

IR Business Briefing Communications Solutions business

Takahide Kimura

Communications Solutions Division Manager

June 8, 2018

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

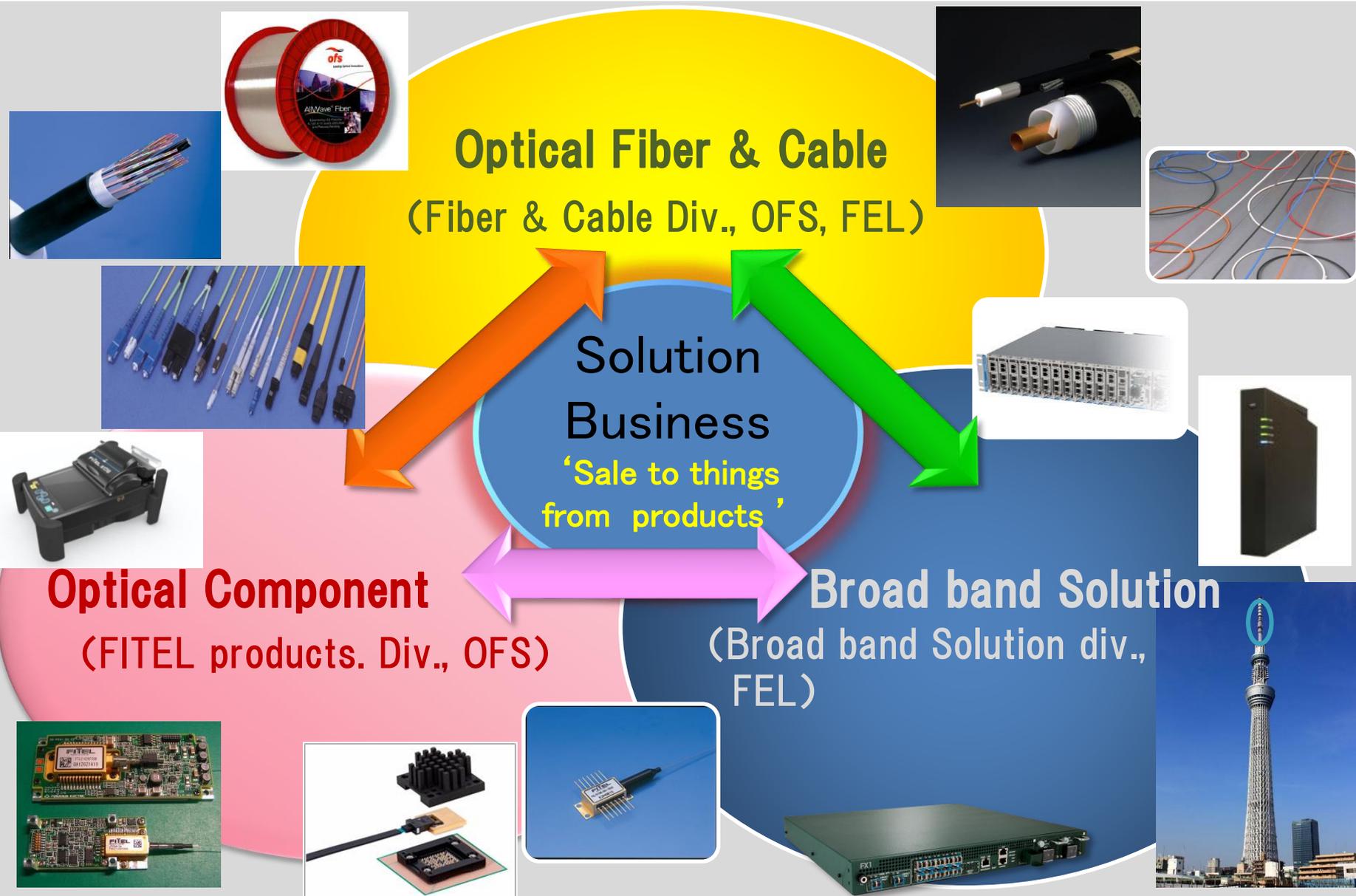
Copyrights

Furukawa Electric Co.Ltd. retains copyrights and other rights involving these materials. Copyright and otherwise reusing these materials in any way without prior consent is prohibited.

Furukawa Electric Co., Ltd

- I. Overview of Communications Solutions Div.**
- II. Optical Fiber & Cable Business**
- III. Optical Components Business**
- IV. Broadband Business**
- V. Solution Business**
- VI. FY2020 revenue growth and FY 2018 forecast**

I . Overview of Communications Solutions Div.



II. Optical Fiber & Cable Business

A) Results of Activities for Business Growth

B) Differentiation of Fiber

C) FEC North America Cable Sales Trend

D) Rollable Ribbon

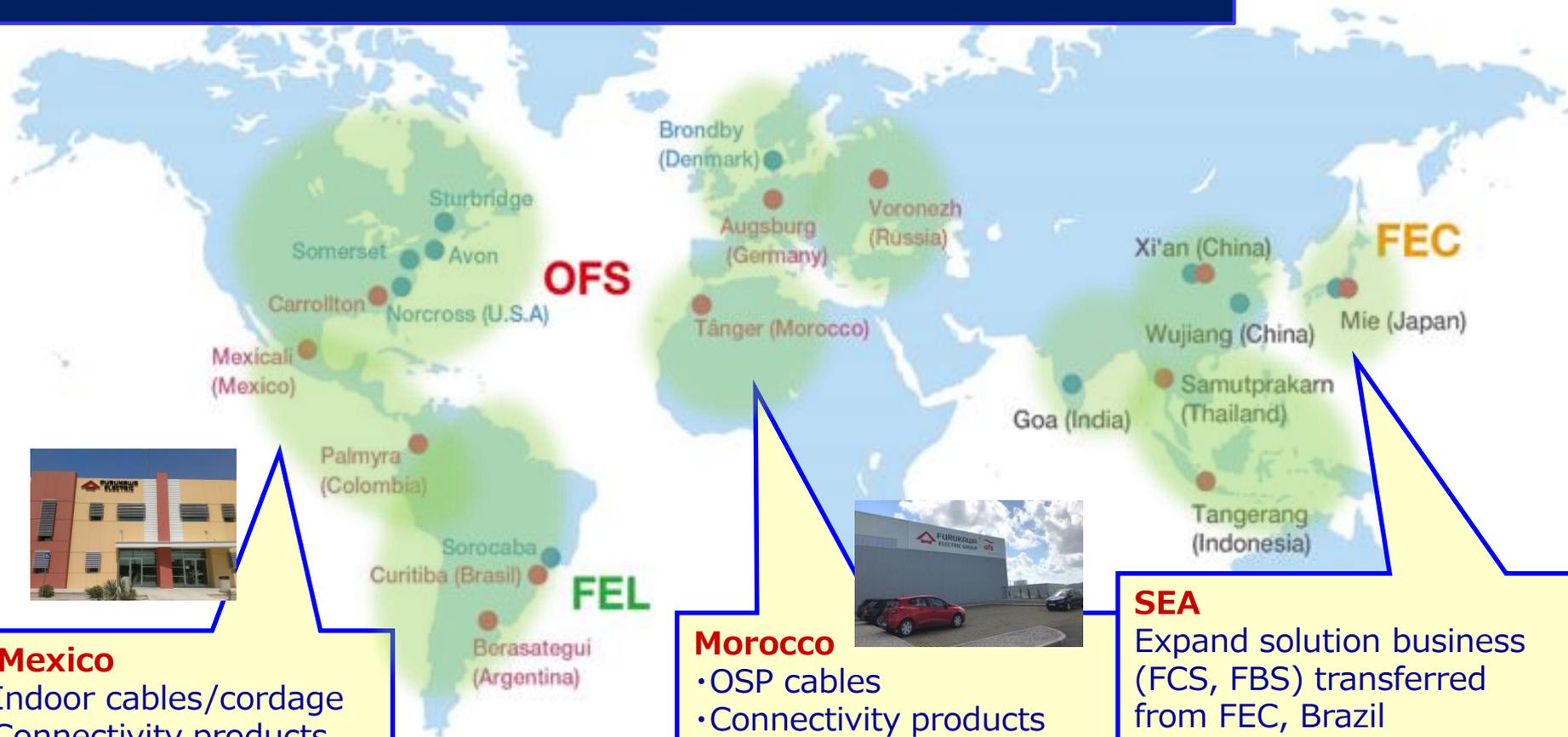
“Development milestones and global expansion”

E) Connectivity

II. A) Results of Activities for Business Growth

- ◆ Signed long term supply contract with CommScope
- ◆ Fiber & Cable expansion announced in Sep 2017
⇒ On plan, Contributing to revenue and profit from FY2019

- Optical Fiber
- Optical Cable



Mexico

- Indoor cables/cordage
- Connectivity products
(Production started: Oct 2018)



