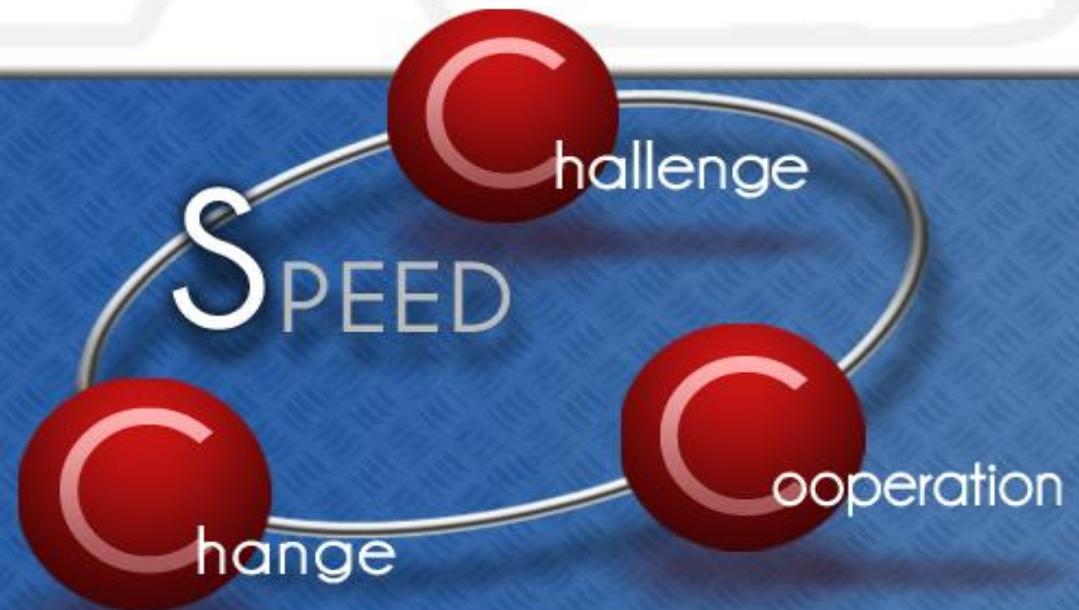




For the World's Leading Manufacturer of Heat Exchange Systems  
that address Environmental Conservation

# Result Briefing for the Fiscal Year Ended March 31, 2018

May 2018  
T.RAD Co.,Ltd.

