

*Furukawa **G** Plan 2020*
*Group **G**lobal **G**rowth*

Progress of
Mid-term Management Plan

President
Keiichi Kobayashi

May 24, 2017

FURUKAWA ELECTRIC CO., LTD

Forward-Looking Statements

Projections of future sales and earnings in these materials are “forward-looking statements.”

Management offers these projections in good faith and on the basis of information presently available.

Information in these statements reflects assumptions about such variables as economic trends and currency exchange rates.

Forward-looking statements incorporate known and unknown risks as well as other uncertainties that include, but are not limited to, the following items.

- Economic trends in the U.S., Europe, Japan and elsewhere in Asia, particularly with regard to consumer spending and corporate expenditures.
- Changes in exchange rates of the U.S. dollar, euro, and Asian currencies.
- The Furukawa Electric Group’s ability to respond to rapid advances in technology.
- Changes in assumptions involving financial and managerial matters and the operating environment.
- Current and future trade restrictions and related matters in foreign countries.
- Changes in the market value of securities held by the Furukawa Electric Group.

Due to the above factors, actual sales, earnings, and other operating results may differ significantly from Looking Statements in these materials. In addition, following the release of these materials, Furukawa Electric Group assumes no obligation to announce any revisions to forward-looking statement in these materials

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Furukawa Electric Co., Ltd

- I. Strengthen and Reform Businesses**
- II. Accelerate Globalization/Regional Strategies**
- III. Step Up Efforts for Key/New Businesses**
- IV. Enhance Group-wide Initiatives for Automotive Business**
- V. Toward Achieving 2020 Mid-term Management Plan Targets**

- **Strengthen key businesses and products**
(FY2016 results)
 - **Responded to growing demand for telecommunications and functional products**
 - **Restructured power cable business**
Took over VISCAS Corporation's operations


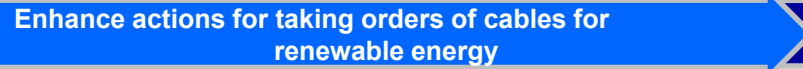




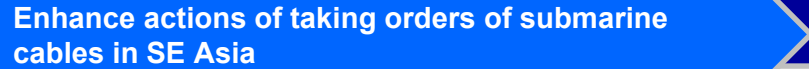

- **Improve profitability of underperforming businesses and low-margin businesses/products**
 - **Power cable and copper strip businesses**
 - **Reforming low-margin businesses/products**

I. Strengthen and Reform Businesses

1. Improve profitability of underperforming businesses: Power cables - Build robust system by enhancing capabilities of manufacturing and installation

Take the following actions in FY2017 under the new organizational structure to be formed as a result of business restructuring

- Enhance capability to respond to demand from domestic power companies as they work to replace aging facilities
 - Capital investments: Upgrade cable manufacturing equipment and boost production capacity
 - Hiring more people: Secure personnel for installation work
- Generate profits by following through on orders received overseas
- Develop technologies with an eye to the future

		Roadmap aimed at generating surplus in FY2018			● Scheduled delivery of orders received	
		2016	2017	2018–	2021–	
J a p a n	Major power companies					
	New players				 	
		※Fukushima floating offshore wind farm demonstration PJ ※Fixed offshore wind farm, mega solar PJ				
Overseas						
		● Qatar 400kV ● Bahrain 400kV	● Singapore 400kV			
						

I. Strengthen and Reform Businesses

1. Improve profitability of underperforming businesses: Copper strips

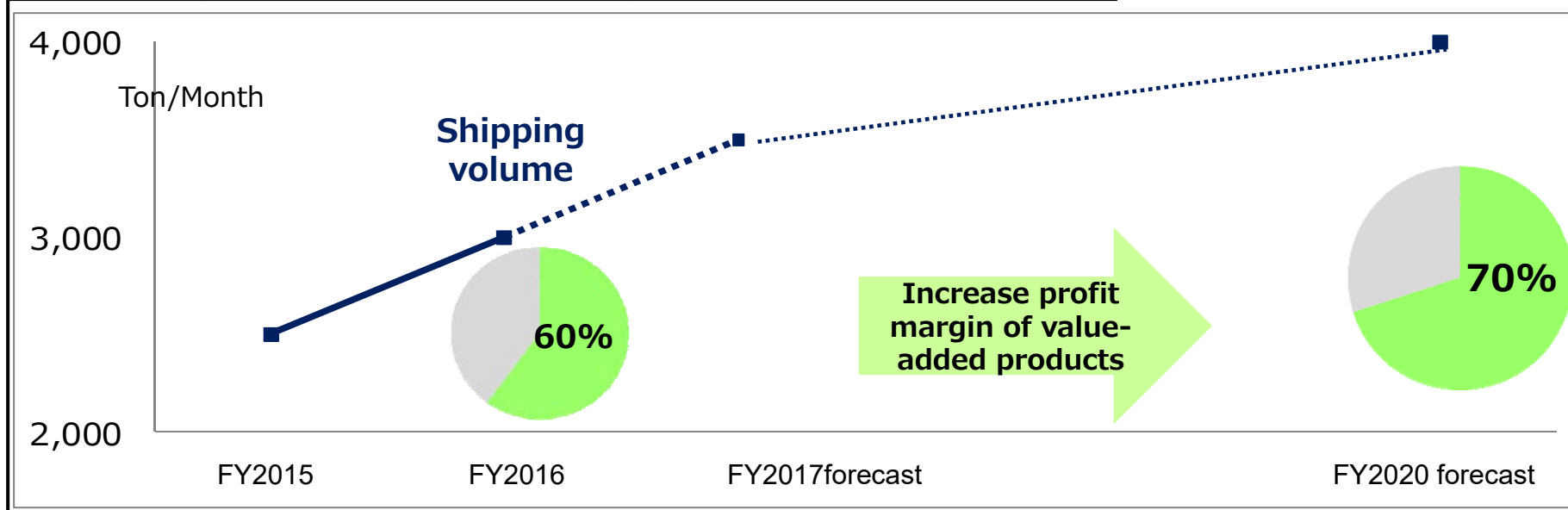
- Improve product mix and increase sales with a focus on automotive markets

	Target markets/applications	Key products
Value-added products	Mobile devices (smartphones, etc.) Automotive connectors	High-performance copper alloy products that will make smaller and higher performance connectors possible
	Semiconductor packages Lead frames for automotive sensors	High-performance copper strips for frames that will make next-generation package design possible
Volume zone	Automotive wiring harnesses Battery tabs	Reflowed tin-plated copper strips that will make products safe and reliable
	Terminals and DCB substrates for power semiconductors Shielding copper strips and other products for heat dissipation and conductive purposes	Oxygen-free copper with superior heat dissipation performance and conductivity

Electronics & Automotive Systems
 * Operating income(JPY billion)
 * Cooper& High Performance Material Products, Electric Conductor, Magnet wire, Copper tube

