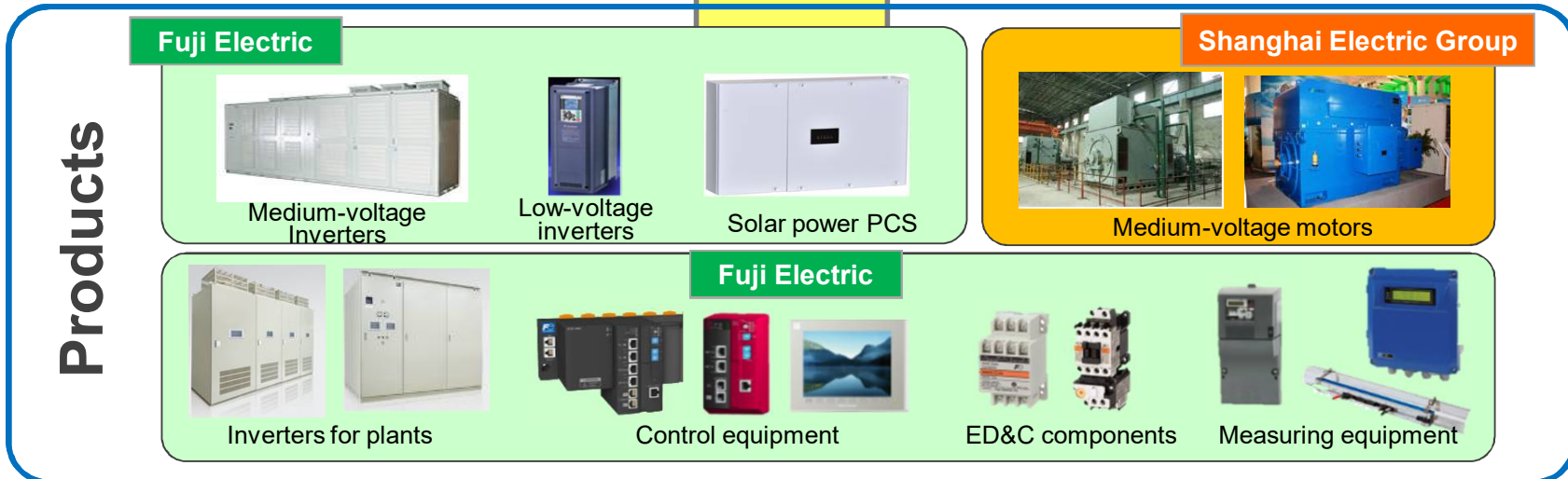
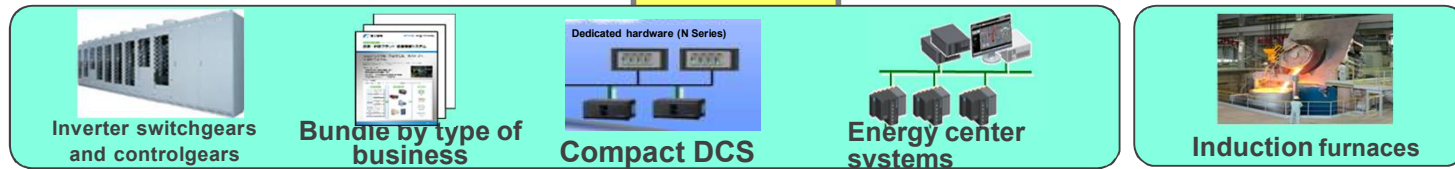


Expand Partner Businesses in China (Fuji Shanghai Electric JV)

Sales of our own drive control technology and process control technology as a bundled system through the wide sales channels of Shanghai Electric



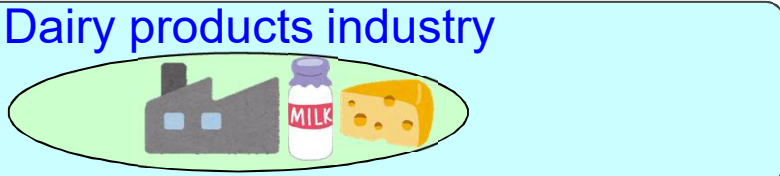
**Shanghai Electric Fuji Electric Power Technology Co., Ltd.
(SFEC)**



Expand Partner Businesses in China (Dalian Fuji Bingshan JV)

Sales of Dalian Bingshan's AC cold heat technology and equipment and our energy-saving technology as a bundled system