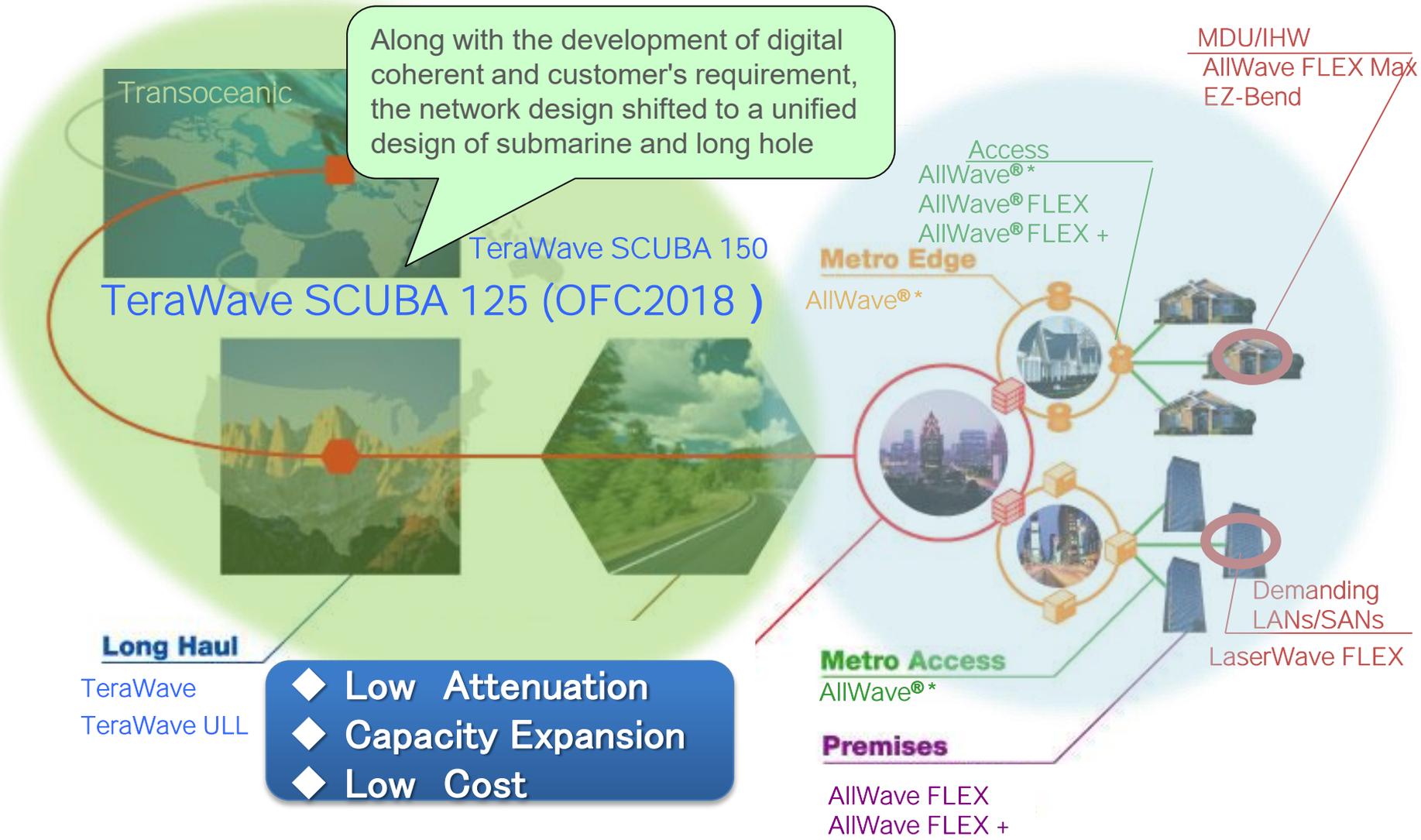
Morocco

- OSP cables
- Connectivity products for EMEA market
(Production started : Apr 2018)

SEA

Expand solution business (FCS, FBS) transferred from FEC, Brazil

II. B) Differentiation Fiber



* AllWave® series include AllWave One, AllWave +, AllWave LL, and standard AllWave.

II. B) Differentiation of Fiber

MDU/IHW

Low bend insensitivity
Easy installation

EZ-Bend®



- Excellent macrobend performance
- Easy to install solutions



Maintain comfortable indoor landscape

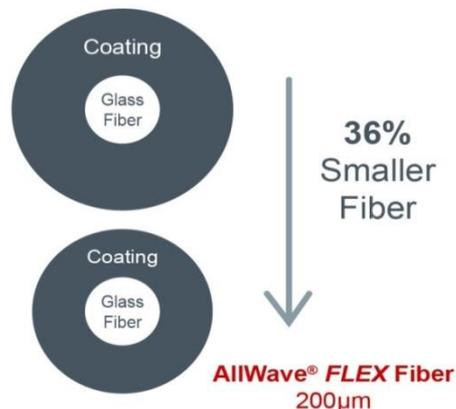
Short-Mid Span

High Fiber Count, Low loss,
Low bend insensitivity

200um Fiber



- High density cable designs favor improved macrobend performance, lower loss and smaller diameter fibers



High density & small diam. Cable

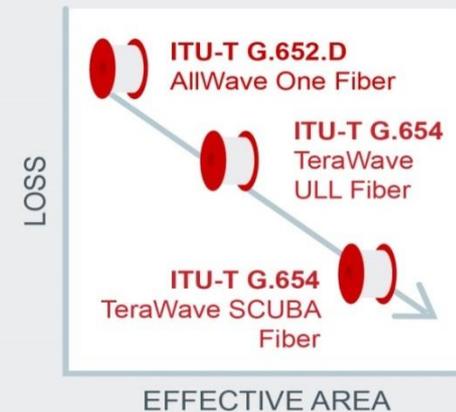
Long Haul

Ultra low loss
Large Aeff

SCUBA125/150



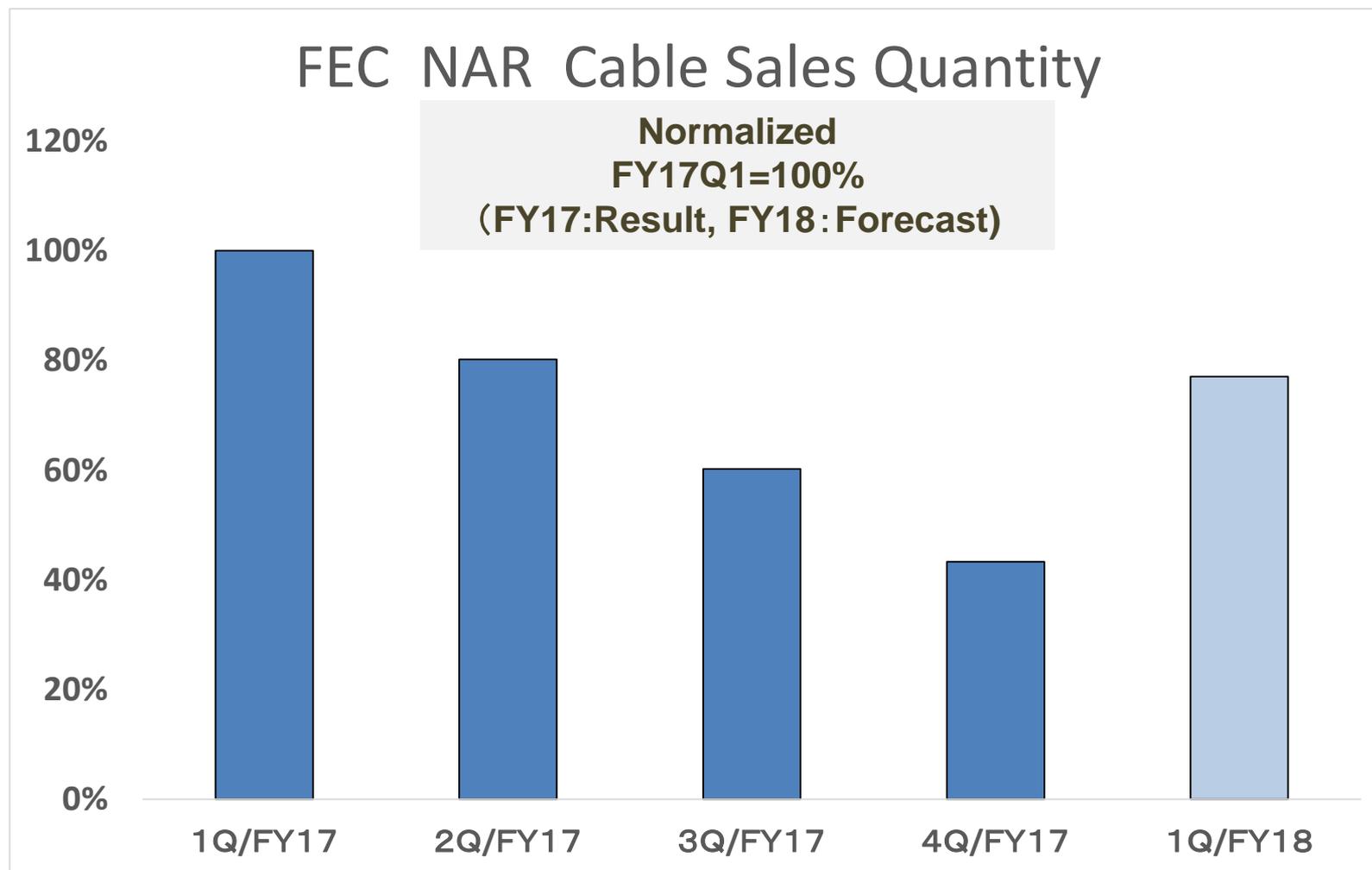
- Coherent transmission systems favor lower loss and higher effective area