Cooper strips drive profitability

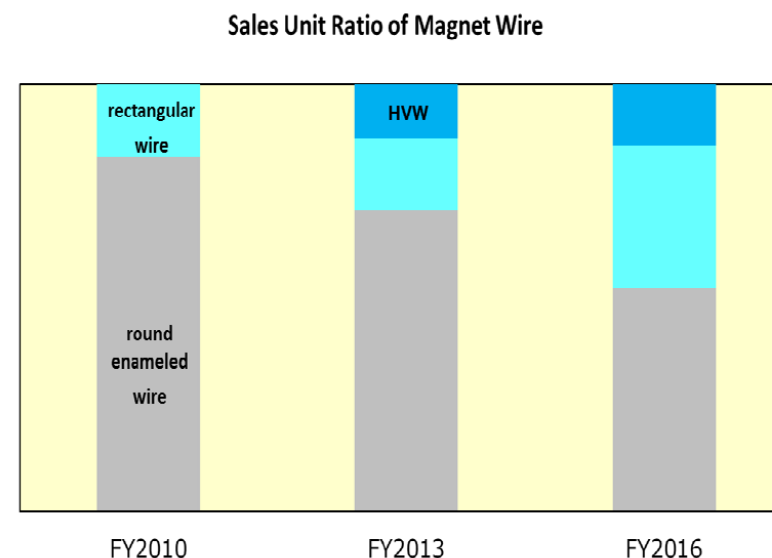
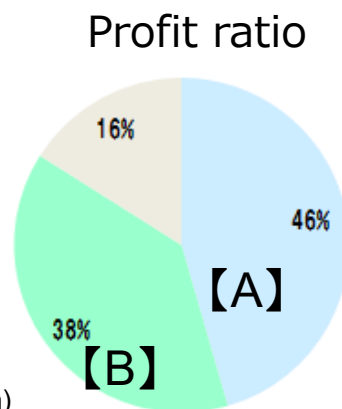
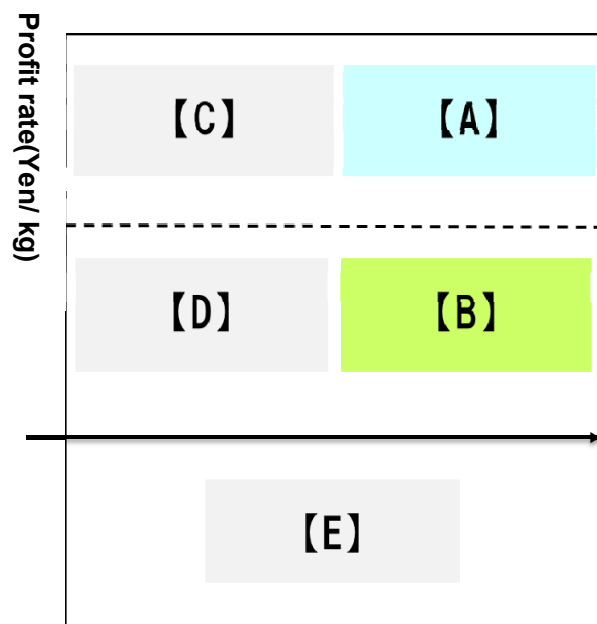
FY2016: 2.7 FY2017 forecast: 4.0



I. Strengthen and Reform Businesses

Higher profitability brought by better product mix: Examples in magnet wire business

- Improved product mix as a result of partial discontinuation of unprofitable thick, round enameled wire and increased production of rectangular wire
 - Started shipping HWV* (HV rectangular magnet wire) for EV power generation/drive motors in late fiscal 2011. After that, concentrated resources on high value-added products rectangular magnet wire and HWV.
- => Turned the business around during the previous mid-term plan period, generating steady profits and even higher profits in FY2016



* HVV : High Voltage Winding Wire (HNWW™ : be waiting for trademark registration)

I. Strengthen and Reform Businesses

2. Reform low-margin businesses/products

- Return on operating assets was introduced to visualize revenue targets in chronological terms by business and product, speeding up the pace of improving low-margin businesses and products.

	FY2015 results	FY2016 results	FY2017 forecasts
Return on operating assets	9.1%	12.1%	11.1%
Operating income	27.1 billion yen	38.6 billion yen	37.0 billion yen
Operating assets	298.2 billion yen	319.6 billion yen	333.5 billion yen

<Case examples to reform less profitable business/products >

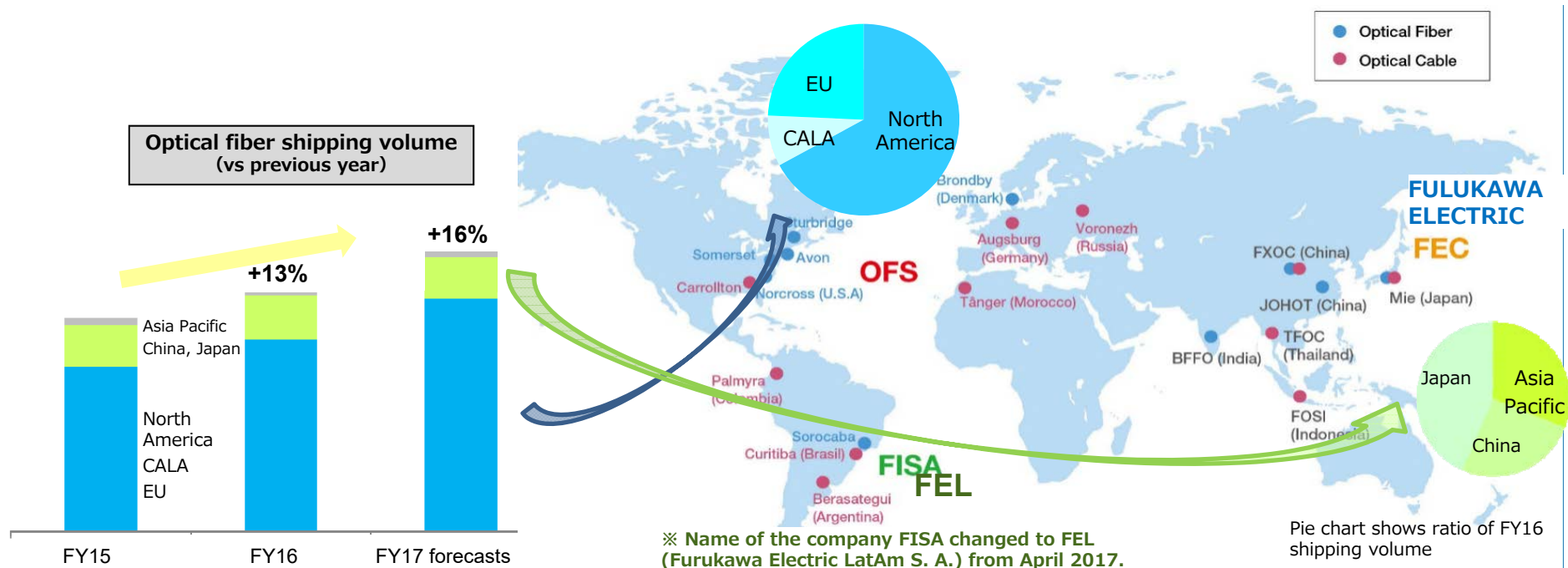
Completed in FY2016	Communications Solutions	(FITEL)	<ul style="list-style-type: none"> • Withdraw from optical amplifiers business (Except some products) • Withdraw from optical engine
	Energy infrastructure	(Industrial cable/Cable accessories)	<ul style="list-style-type: none"> • Integrate domestic parts production sites • Withdraw from bus duct business(China Market)
	Automotive Products	(W/H)	• Integrate North China sites
	Electronics Component Materials	(Metal processing)	• Close the Nikko sites
In process	Communications Solutions	(Fiber •Cable) (FITEL)	<ul style="list-style-type: none"> • Transfer to the solution business at Southeast Asia • Cooperation for passive optical device (Established Joint venture in April, 2017)
	Automotive Products	(W/H)	• Integrate India sites
	Electronics Component Materials	(Cooper tube)	• Integrate manufacturing sites for refrigerant pipe
	Functional Products	(Cooper foil)	• Shrink generic foil manufacturing