Top priority target businesses

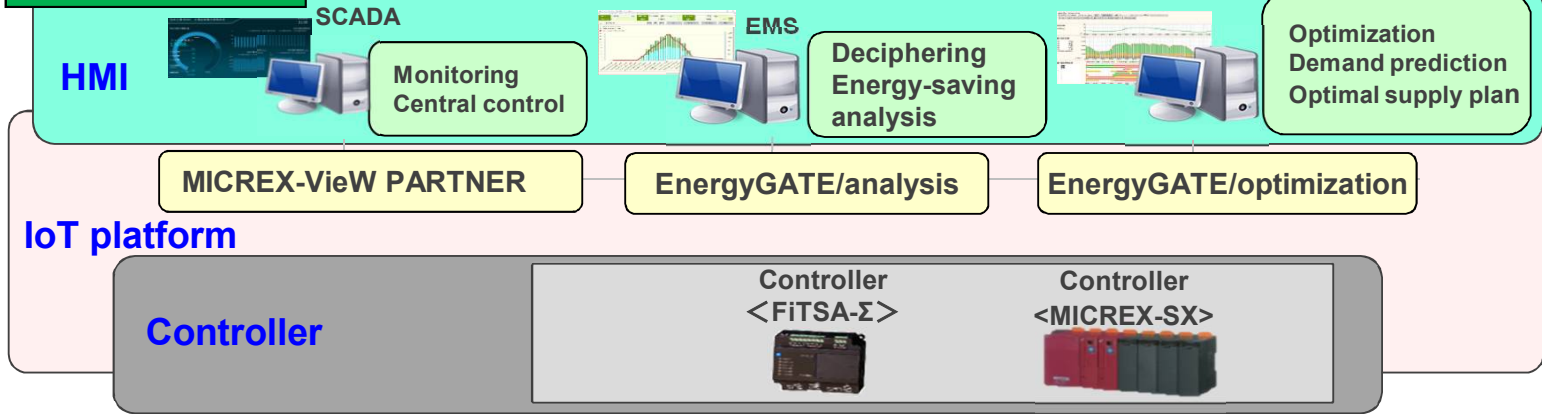


Utilize competitive sales channels

Dalian Fuji Bingshan Smart Control System Co., Ltd.

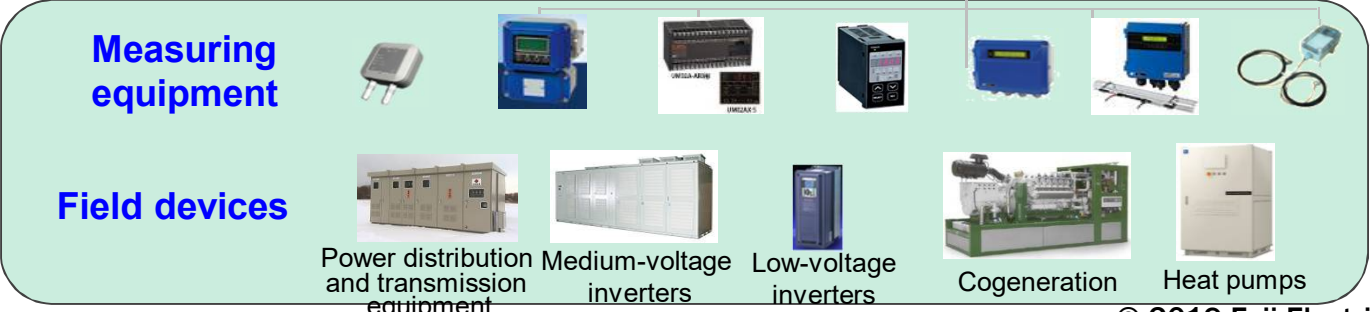
Provide as a system combined with the energy-saving technology

Fuji Electric



AC cold heat technology and equipment

Dalian Bingshan Group



Expand Partner Businesses in Asia

Establish a regional based business system centered on the Thailand factory

Target business	Vessels	Chemicals	Food and beverage	Non-ferrous	Steel	Cement	Waste incineration
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Form a locally rooted service system

Sales and engineering

Reinforce collaborative partner business

CN	FGEM	FCAC
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Thailand

Fuji Furukawa E&C
(Equipment construction)



Regional mother factory
Engineering base

Drive & process control and global products

Reinforce system sales

Inverter switchgears and controlgears	Bundle by type of business	Dedicated hardware (N Series) Compact DCS	Transformers	GIS
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Overseas production base

Manufacturing cooperation

FMT	FSMBE	FEI	FTU
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Expand Partner Businesses in Asia (India/FGEM)

Bundle using FE's products and system know-how through FGEM sales channels

Market Trends (Steel)

Demand expected to steadily increase with infrastructure investment leading the way

[CAGR (2018-2023): 6.5% in India and 6.0% in ASEAN]

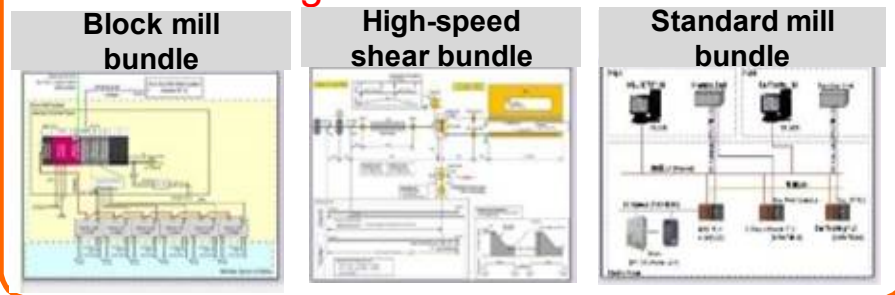
Source: IHS Global Insight (April 2019 Forecast)

Target facilities of steel manufacturers



Utilize FGEM's sales channels and engineering capability

Bar rolling line for standardization



Japan

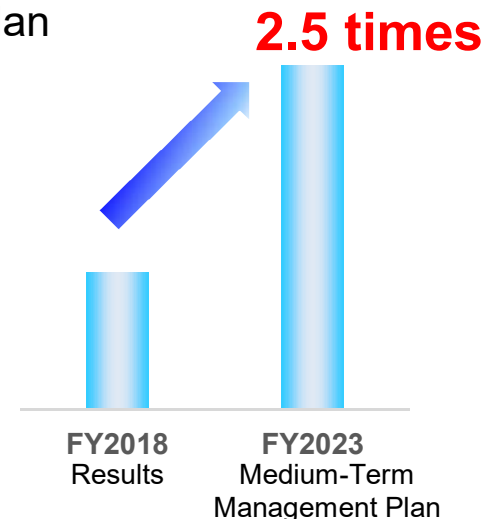
Local production and procurement

FGEM: Engineering base for steel industries in India and Southeast Asia

Priority Measures

- Expand local production and local consumption (production expansion of switchgears and controlgears)
- Standardize switchgears and controlgears design (FE technology support)
- Deploy horizontally to leading companies in India and Southeast Asia