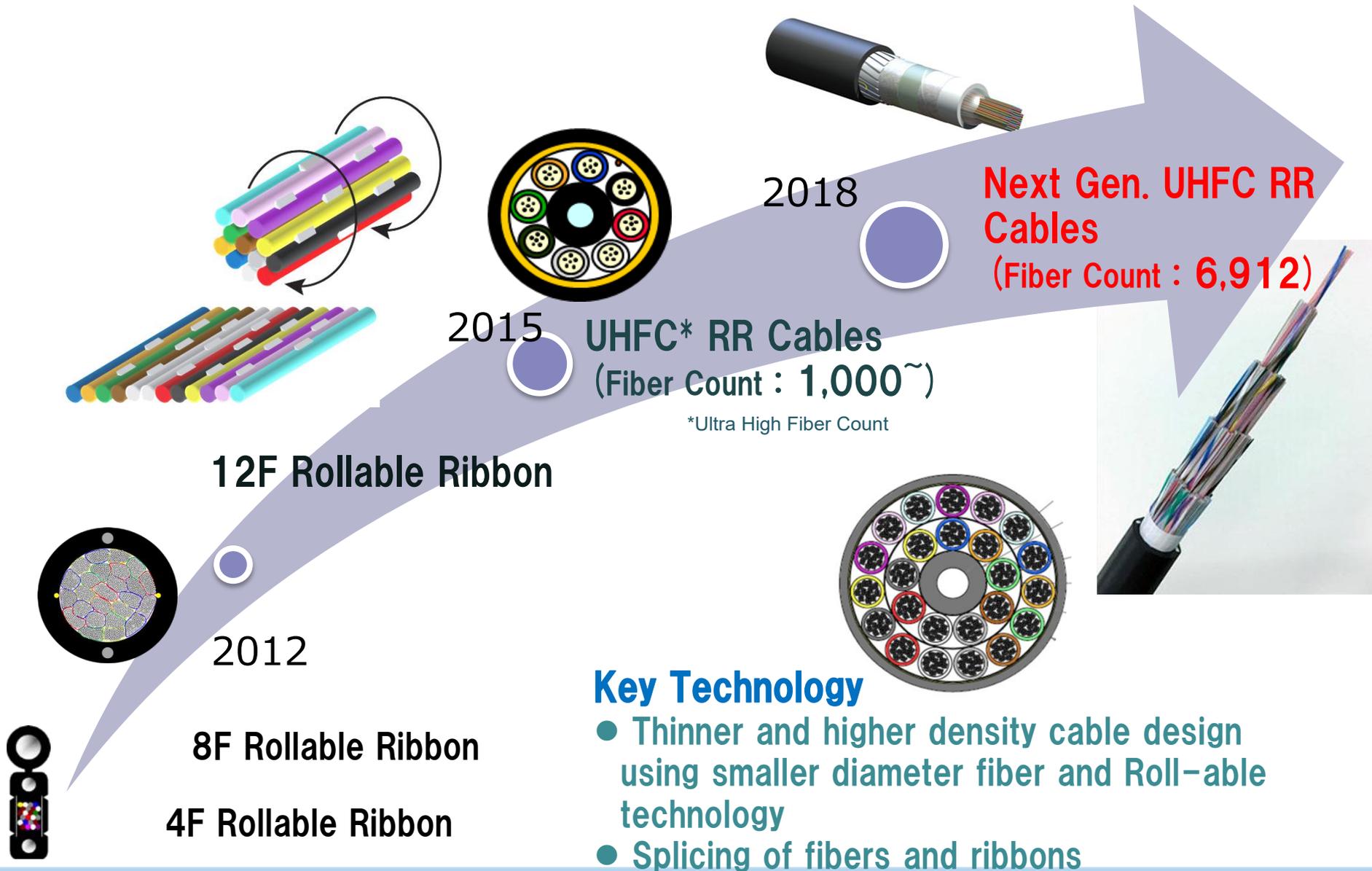


Expansion from submarine to Long Haul

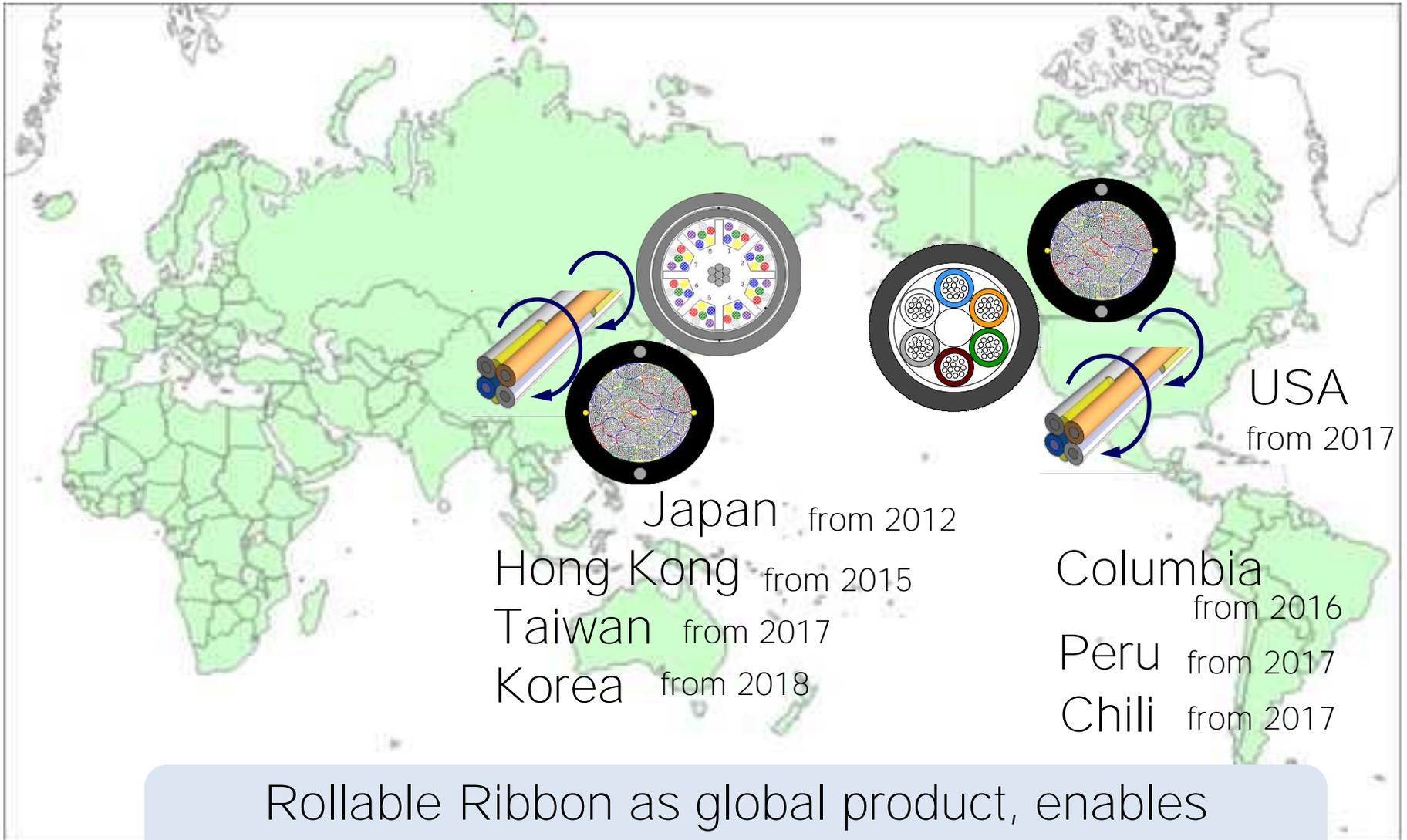
II. C) FEC North America Cable Sales Trend