II. Accelerate Globalization/Regional Strategies

1. Strengthen global operations for optical fiber & cable businesses

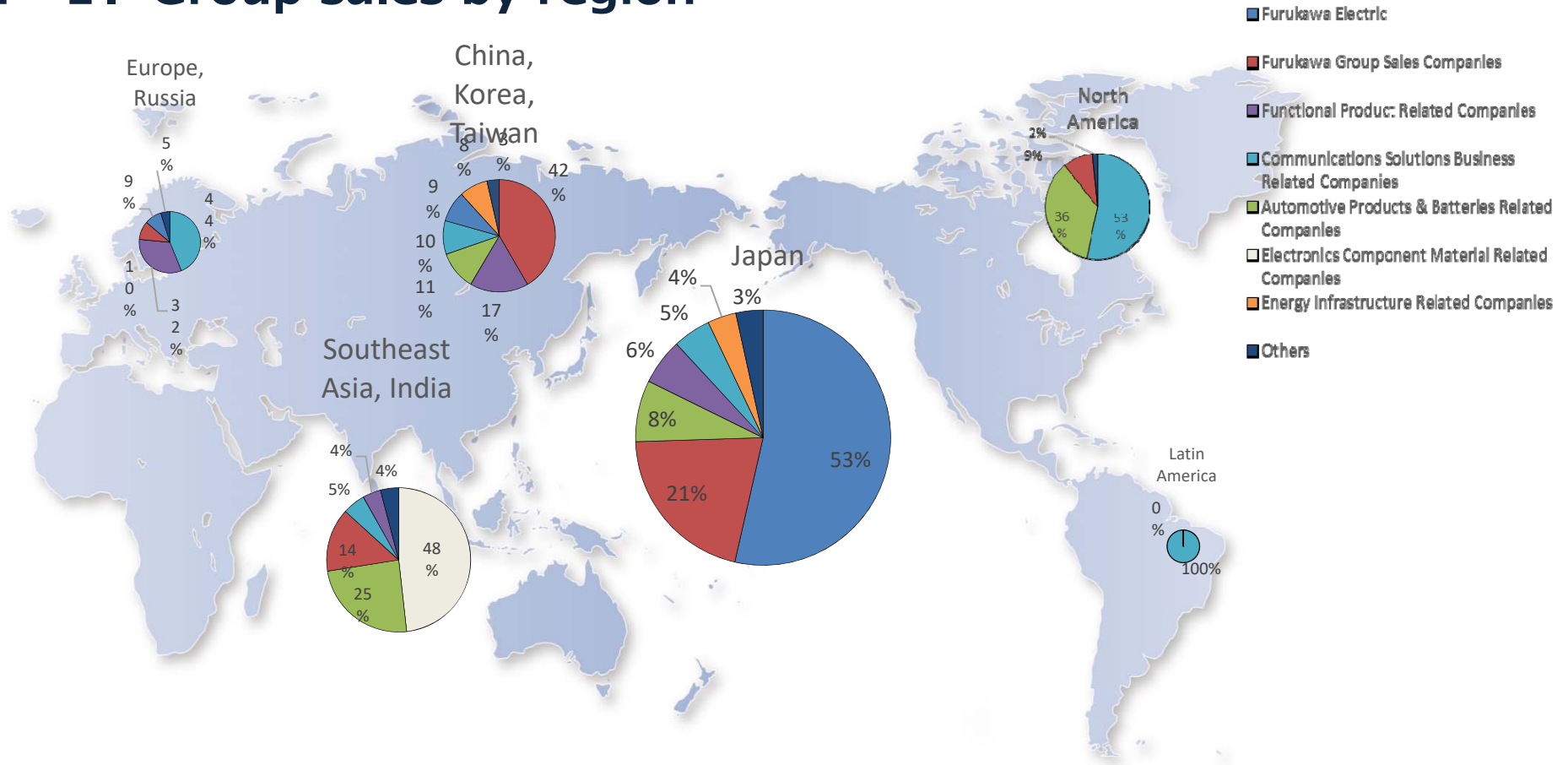
Build a centralized management system within the Group to respond to growing demand and customer requirements

- Establish a global system for centrally managing production and supply allocation for fiber factories in Japan, the U.S., and India based on global strategies
- Respond to regional customer requirements at local cable production bases
- Boost production capacity for optical fibers in line with demand trends
(Capacity increased 20% from early FY2015 to date and will be increased by another 20% by early FY2018)

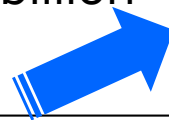


II. Accelerate Globalization/Regional Strategies

2 – 1. Group sales by region



FY2016 Consolidated net sales : 843.3 JPY billion
 -Overseas sales : 390 JPY billion (46%)



FY2020 Target : 60%

II. Accelerate Globalization/Regional Strategies

2-2. Steps to Developing Regional Strategies

Matrix of strategies/challenges by region for each business division/group

...	CHN, KOR TWN	SEA	North America	Latin America	...
D product	CHN, KOR TWN	SEA	North America	Latin America	...
C product	CHN, KOR TWN	SEA	North America	Latin America	...
B product	CHN, KOR TWN	SEA	North America	Latin America	...
A product	CHN, KOR TWN	SEA	North America	Latin America	...
a product	○		●		
b product		○		●	
c product					
:					

<Successful segment>
Market segment, growth rate, our market share, competitor benchmarks, sales channels, distribution channels, personal connections (customers/industries), KSFs

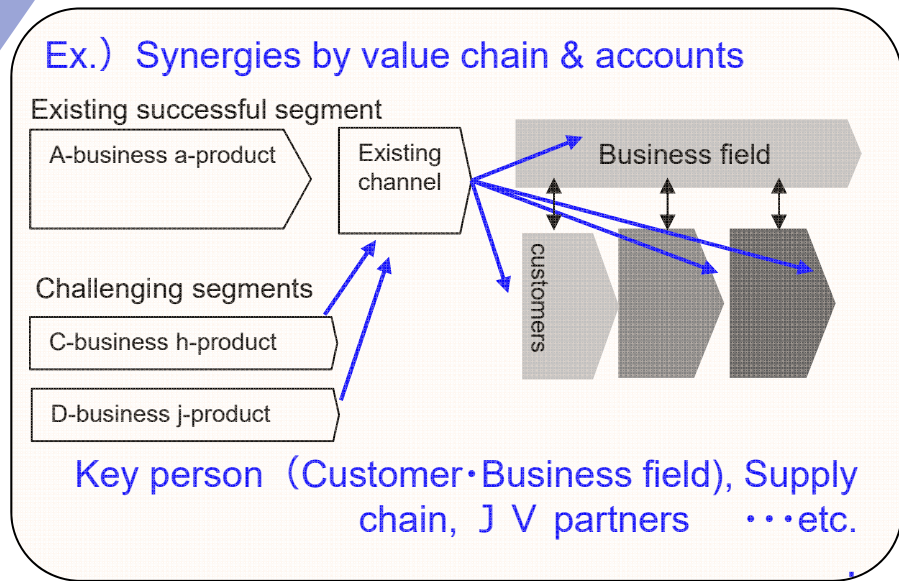
<Underperforming segment>
- Market and growth rate are attractive
- Problem with expanding trade area

Take a cross-sectoral look at the strengths and weaknesses of each business

Regional headquarters function
China: Implemented in April 2017
Southeast Asia: To be implemented in July 2017

Pursue group synergies by each region

	CHN, KOR TWN	SEA	...
Advantages	A-business a-product ...	A-business b-product B-business d-product
Challenges	C-business h-product D-business j-product ...	D-business k-product
Initiatives	Use A-a channel ...	Use A-b channel