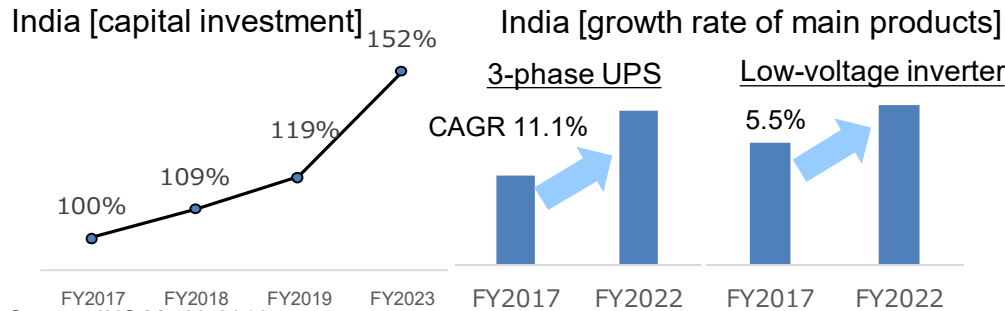
Sales Plan



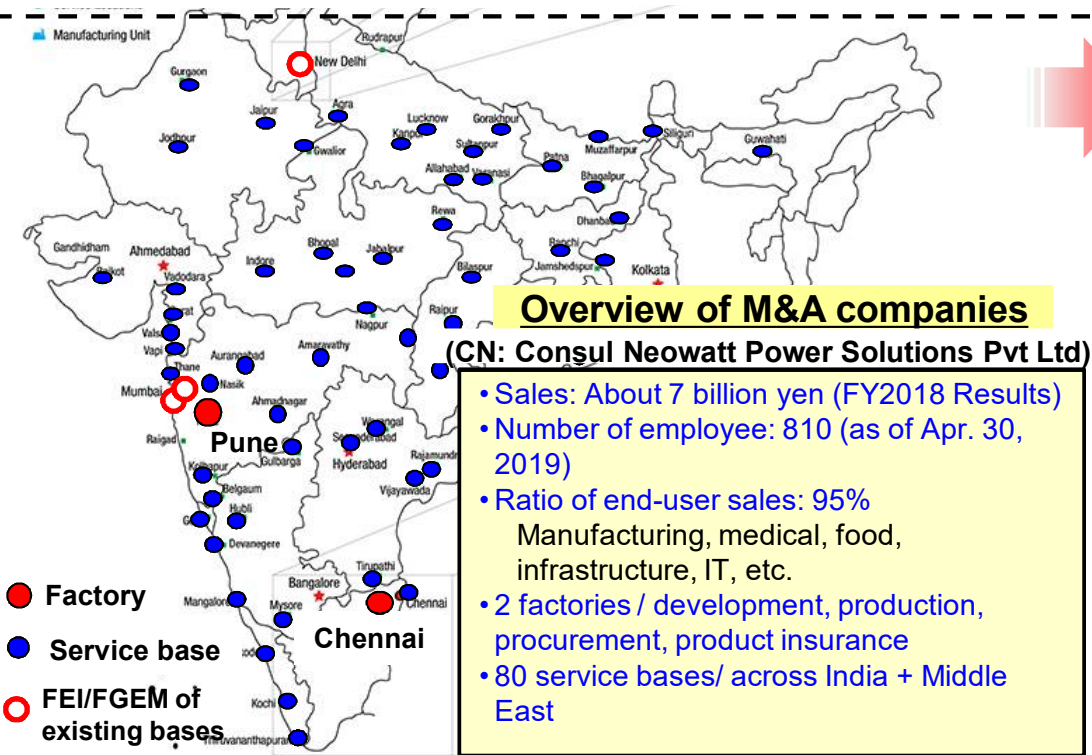
Expand Partner Businesses in Asia (India/CN)

Expand business in India and the Middle East by M&A (CN)

Market Trends



Source: IHS Markit 2018



Purpose of M&A

- Acquire foundation of energy solution business
- Expand end user channels
- Enhance manufacturing function
- Acquire after service network

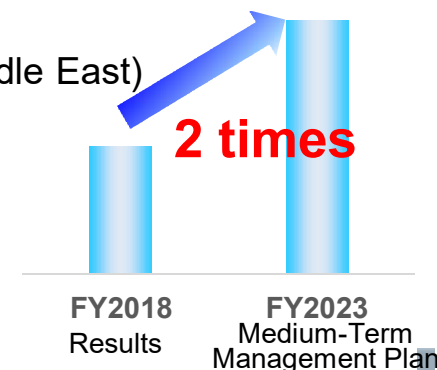


Priority Measures

- ◆ **Transfer FE technology**
New entry through local development and local production
- ◆ **Consolidate manufacturing functions in India**
Expand local production and consumption, maximize reduction of lead time and cost
- ◆ **Expand FE to other businesses and other models**
- ◆ **Utilize service network**

Sales Plan

(India, the Middle East)



Expand Partner Businesses in Asia (Vietnam/FCAC)