~Recovery trend~





II. D) Roll-able Ribbon “Global Expansion” **FURUKAWA ELECTRIC**



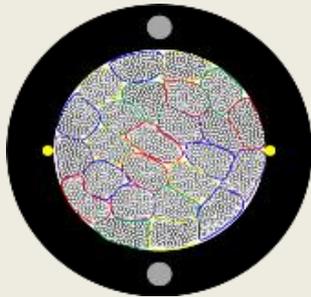
Rollable Ribbon as global product, enables variety of cable design to meet local requirements

II. E) Connectivity

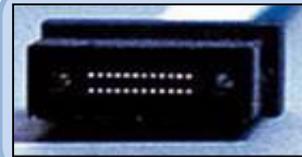
~Development of Multi-fiber Connecting Technology~

Demand for data centers (DC) expands, demand for multi-fiber connecting

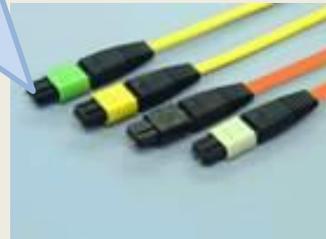
- High Density Optical Fiber Cables (Rollable Ribbon)



- MT Connector



Connector End Face



- Fusion Splicer



Increase Demand for DC-DC and inside of DC

Ⅲ. Optical Components Business

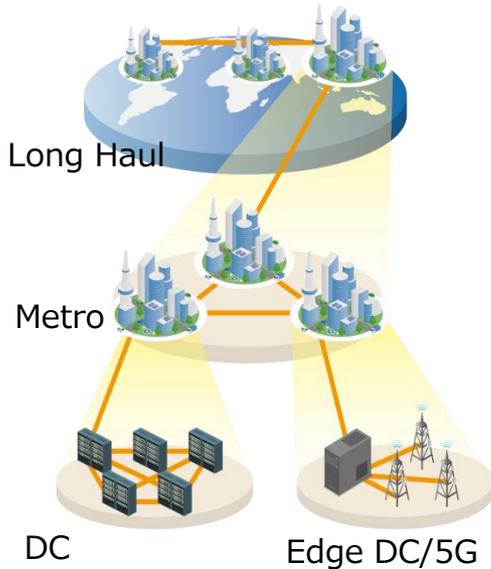
A) Market Overview

B) FEC's Optical Devices Line-up

C) ITLA Activity in long term

D) Fiber Laser Business

Market Trend



Long Haul : >1000km

(ITLA/Pump-LDM)
Wide Bandwidth
(C→C+L-Band)
High Power

Metro : >80km

(ITLA/Pump-LDM)
Downsize, Integration
Low Power Consumption, narrow
Linewidth

Client : 0.5~80km

(Non-coherent/Pump-LDM)
Downsize, Low Cost
Low Power Consumption

Furukawa

L/H, Metro

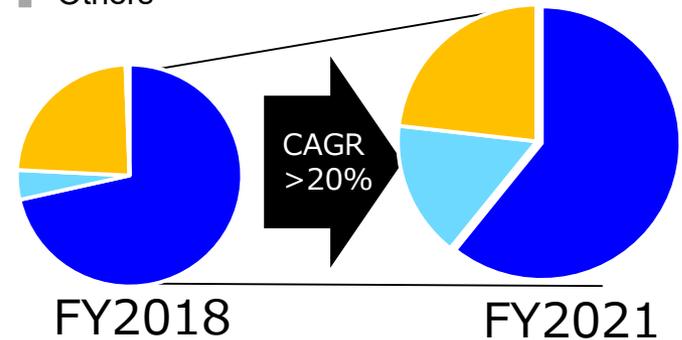
- ✓ 14xx Pump for Raman System
- ✓ L-Band ITLA and Pump LDM
- ✓ Small and High performance μ ITLA

Client

- ✓ Suitable for harsh environments

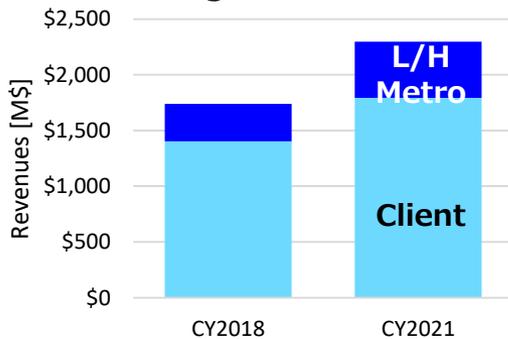
Optical Devices Sales Overview

- L/H, Metro
- Client
- Pump-LDM
- Others

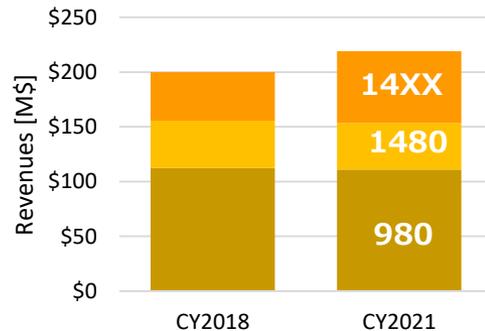


C-band (Conventional) 1530-1565nm
L-band (Long wavelength) 1565-1625nm

Signal Laser Market

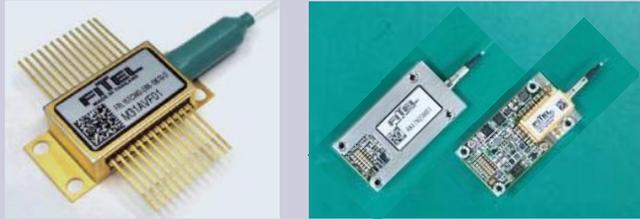
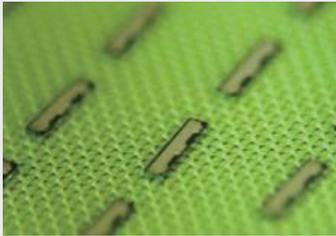
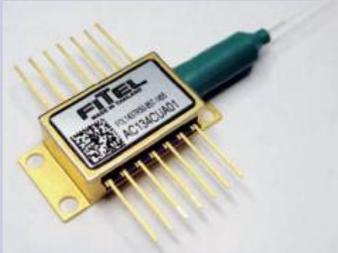


Pump Laser Market



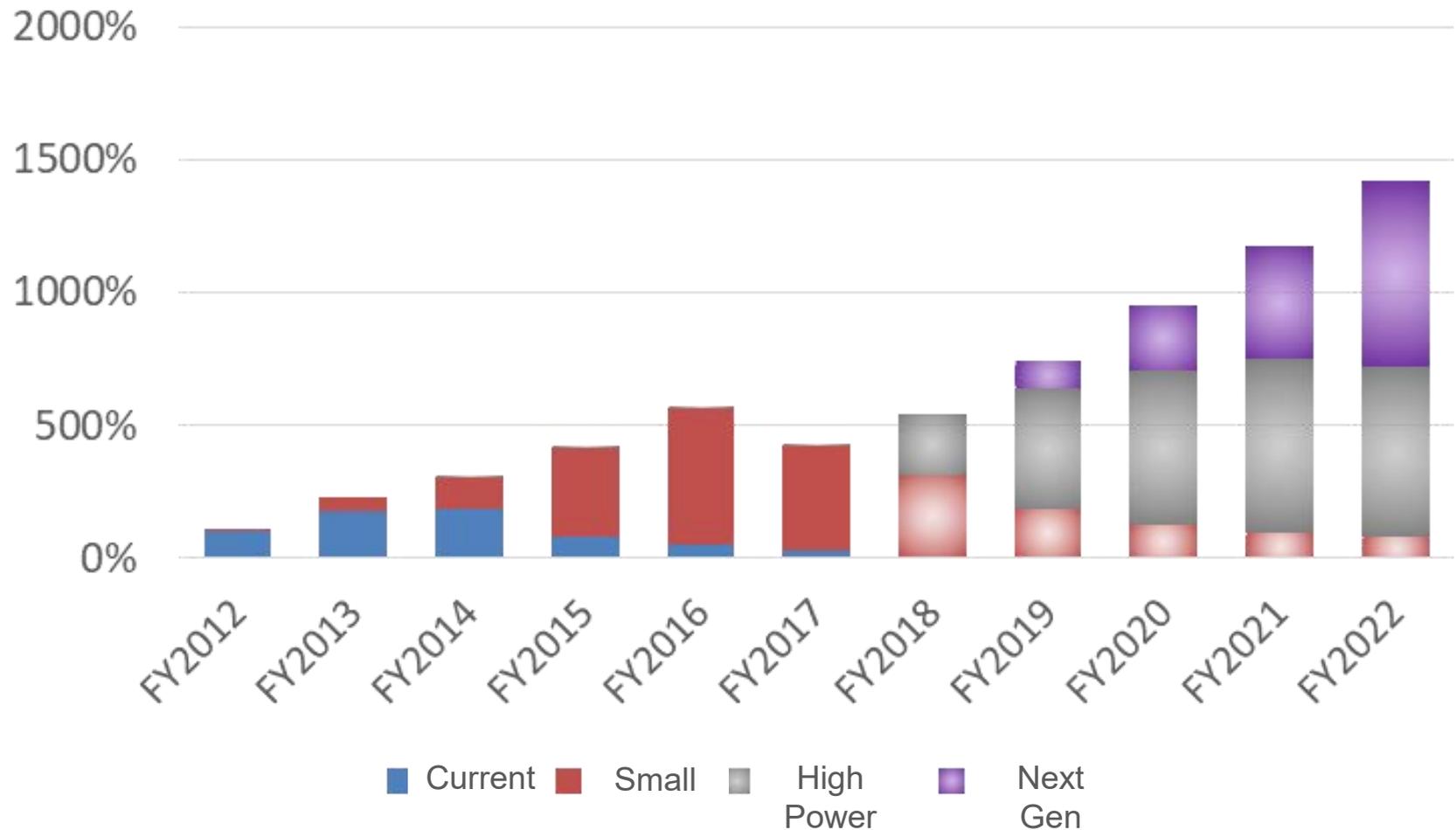
Source : Ovum Report : Total OC Forecast Spreadsheet: 2016-22