III. Step Up Efforts for Key/New Businesses **FURUKAWA ELECTRIC**

1. Boost ITLA* production and performance (high-output, small, energy-saving)

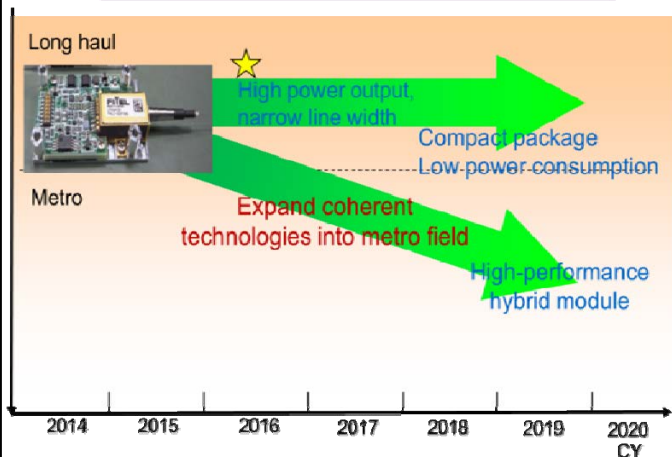
- Use of optical digital coherent transmission technology for metro networks and data centers is growing in step with increasing telecommunication traffic.
- At the same time, demand for ITLA is rising and ITLA is becoming more advanced.

=> Working to boost production capacity and improve products for higher output while making them smaller and more energy-saving

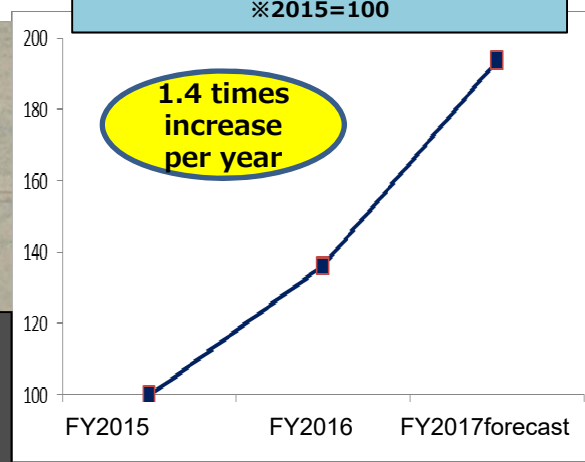
Established a joint manufacturing venture with NTT Electronics Corporation to operate two production sites in Ichihara, Chiba and Naka, Ibaraki

Beef up R&D to develop narrower, higher output ITLAs

ITLA development roadmap



Sales units of ITLA (Y to Y) ※2015=100



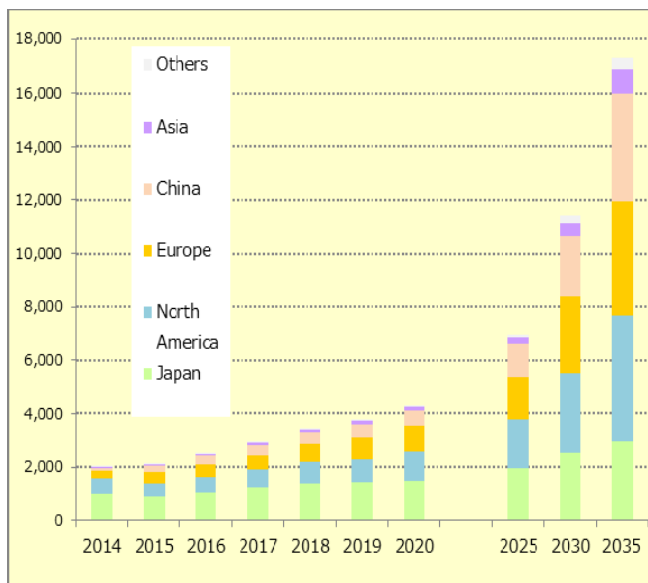
* ITLA: Active optical product for digital coherent transmission

III. Step Up Efforts for Key/New Businesses

2. Strengthen magnet wire business (collaborate with Essex Magnet Wire*)

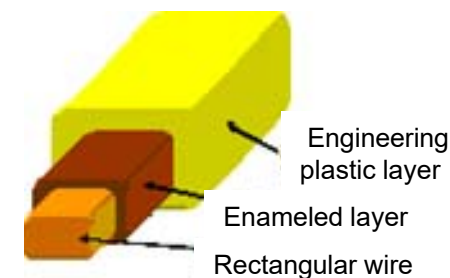
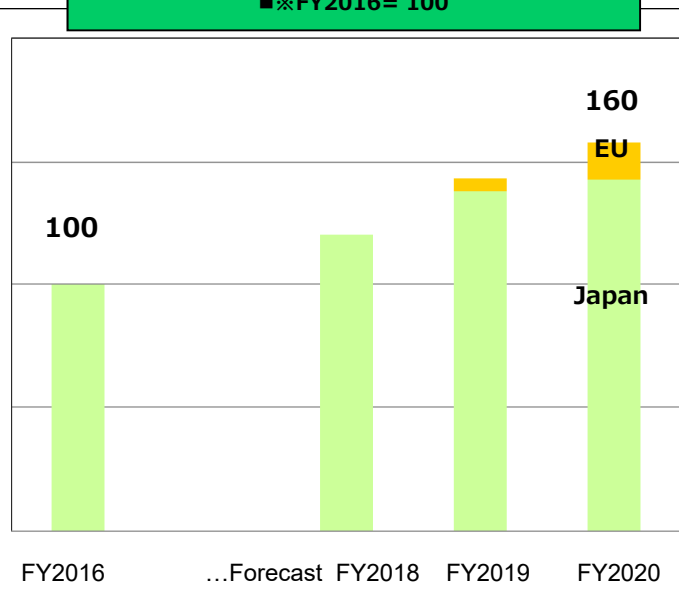
- Launched a joint venture in March 2017, combining Essex Magnet Wire’s manufacturing/sales capabilities in Europe with our technological capability, to supply HVW (HV rectangular magnet wire) to the European automobile market
- Working with customers to enhance efficiency and output of eco car motors, a market that is expected to grow

**Eco-car(HEV,PHEV,EV,FCV)
Market forecast (Our assumption) 1000unit**



HVW Sales unit perspective

■※FY2016= 100



HV rectangular magnet wire
Meet needs of light weight, thin type, high voltage resistance

* One segment of American manufacturing & Sales company for Cooper, Aluminum wire and Cable; Superior Essex

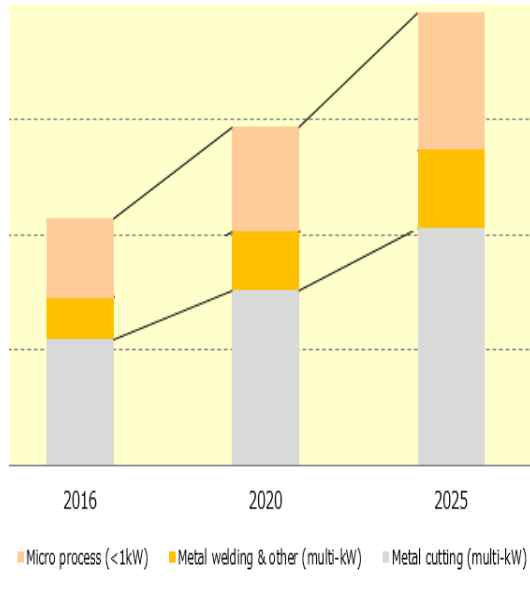
3. Fiber laser (enhance welding quality via fusion with materials technology)