Expand to the Southeast Asian market by utilizing the sales channels and engineering capabilities of FCAC

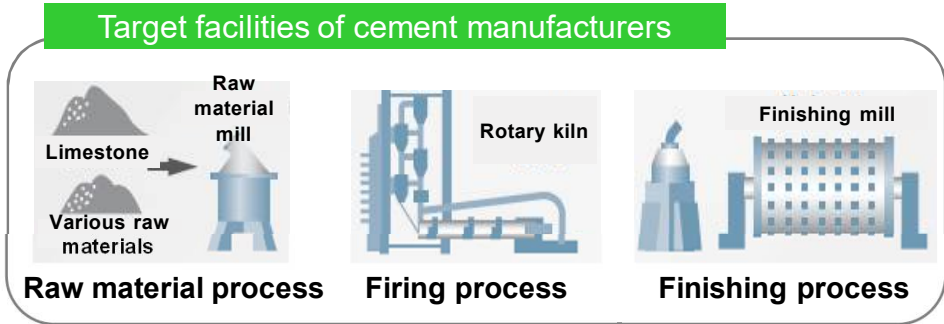
Market Trends (Cement)

Domestic demand and exports are expanding in Asia with strong investment on construction

[CAGR (2018-2023): Vietnam: 5.8%, ASEAN 5.0%]

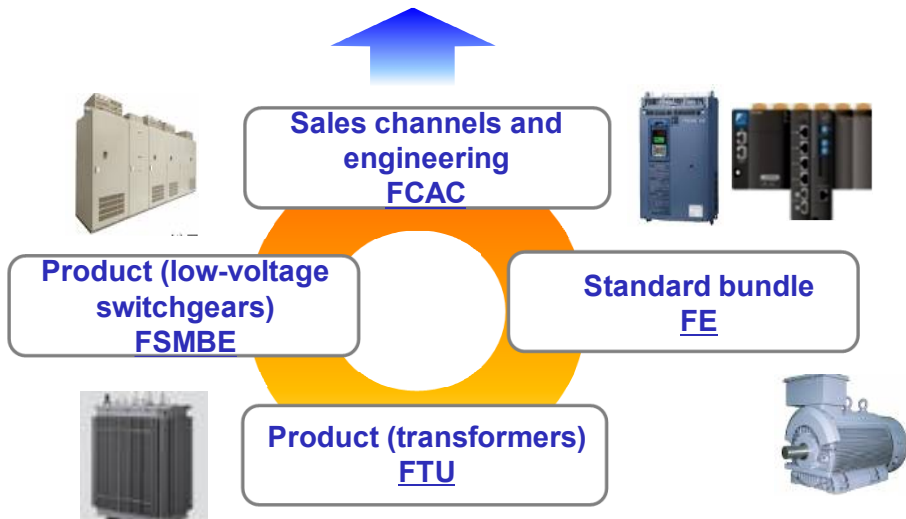
Source: IHS Global Insight (April 2019 Forecast)

FCAC: Engineering base for cement, steel and food industries in Southeast Asia

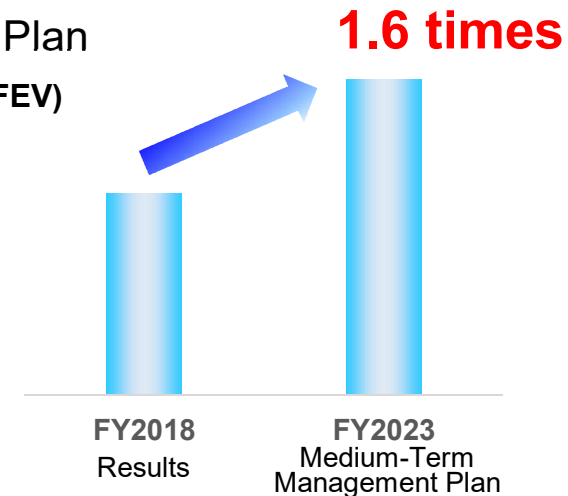


Priority Measures

- Expand and horizontally deploy to target industries (steel, food)
- Registration of vendors of medium-voltage switchgears and controlgears, and promotion of cost reduction
- Further enhancement of engineering capabilities (Technical support for FE, systematization of plant education)



Sales Plan (FCAC+FEV)



Expand Domestic Business

Expand sales by expanding new businesses with differentiated products, and expand sales by receiving comprehensive electrical equipment orders

Market Trends

- Replacement demand for aging equipment remains steady
- Demand in the industrial machinery sector continues to be stagnant.
- Investment on environment and energy saving will increase over the medium and long term.

Domestic Sales in FY2023

FY2023 +15.4 billion yen
(compared with FY2018)
 (FY2018: 436.6 billion yen → FY2023: 452.0 billion yen)