III. B) FEC's Optical Devices Line-up

Market		Products	Features
F o r S i g n a l	L/H Metro Client	Full Band Tunable DFB ITLA 	<ul style="list-style-type: none"> • Small, LPC • Narrow Linewidth for Next Generation System • High Power Output • L-Band Comply
	Client	DFB Chip 	<ul style="list-style-type: none"> • Contributing to compact and low-cost customers' products by enabling them to cope with harsh environments
P u m p	L/H Metro Client	14xx 1480 980 	<ul style="list-style-type: none"> • 14xx has advantage in C+L band

III. C) ITLA Activity in long term

Long Term View in next 5 years
(Change Product Mix) (FY2012=100%)



Welding

Cutting

FITEL Beam forming technologies provide good solution to customers

Application Lab

High Power Fiber Laser



6kW Fiber Laser



1kW/500W Fiber Laser

Semiconductor Laser



Passive Component

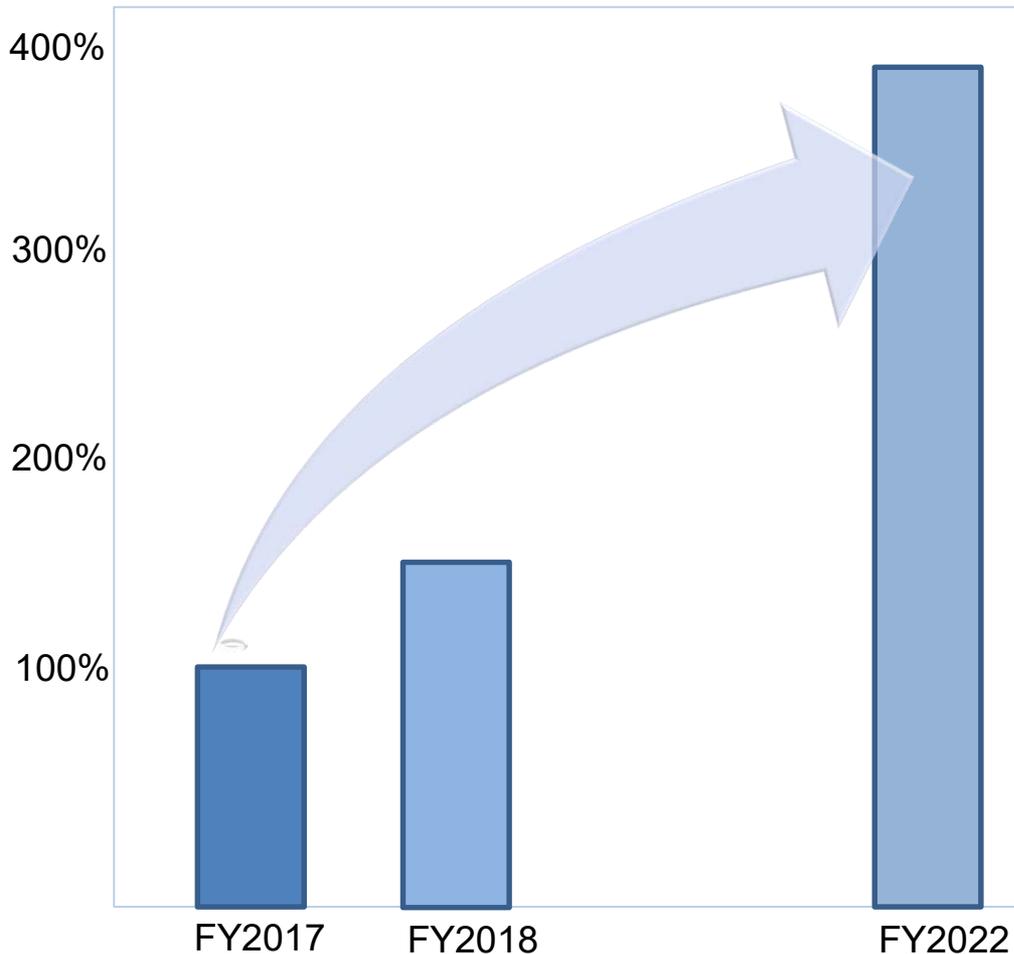


Optical Fiber

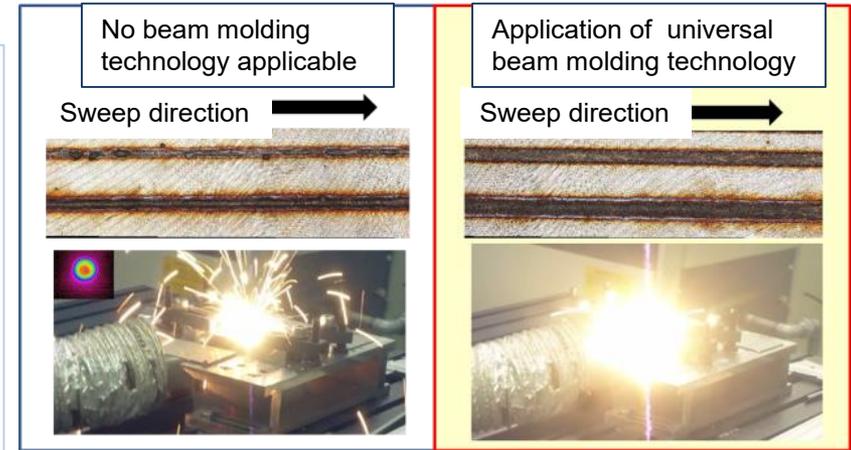


Main components can be made by Furukawa Group

Fiber Laser Business Revenue
(100% as of FY2017)