- Integrate technologies to differentiate ourselves as the only manufacturer having both fiber laser and materials technologies (e.g., offer solutions packaged with copper strips suitable for laser welding)
- Expand operations and enhance high value-added materials such as fiber components and laser modules, which are key components

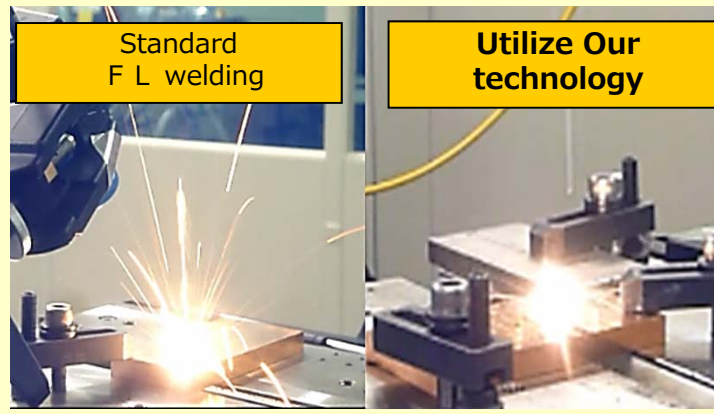


**6 kW Multi mode
Fiber laser oscillator**

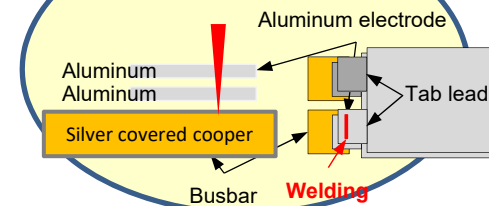
**Fiber laser demanding forecast
(Our assumption) (Unit : Million \$)**



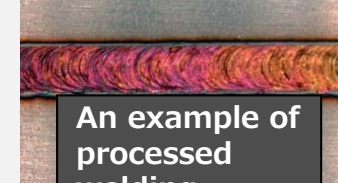
Thanks to combination of our high beam quality and beam forming technology by Furukawa Denshi Co., Ltd., airborne droplet inhibited welding became reality



Example of Automotive battery module welding



Most appropriate cooper strip for laser processing completed surface processing



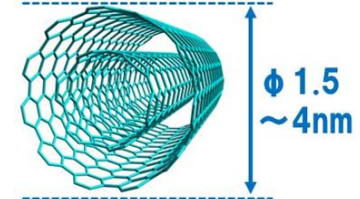
An example of processed welding

III. Step Up Efforts for Key/New Businesses

4. <Focus of cutting-edge technological development>

Carbon nanotubes (CNT), electric wires of the future

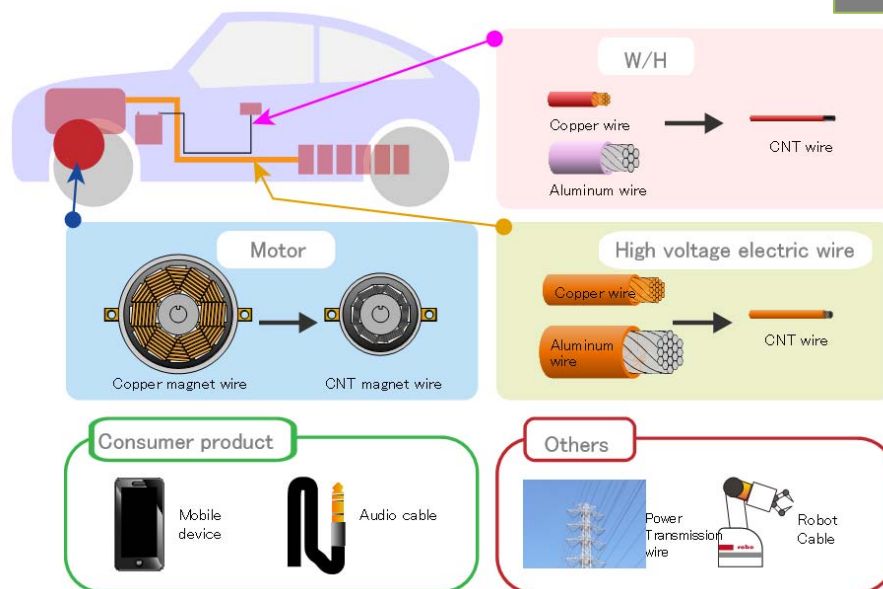
- Now developing low-resistant, ultra-lightweight electric wires with a conductor made entirely of carbon
- Make wires stronger and more lightweight for higher performance as well as energy- and space-saving designs



<Future applications>

- In-wheel motors => Free up automobile engine space (to be used for other purposes)
- Lighter and thinner cables => Simplify transmission line towers and reduce cable space by 90%

Main application



Development status



Succeed to make Jacket CNT wire sample

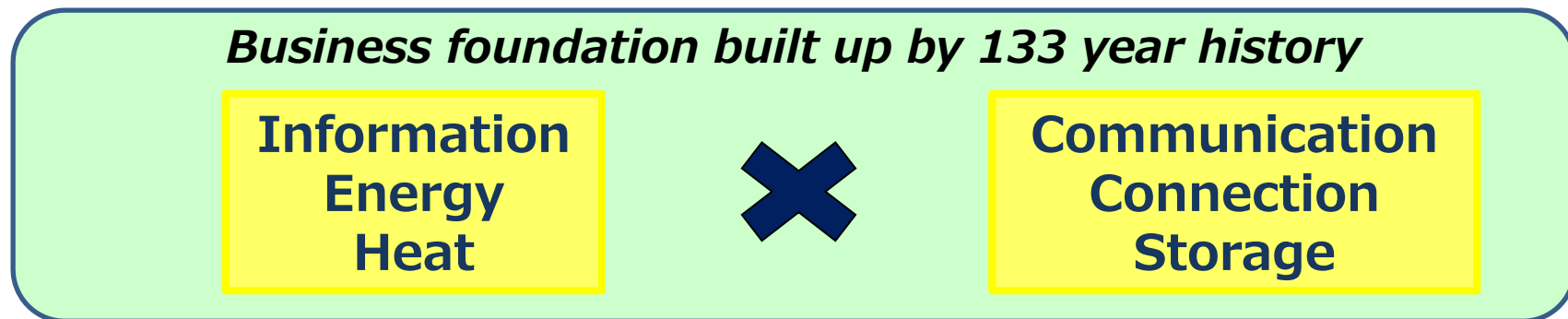
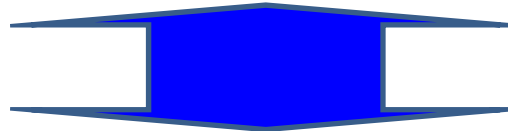
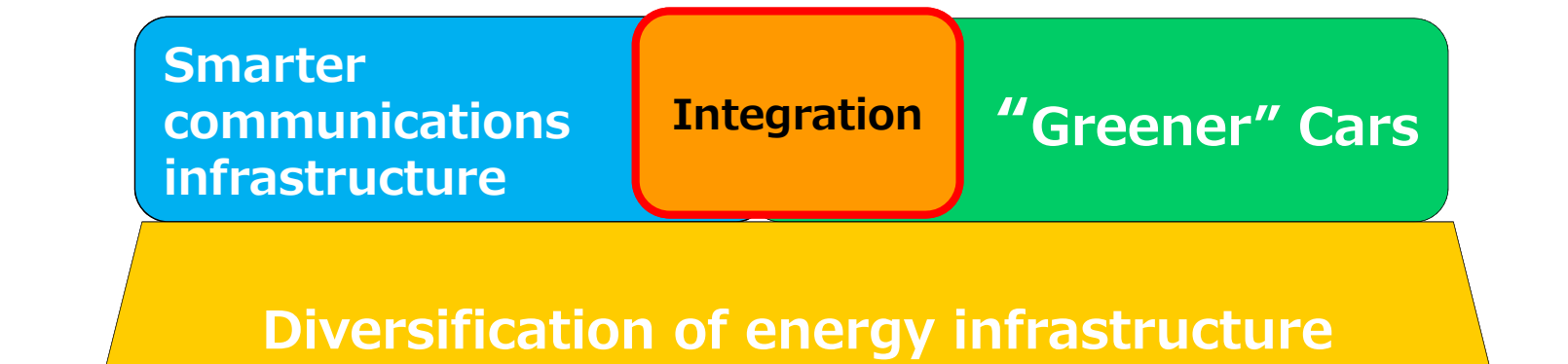