Factors for declining income

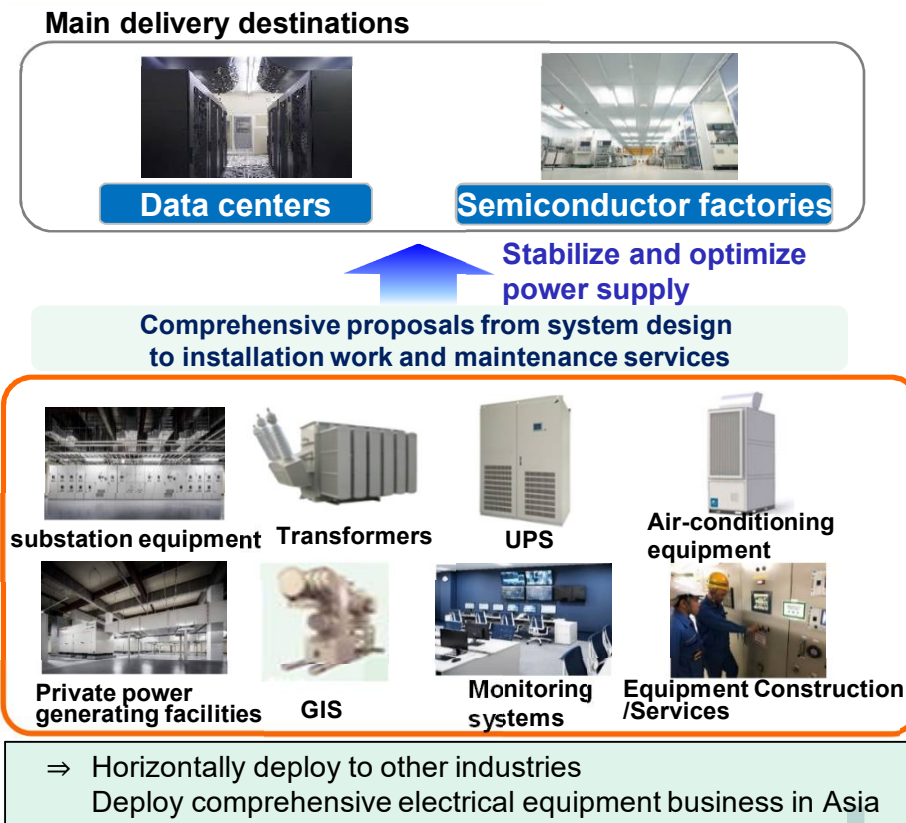
- Decrease in demand for smart meters
- Select and concentrate business

Factors for increasing income

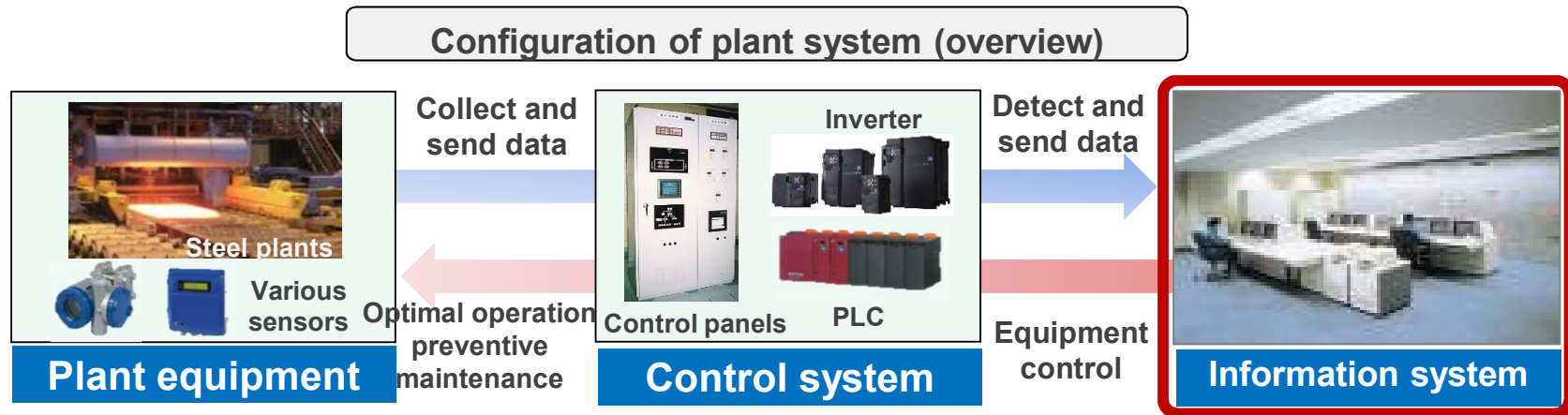
- **Continuation of comprehensive electrical equipment business**
- Expand system business operations using IoT
- Expand vessel systems business
- Expand railways business

Comprehensive electrical equipment business

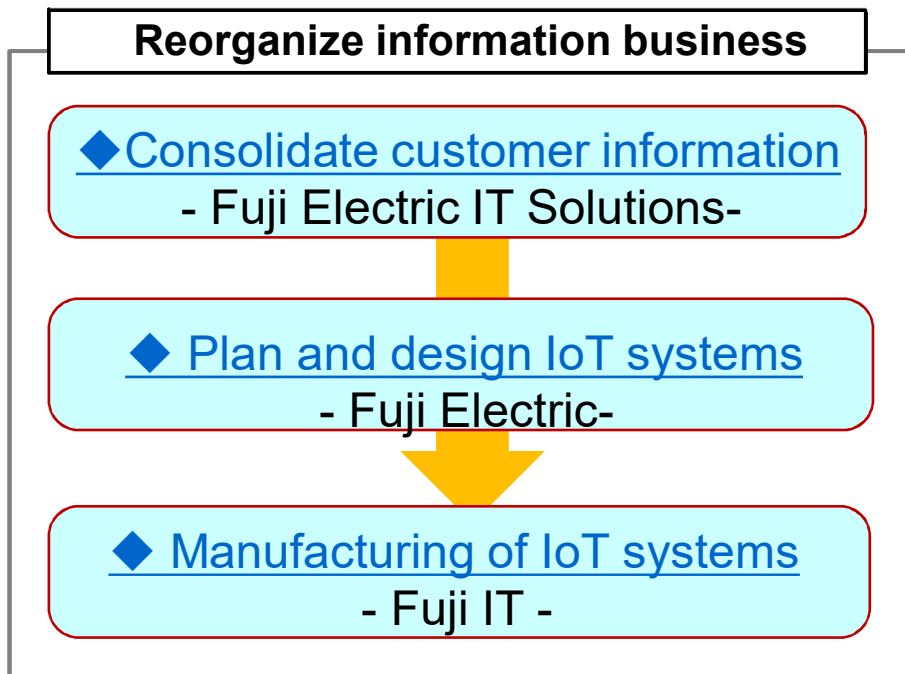
- Expand receipt of orders mainly from domestic data centers and semiconductor factories
(Results of receipt of orders in FY2018: Approximately 30 billion yen)