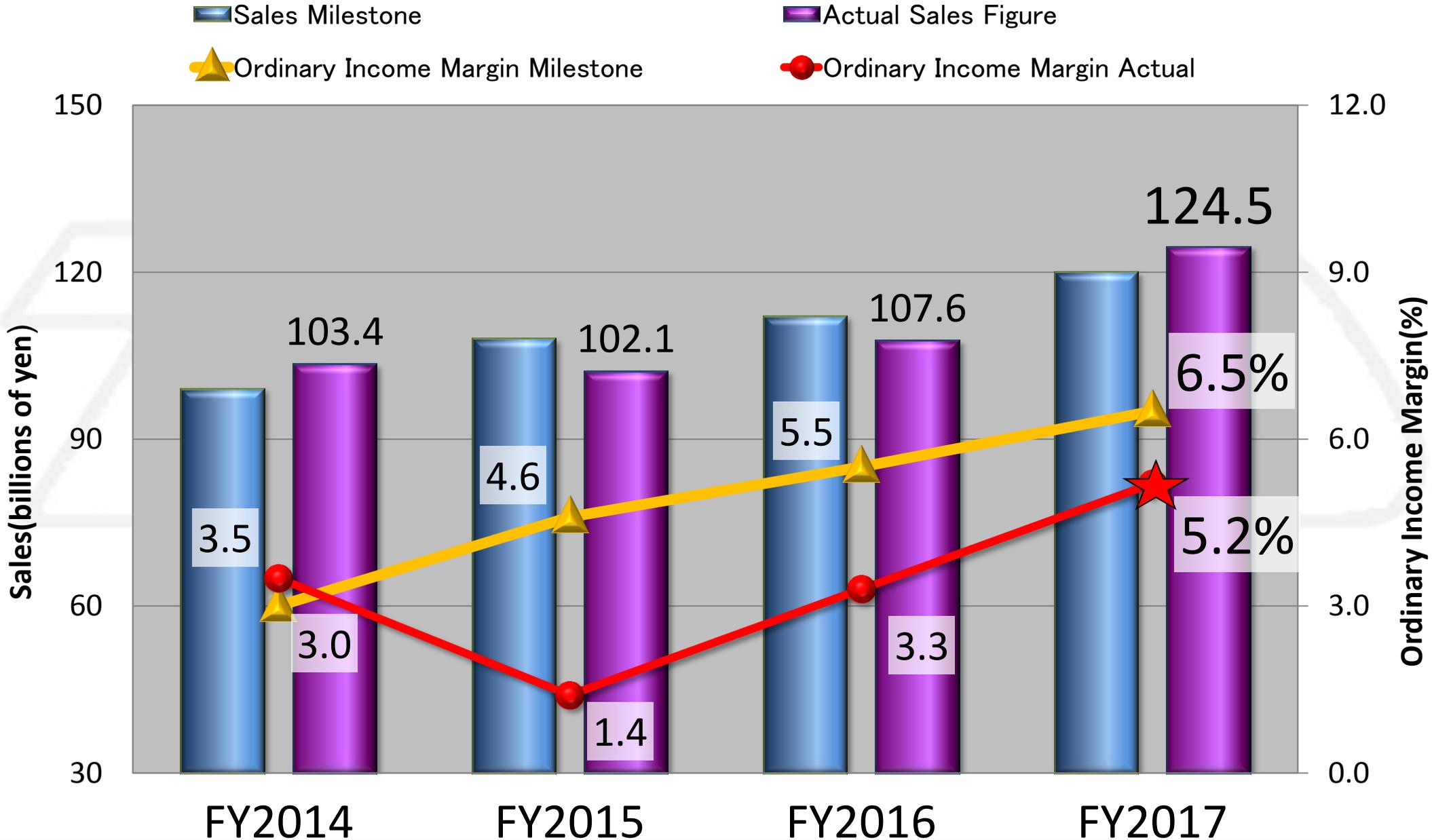




# **The 10th medium term management plan Review of “T.RAD-10” and its Results**



# T.RAD-10 Sales Revenue **[Consolidated]**





# **The 11th medium term management plan “T.RAD-11”**



# Management Philosophy & Corporate Slogan

## Management Philosophy

- **T.RAD provides superior heat exchanger products and contributes to the evolution of society and environmental preservation with our technology and services.**
- **T.RAD pursues the continuous prosperity of the company, coupled with happiness of its customers, shareholders, employees, suppliers, and the surrounding community.**

## Corporate Slogan

- **Entrust our dreams to the boundless heat exchanger technology**
- **Aim at becoming the world's No.1 environmentally –friendly heat exchanger manufacturer**



## 1. A company that is continuously chosen by its satisfying customers

- (1) To provide safe, reliable, and the highest quality products in the industry.**
- (2) To propose distinctive products tailored to meet the needs of customers, the community, and the environment with our evolving heat exchanger technology.**
- (3) To actively propose and expand sales of components used for electric-powered vehicles (EV, HV, PHV, and FCEV).**
- (4) To create new business opportunities.**
- (5) To establish emergency preparedness.**



## 2. A Company trusted by its stakeholders

- (1) To provide stable dividend payouts to the shareholders.**
- (2) To grow professionally together with the suppliers.**
- (3) To enrich communication activities with the stakeholders.**
- (4) To contribute to the earth's environment.**
- (5) To ensure thorough compliance.**