Proven Model motor driving

Features

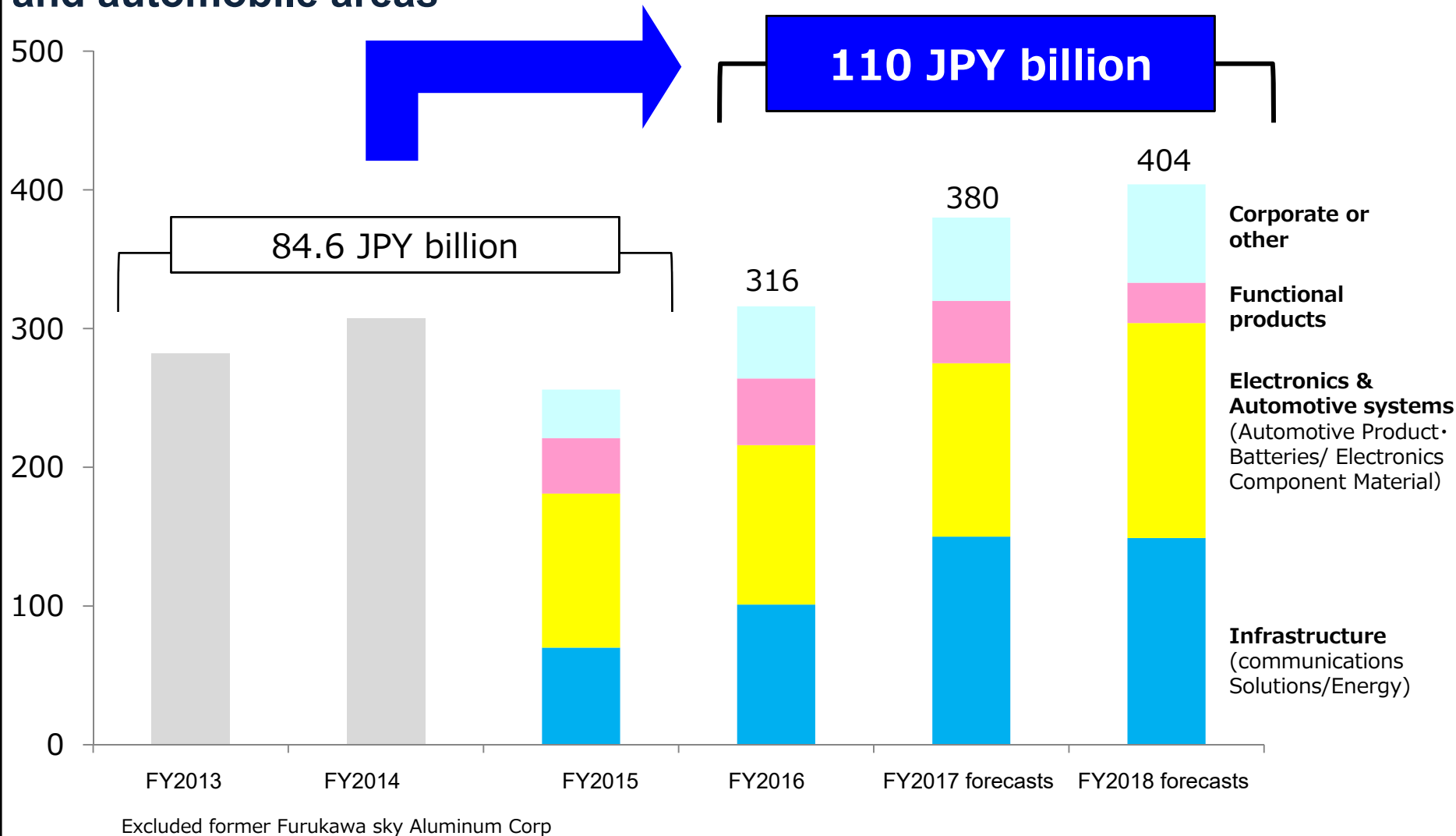
- Light weight (Specific weight 1.8 : 1/5 of Cu)
- High intensity (1GPa : 3times of Cu)
- Large current (Fusing current : 10times of Cu)
- High resistance to environment and corrosion

More chances to take advantage of our strengths in infrastructure/automobile markets