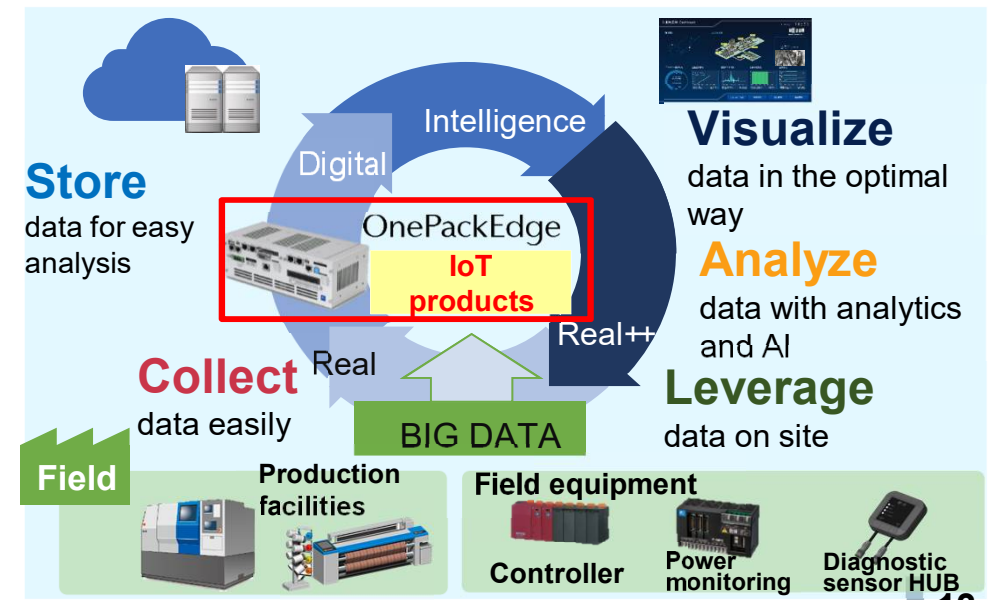
Expand Information System Business utilizing IoT



Expand systems business by establishing a comprehensive IoT network



■ Case: System for collecting and analyzing data "OnePackEdge"



Expand Business through Differentiated Products (Vessel Systems)

Being sold Sales will start in FY2019

EGCS (Exhaust gas cleaning system for ships)

Size	Tower diameter x Height	Engine output (Reference)	Equivalent shipping tonnage (reference)	Estimated length (Bulk carrier)
S	Φ2.0m x H 7.0 m	~8MW	45,000 to 75,000 shipping tons	150~200m
M	Φ2.3m x H 8.0 m	~12MW	75,000 to 120,000 shipping tons	200~250m
L	Φ2.7m x H 9.2 m	~16MW	120,000 to 200,000 shipping tons	250~300m
2L XL	Developmental products	~18MW ~24MW	200000 to 300000 shipping tons	(300m~)