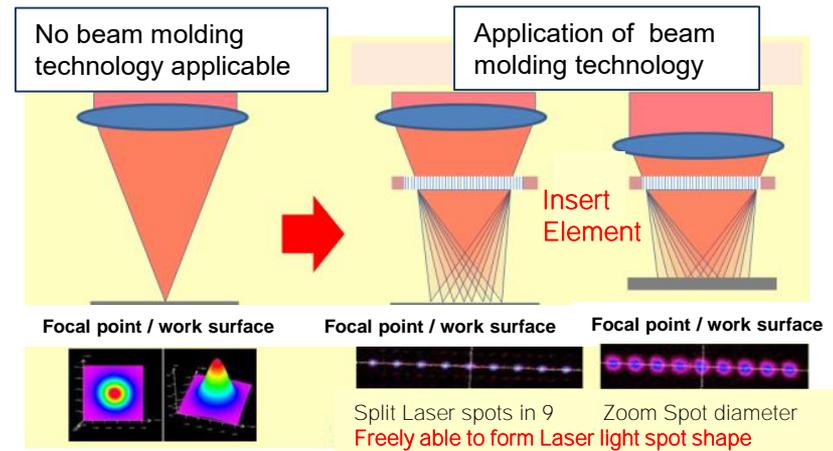
Our Fiber Laser's strong points



Many Metal splash

Less Metal splash

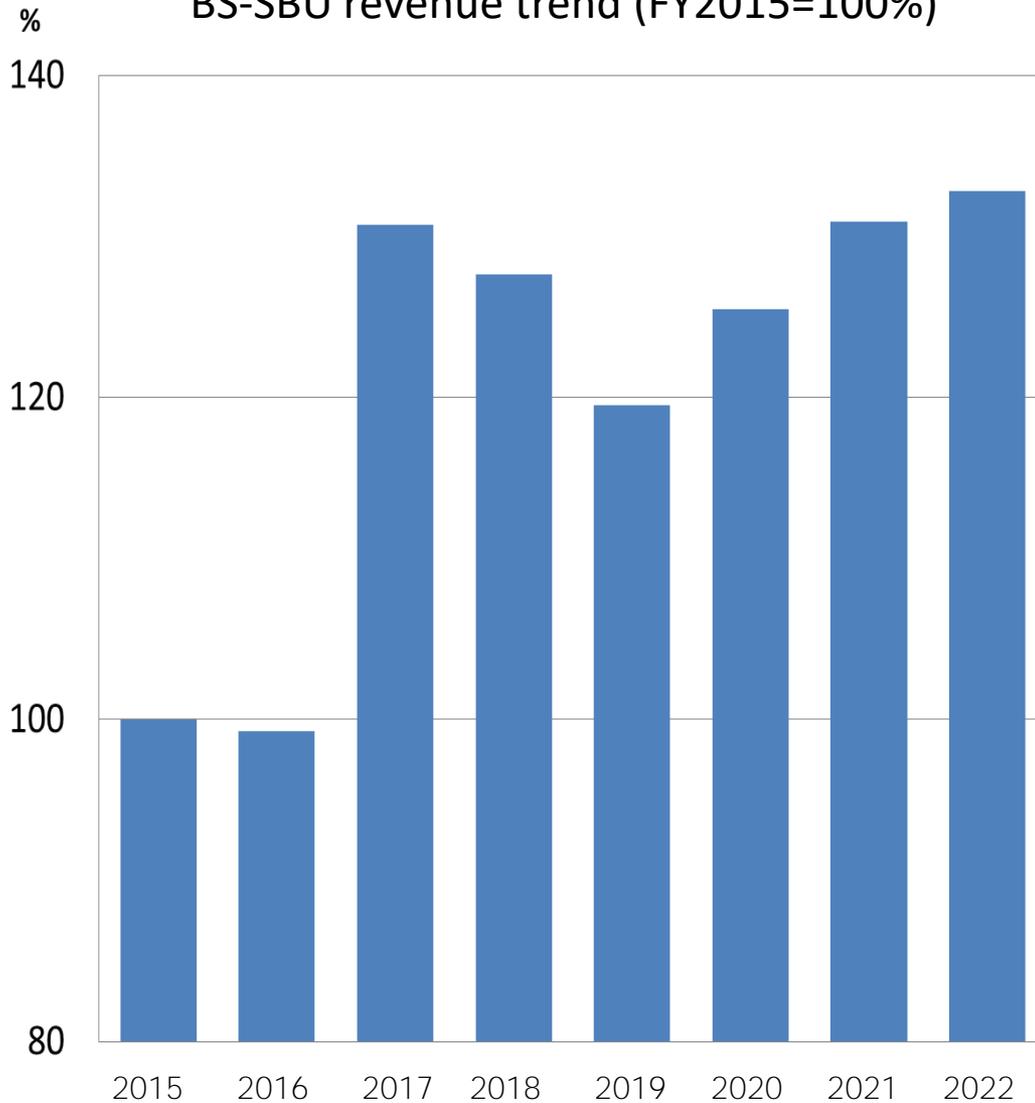
■ Small spatter by beam control



IV. Broadband Business

IV. Broadband Business

BS-SBU revenue trend (FY2015=100%)



FEC's system products lineup which supports FTTH of telecommunications /broadcasting

D-ONU

OLT



10G-EPON system

Optical transmission equipment

V-ONU



Optical amplifier



3.2G optical transmission system

High spec. SP



Digital HE equipment



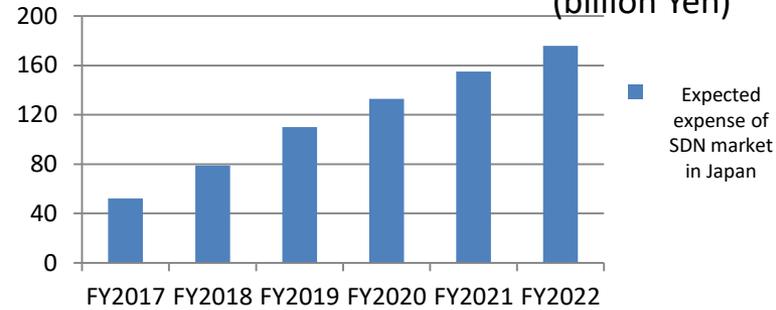
4K · 8K system

IV. Development of Broadband Business

1. Upcoming issue in Japan :

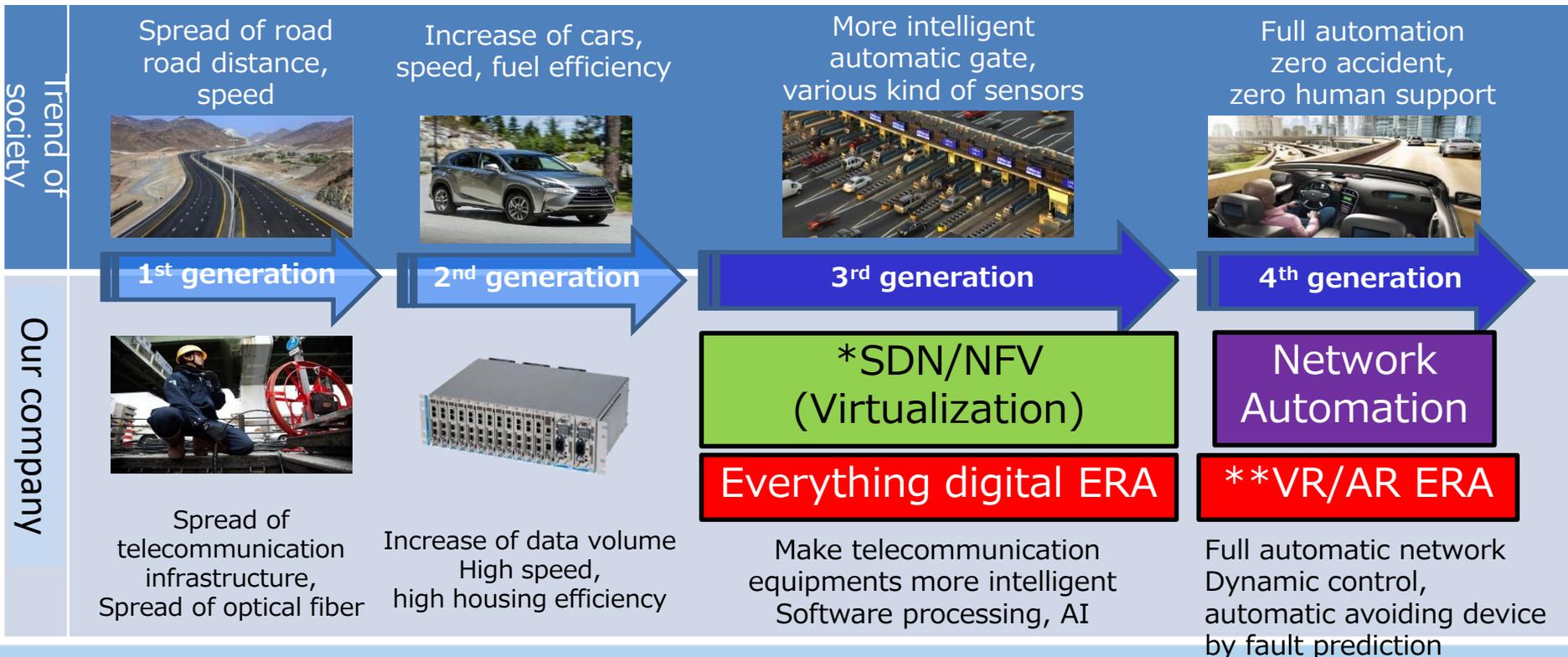


Expected expense of SDN market in Japan (billion Yen)



source : IDC Japan 4/2018

2. To solve the issue



V. Solution Business

A) FCS (LAN Solution) 、 FBS (FTTx Solution)