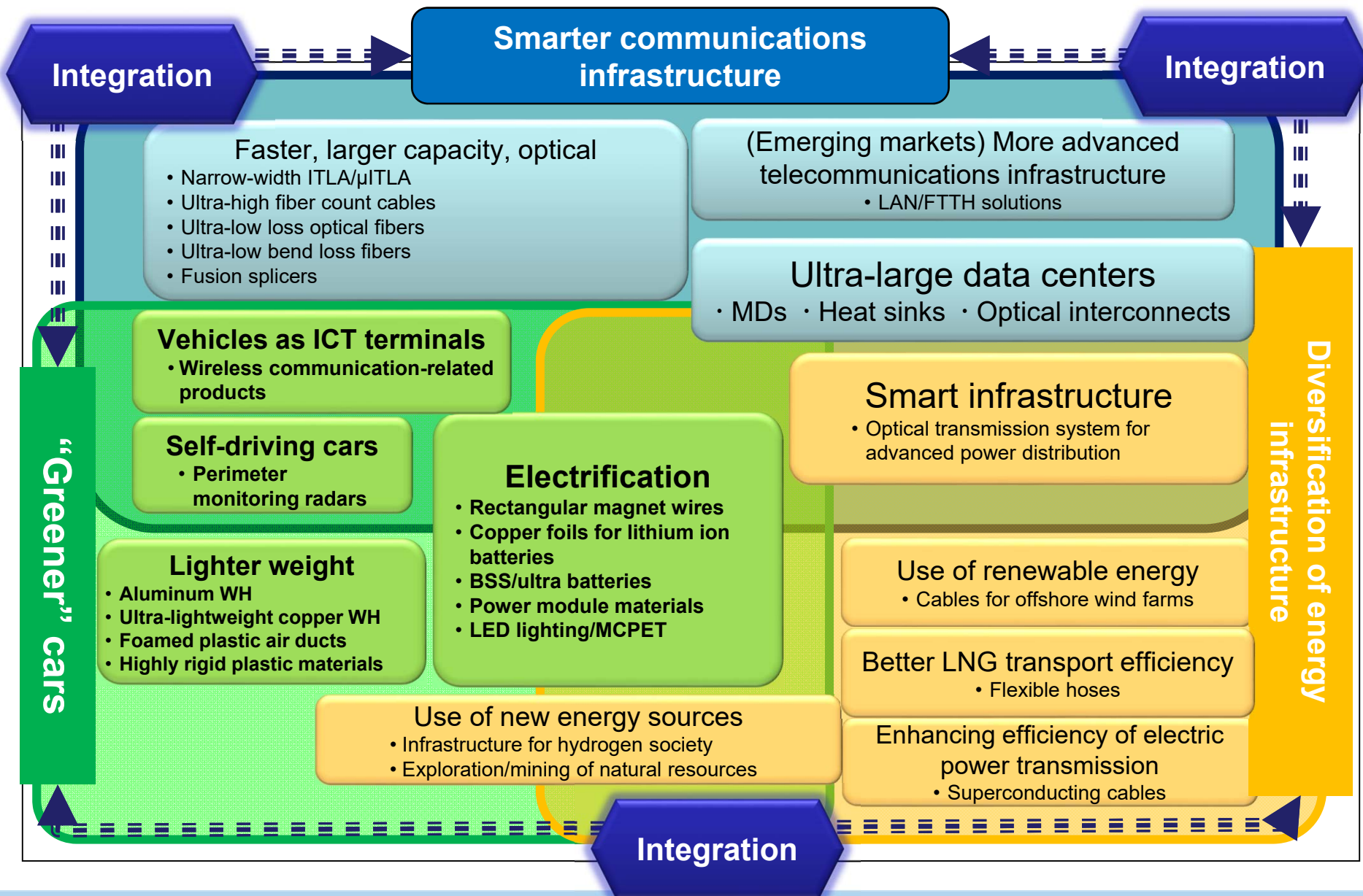


Increase Capital Investments in Growth Areas

Increase growth investments with a focus on infrastructure and automobile areas



Increase Business Opportunities by Expanding the Scope of Integrating Infrastructure/Automobile Applications



IV. Enhance Group-wide Initiatives for Automotive Business

Technology
integration

Materials
technologies

Apply telecommunication infrastructure and other technologies our Group has developed to automobiles to provide differentiated products

Meet the needs of the automobile market for energy-saving, fuel-efficient, and self-driving cars with products that leverage the Group's materials technologies

		Telecommunication solutions	Automotive products/batteries	Electronic component materials	Functional products
1. Energy saving (Reducing CO ₂ emissions) Better fuel economy	(1) Lighter weight	*Optical fiber technology *Laser technology	Ultra-lightweight copper W/H Aluminum W/H α terminal (connector)*	Thin copper wire (high-performance alloy wire) Connector material (copper strip)	Foam products
	(2) Electrification	*Optical fiber technology *Laser technology	High-voltage W/H Batteries and BSS for idle-stop vehicles	Rectangular magnet wire/oxygen-free copper Connector material (copper strip) Power semiconductor materials (oxygen-free copper GFOC) Plated copper strips for laser processing*	Electrodeposited copper foil for lithium ion batteries
2. Self-driving cars/ Safety		*Signal transmission technology *High frequency technology	SRC Perimeter monitoring radar*	Tough pitch copper rectangular magnet wire High-performance copper alloy (UHD)	
3. Vehicles as ICT terminals	Moving ahead with R&D and commercialization with an eye to the 5G era				

IV. Enhance Group-wide Initiatives for Automotive Business

1. Energy Saving (1) Lighter weight

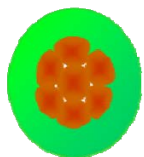
Wiring harnesses (W/H)

Materials technologies

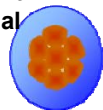
- Use **high-strength, highly conductive materials** to make thinner and lighter W/H possible. Supply W/H made of these materials along with aluminum W/H to respond to the need for more fuel-efficient, lighter cars



Features of high spec copper alloy wire



Pure copper: 0.22-0.35mm²



Copper alloy wire: 0.13mm²

- Cross-section; half weight
- Intensity; more than equal

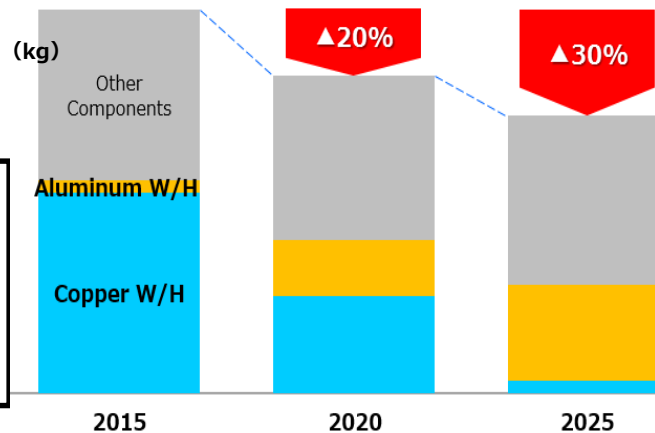
Harness terminals

Materials technologies

Technology integration

- Take advantage of the **excellent balance between strength and conductivity** as well as superior bending workability to make smaller terminals.
- Use our **optical fiber laser welding technology** to supply corrosion-proof terminals for aluminum wires (α terminals) with an airtight, corrosion-resistant structure.
Enhance our lineup of terminals to increase the ratio of aluminum harnesses

W/H lighter weight case example



α terminal



Fiber laser used for welding

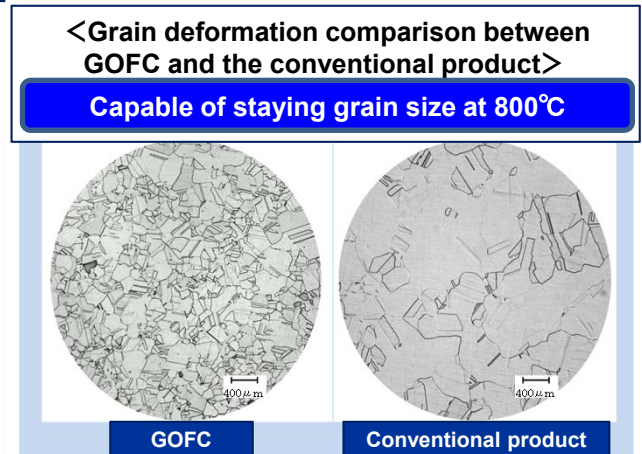
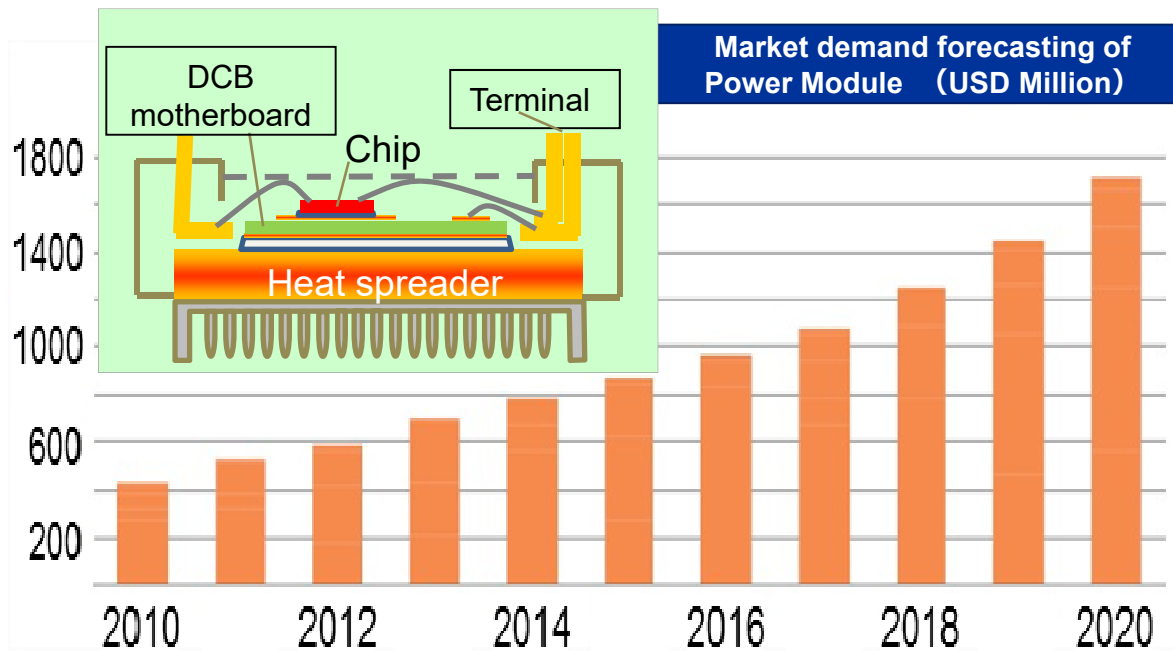
IV. Enhance Group-wide Initiatives for Automotive Business