Bulk carrier



Control panels



Laser gas analyzer



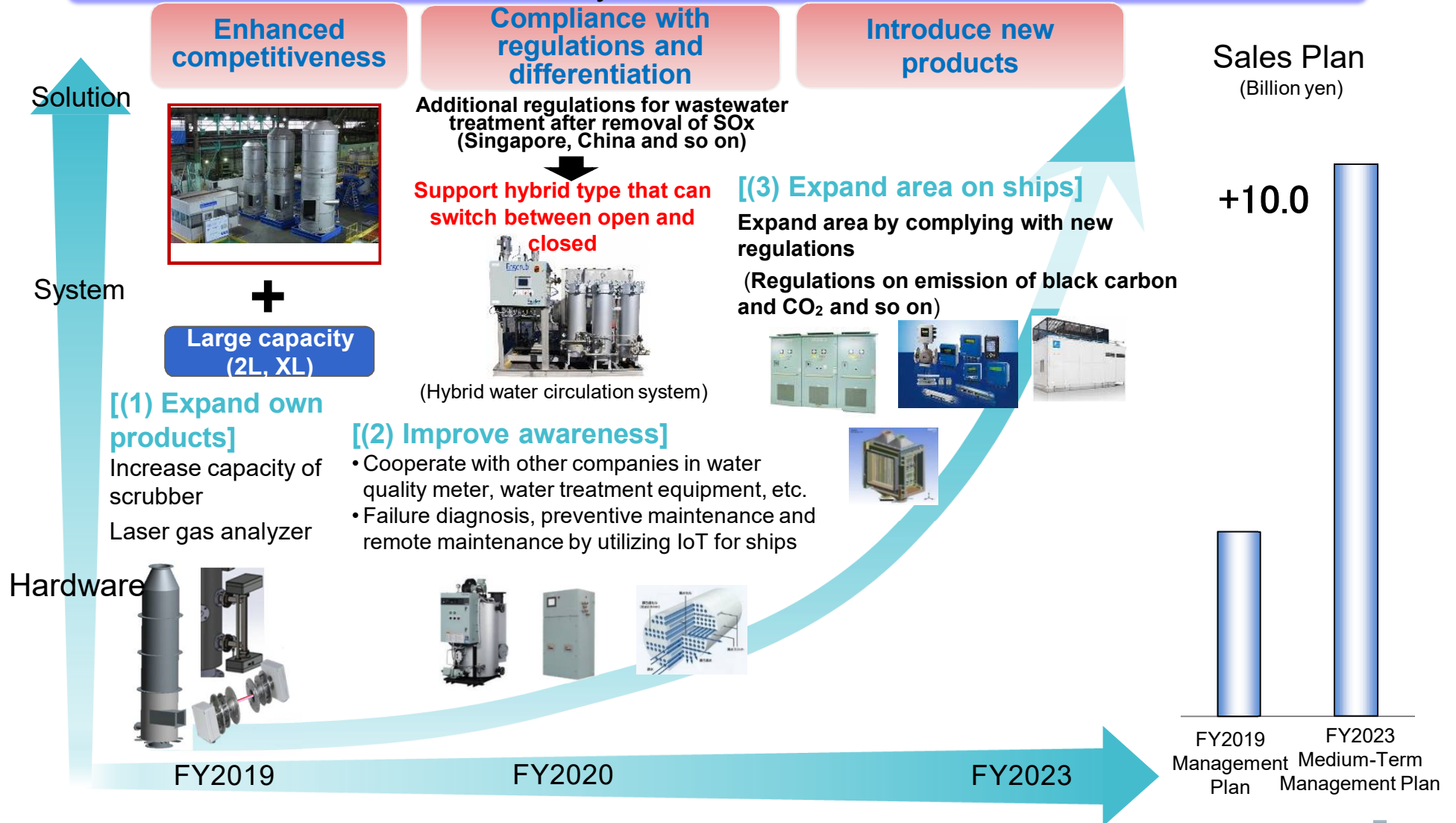
Water quality meter
(pH, PAH, turbidity)



Flow control inverter

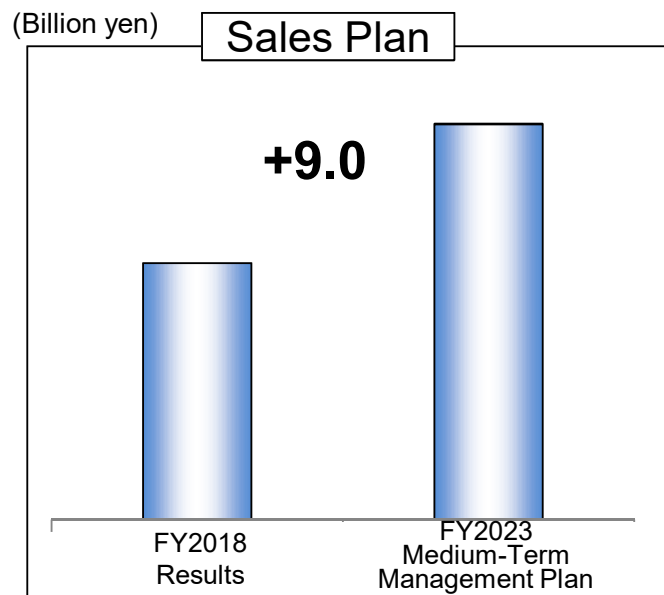
Expand Business through Differentiated Products (Vessel Systems)

Expand business by promoting collaboration and introducing new products after entry into market with EGCS



Expand Business through Differentiated Products (Railway Business)

- Expand differentiated products for high-speed railways/ application of SiC
- Increase efficiency by preparing a thorough platform (PF)



[Fuji Electric's Strengths]



Realize low loss, small size and light weight products

[Priority Measures]

● Propulsion systems



- Increase SiC product orders for high-speed railways
- Develop equipment for next-generation high-speed railways

● Railway substations



- Develop products and increase manufacturing systems for prepare systems for acquiring new orders

● Door systems

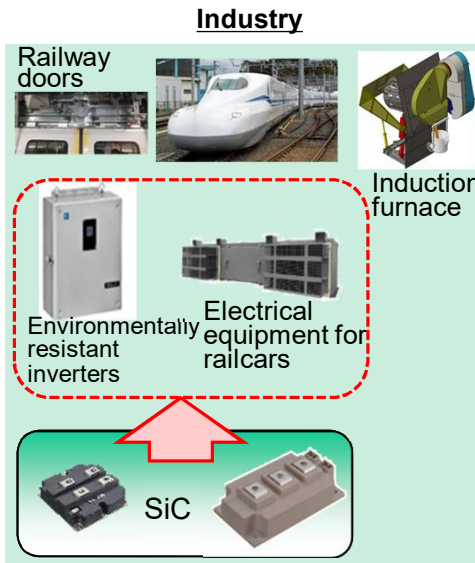
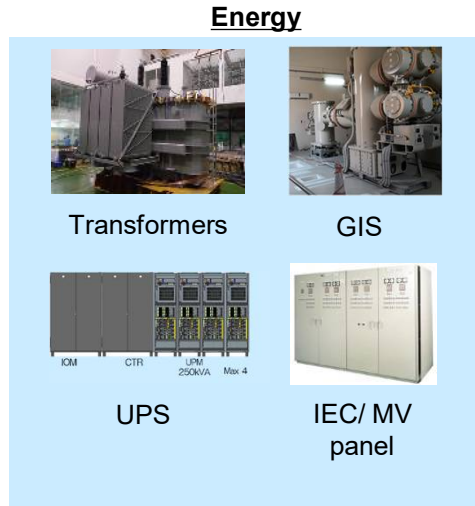