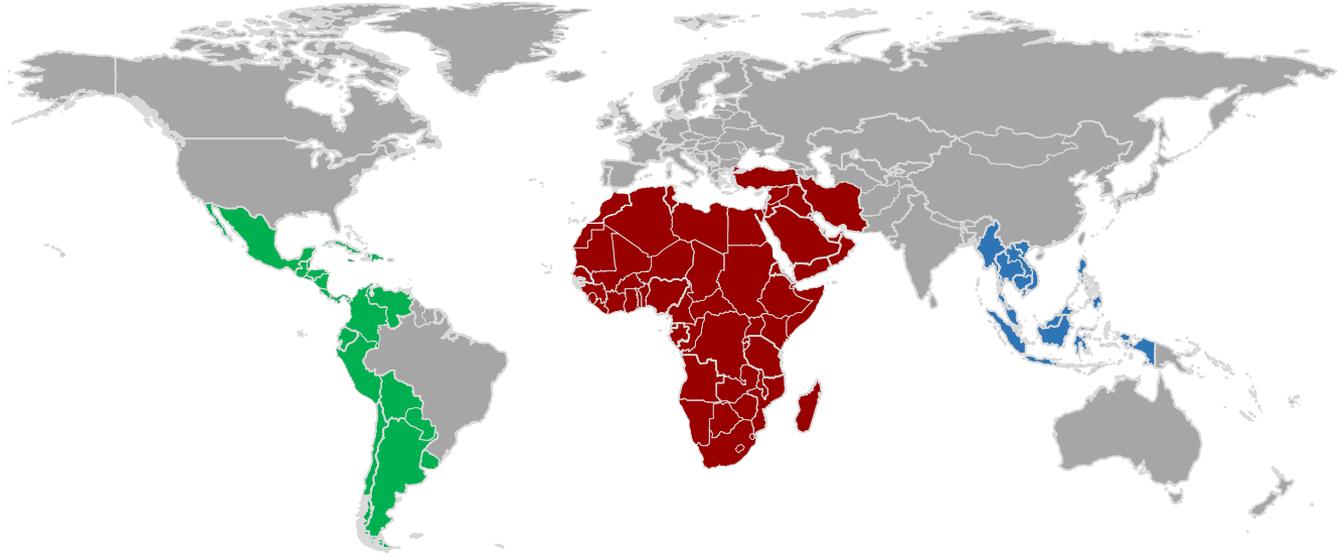
B) Activity for 5G

Transferring Solution Business Model from LatAm to SEA

Value Proposition by packaging variety of products and various services



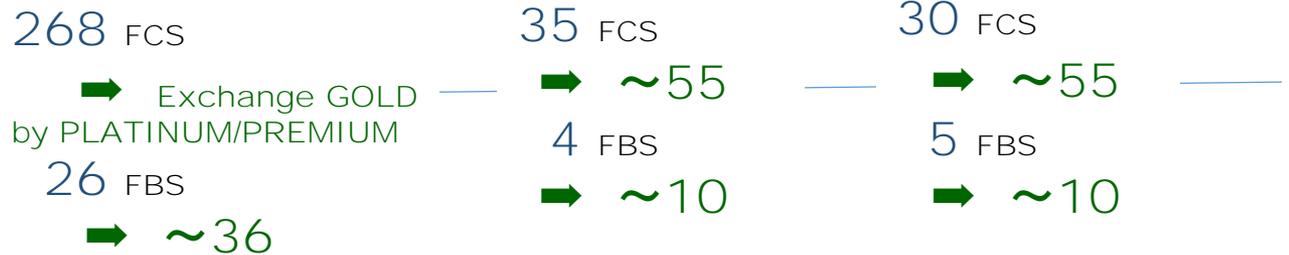
V. A) FCS & FBS Sales Channel Development FURUKAWA ELECTRIC



Distribution Sites



**Installers
System Integrators**



Training Centers



V. B) Activity for 5G

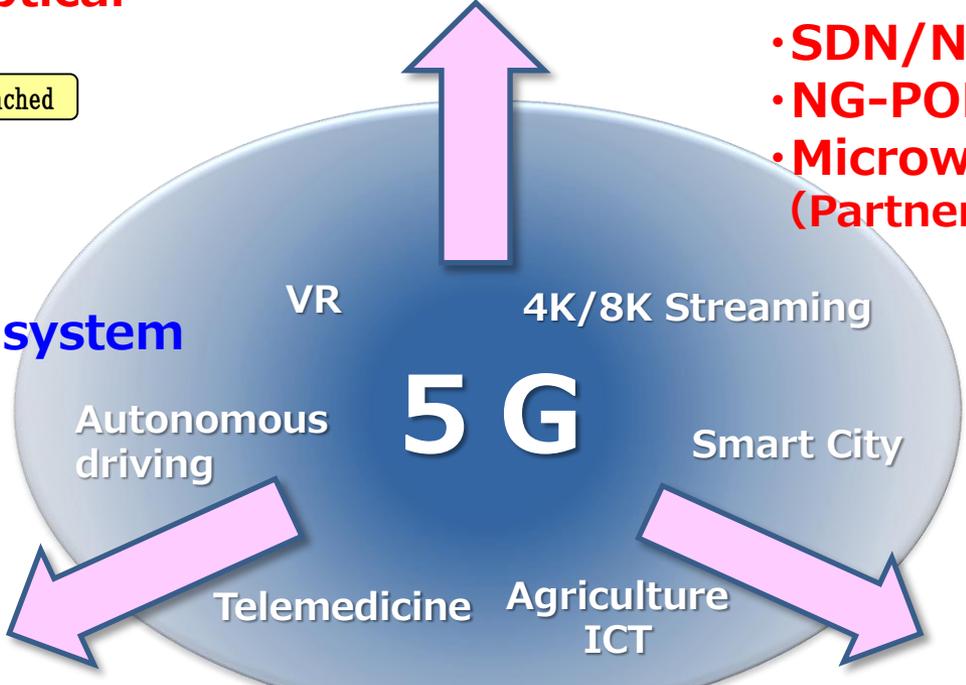
- High-Density Multi-fiber Optical Connector
- High-Density Optical Fiber Cable
- micro ITLA Launched
- Cabinet for 5G

High Speed
Large Capacity

Red : Elemental Technology
Blue : Use Case

- SDN/NFV technology
- NG-PON2
- Microwave Transmission (Partnership with Intracom) Launched

- 5G Key station system
- ITS system



- Optical Fiber Sensing System
- Optical Power Supply System

Low
Latency

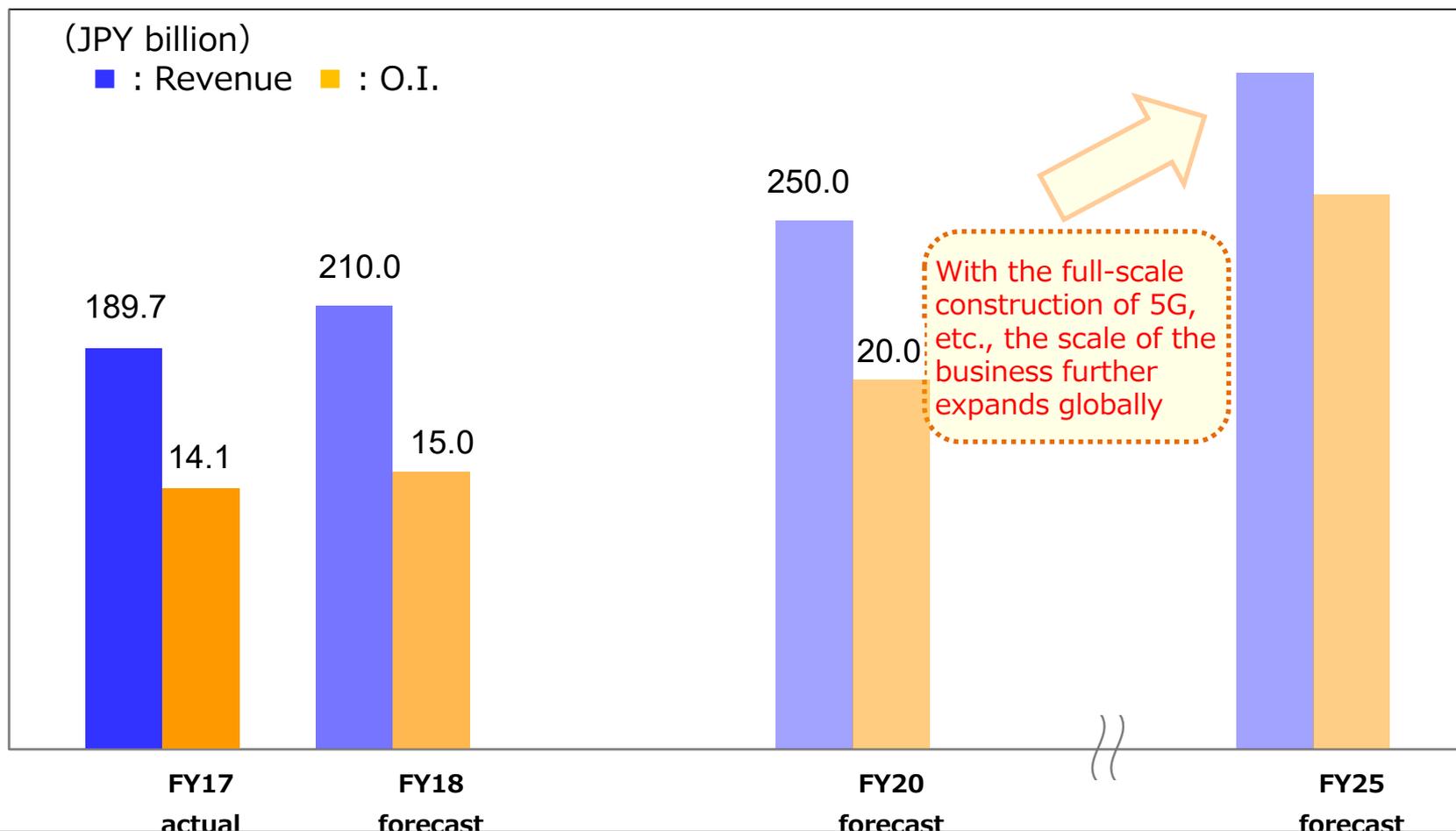
- Virtual Router Launched
- Dead Band System for Radio wave
- Next-generation Distribution Automation System
- IoT System