Materials technologies

1. Energy Saving (2) Electrification

Material for power semiconductor DCB substrates and peripheral components

- Superior electrical and thermal conductivity as well as heat dissipation performance is required for power semiconductor substrates and materials used for automotive motor control. Started mass producing GOFC,* oxygen-free copper strips that have all of the above properties, in the spring of 2017
- Boasting world-leading heat resistance performance, GOFC reduces problems that can occur during the heat-treating process when manufacturing power modules and enhances the quality of final products.



* GOFC: Grain Growth Control Oxygen Free Copper

IV. Enhance Group-wide Initiatives for Automotive Business

2. Self-driving Cars (ADAS)

Technology
integration

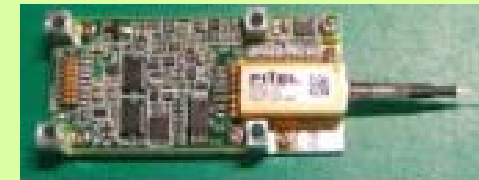
Perimeter monitoring radar

- Employing our proprietary sensing technology (the pulse method), which combines signal transmission and high-frequency technologies that we have developed through the telecommunication infrastructure business, perimeter monitoring radar detects a person or object located behind a car or in the driver's blind spot.

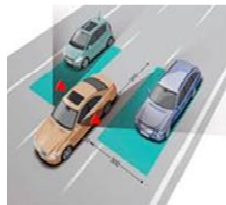


■ Signal transmission technologies

- I T L A



Blind spot detection



Lane changing support

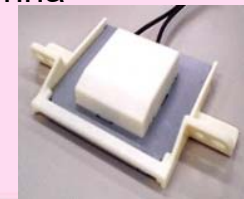


Proximity detection
driving a car in reverse



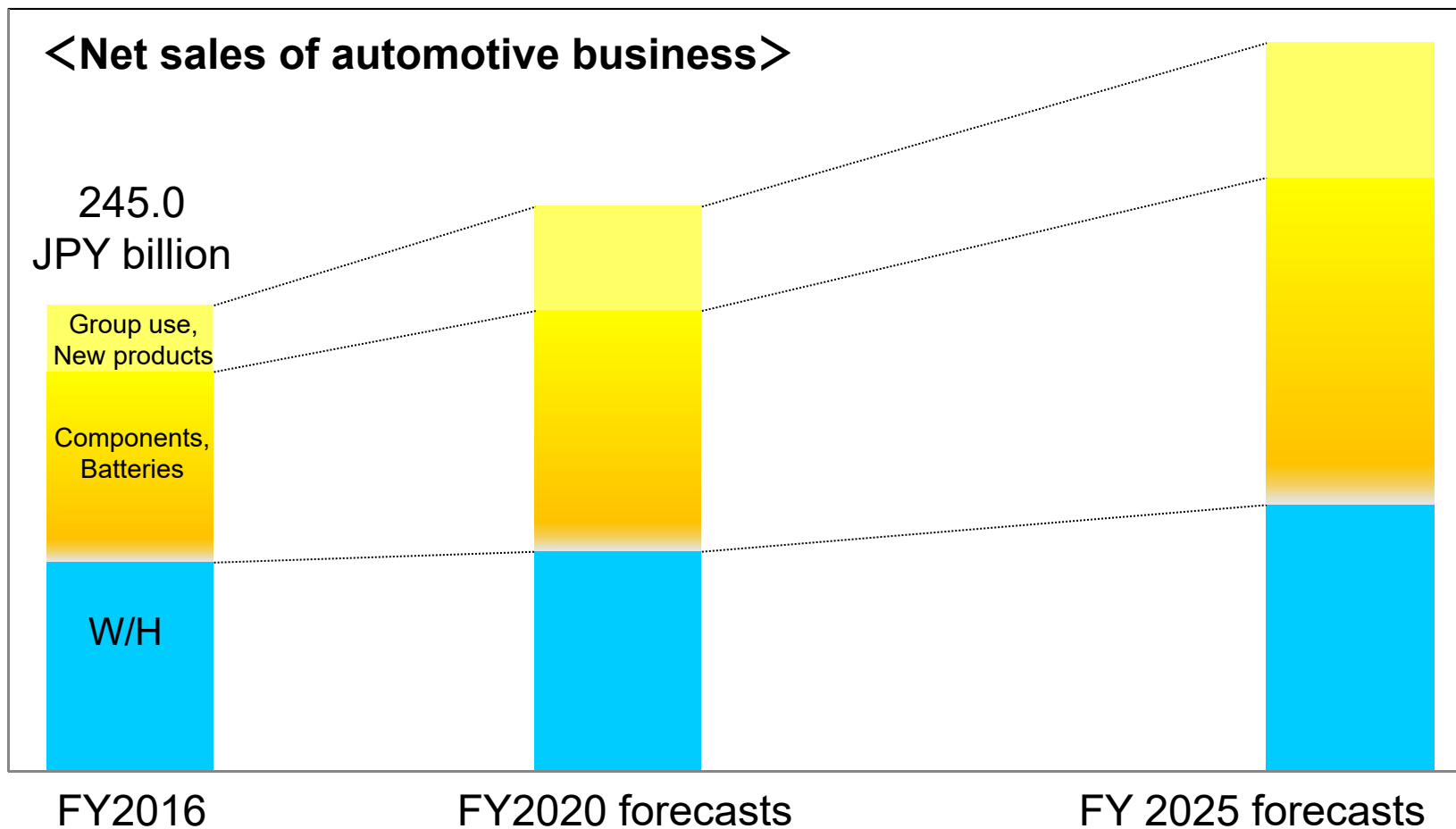
■ High-frequency technologies

- Automotive composite antenna



IV. Enhance Group-wide Initiatives for Automotive Business

- ◆ Respond to customer needs with **combined Group resources** and **materials technologies** with an eye to sustainable growth



IV. Toward Achieving 2020 Mid-term Management Plan Targets

	FY2016 results	FY2017 forecasts	FY2018 Milestone		FY2020 Mid-term Target	Target
Operating income	38.6 (JPY billion)	37.0 (JPY billion)	35.0 (JPY billion)		> 40.0 (JPY billion)	
Net income	17.6 (JPY billion)	20.0 (JPY billion)			> 20.0 (JPY billion)	
D/E ratio	1.22	1.29				< 1.0
Net D/E ratio	0.99	1.06				< 0.8
Equity capital ratio	27.6%	27.8%				> 30%
R O E	9.3%	9.5%			> 8%	> 10%

- Strengthen and reform businesses
- Expand sales in the global market
- Step up efforts to tap into new market



Thank you very much
for your attention.

Bound to  ***Innovate***