- Reduce costs by standardizing design
- Enhance the development and engineering systems of FSEMEC

Create Competitive Components

Differentiated products Commercialize competitive components

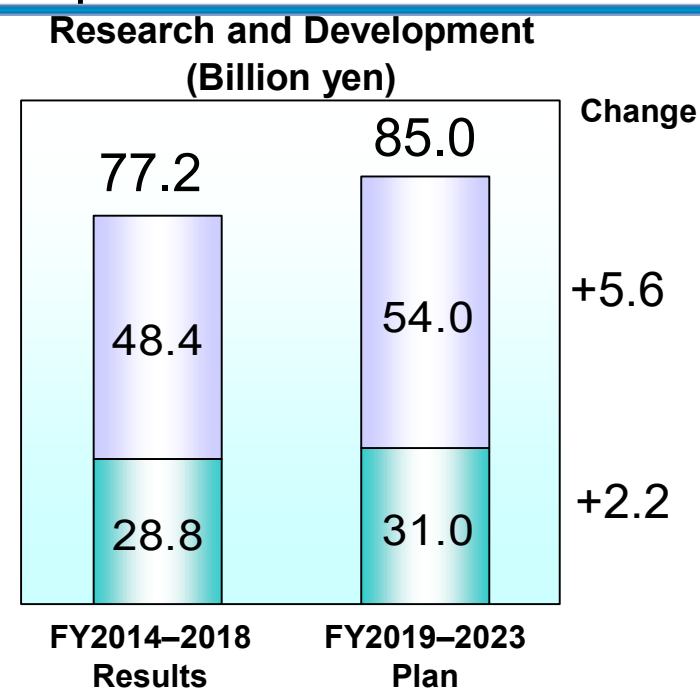
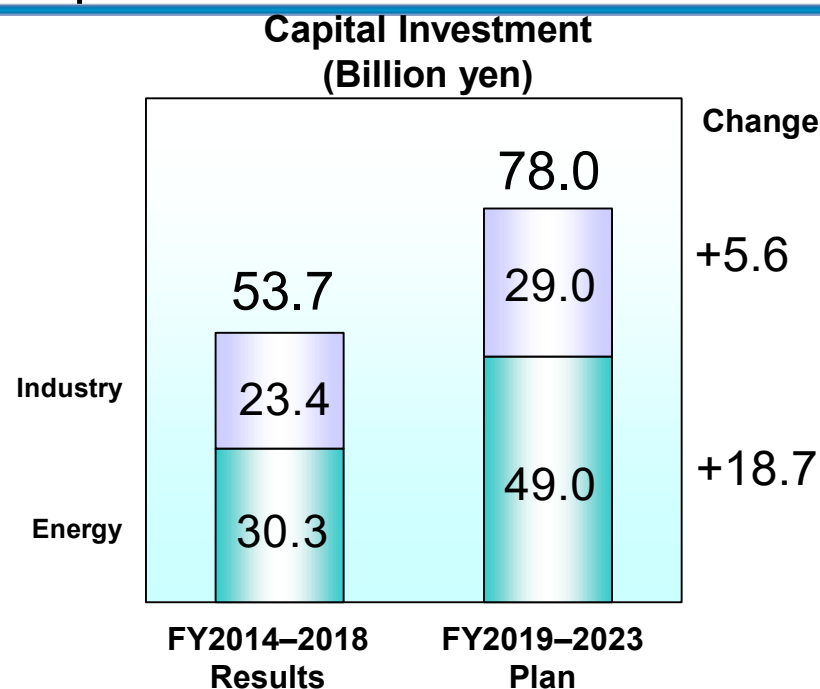
★Planned launch (timing of commercialization)



Segment	Model	Target areas	FY2018	FY2019	FY2020	FY2021 to FY2023	
Energy	Transformers	Southeast Asia, Middle East	→		★	Next generation machines, expanded series	
	GIS (Gas insulated switchgear)	Southeast Asia, Middle East	→		★	Next generation machines, expanded series	
	UPS (Uninterruptible power systems)	Southeast Asia, North America	SiC →			★	Expanded series
	MV panel compliant with IEC standard	Southeast Asia	→		★	Expanded series	
Industry	Global induction furnace	China	→		★	Expanded series, SiC	
	Environmentally resistant inverters	Japan	SiC →	★	Expanded series		
	Main power converter Electrical equipment for railcars	Japan	SiC →		★	Next generation models	
	Railway doors	North America	→		★	Expanded series	

Power Electronics Systems

Capital Investment and Research and Development



<Energy>

- New building at Thailand Factory (switchgears and controlgears system business)
- Construction of engineering building at Chiba factory (Transmission and distribution systems)
- Construction of new building at Fukiage, equipment new products (ED&C components)

<Industry>

- Enhance system tests for information control panels

<Energy>

- Develop global products (transformer, GIS, UPS, switchgears and controlgears)
- Reduce cost of AC to DC power conversion systems
- Develop railway ground power units

<Industry>

- Vessel systems, railways
- New inverter / servo
- Global induction furnace

*The 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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