Multiple Terminal
Connections

VI. FY2020 revenue growth and FY 2018 forecast

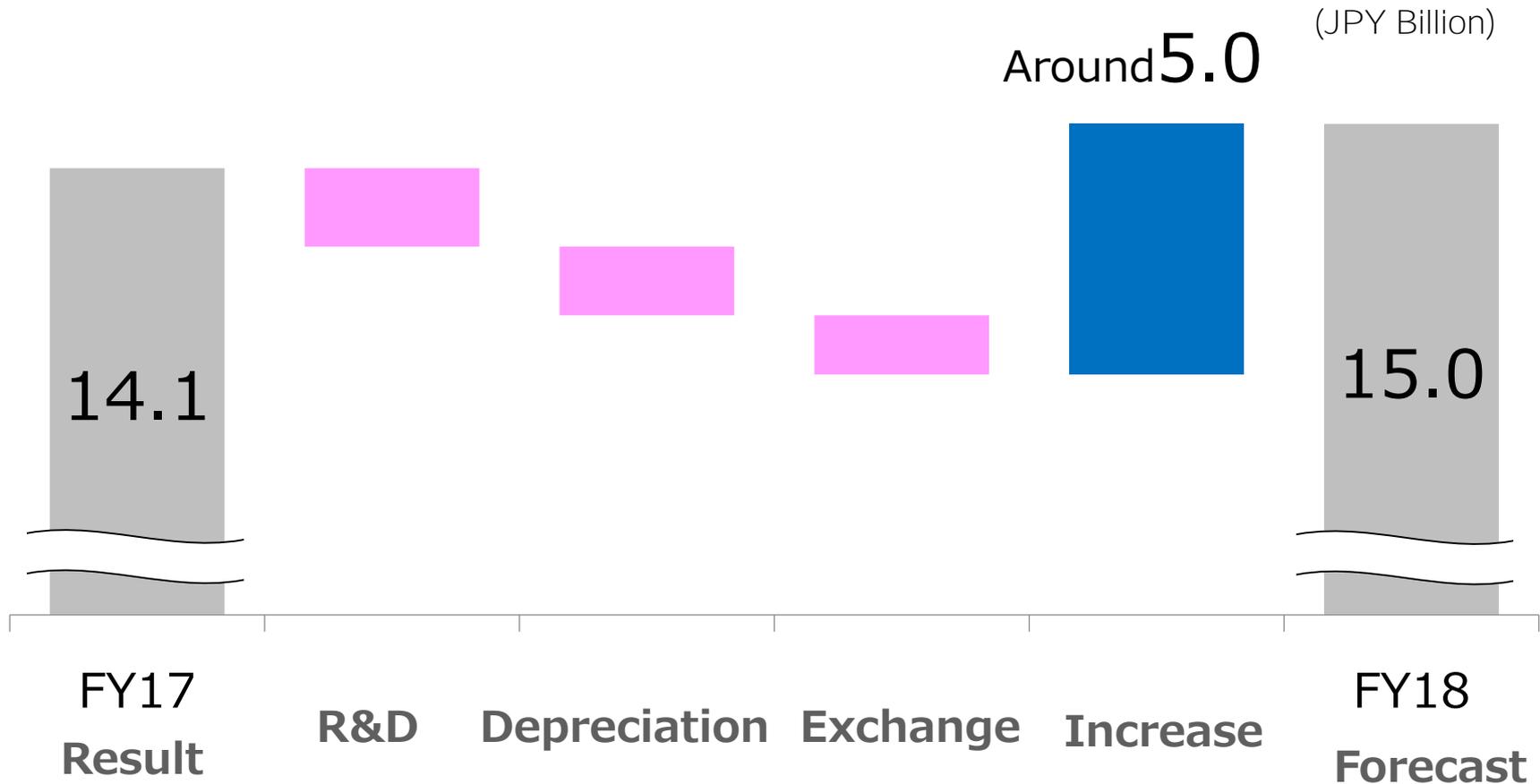
VI. FY2020 revenue growth and FY 2018 forecast **FURUKAWA ELECTRIC**

- Starting in fiscal 2019, we will increase O.I. on investment in optical fiber and cable expansion
- Revenue recovery of optical components (Fitel business) contributed



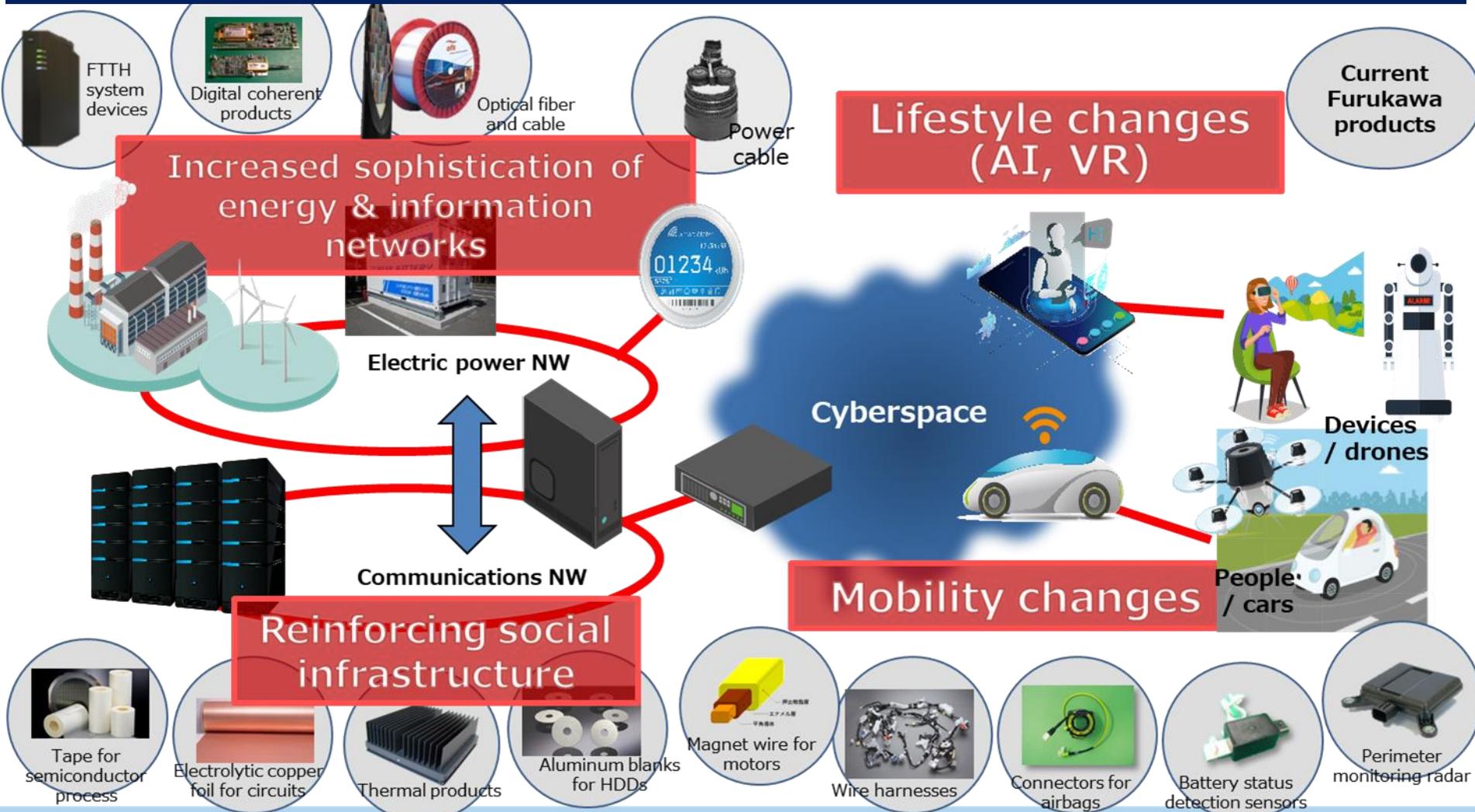
VI. OI forecast for 2018

Depreciation cost, R&D expenses, Impact of exchange rate



In conclusion

Through the communication, connection and storage of energy, information and heat, Furukawa Electric will contribute to the changes in society mainly in the areas of infrastructure, automotive products and a fusion thereof



Thank you!

Bound to  ***Innovate***