## 3. A Company that values human resources

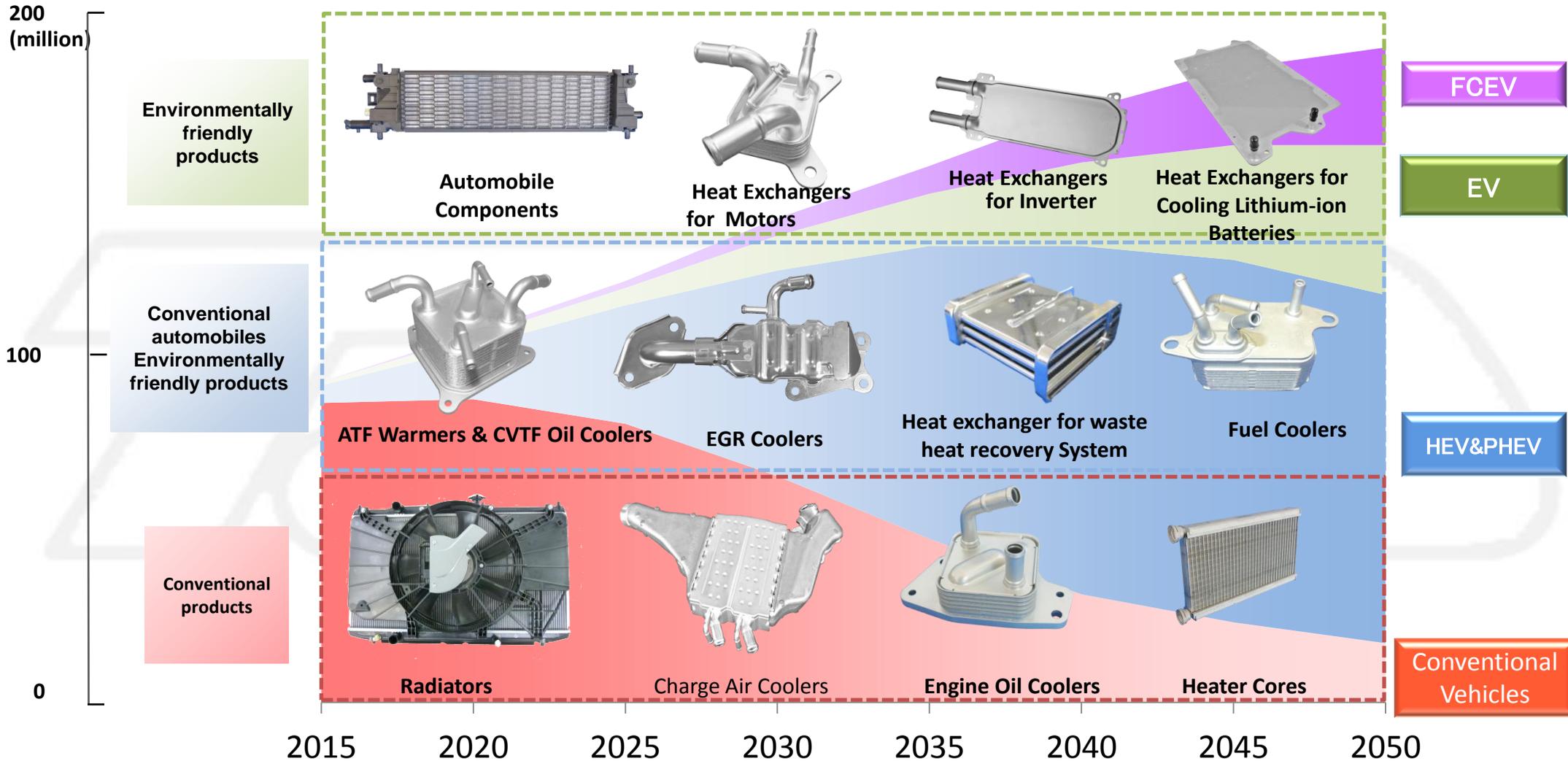
- (1) To establish safe and secured production activities, aiming at zero labor accidents.**
- (2) To develop human resources through manufacturing.**
- (3) To develop local human resources in the subsidiaries outside Japan.**
- (4) To revolutionize workstyles and improve the workplace environment.**

## 4. Achieve stable profitability

- (1) To improve productivity.**
- (2) To strengthen the cost competitiveness for purchasing materials.**
- (3) To reduce uncontrolled expenses.**
- (4) To visualize and optimize inventory and reduce inventory errors.**

## 5. 3C+S: Challenge Change Cooperation + Speed

- (1) To create the corporate culture encouraging the challenge for innovation.**
- (2) To initiate activities fearlessly for changes.**
- (3) To communicate and promote cross-departmental collaboration.**
- (4) To design activities prioritizing speed in operations.**

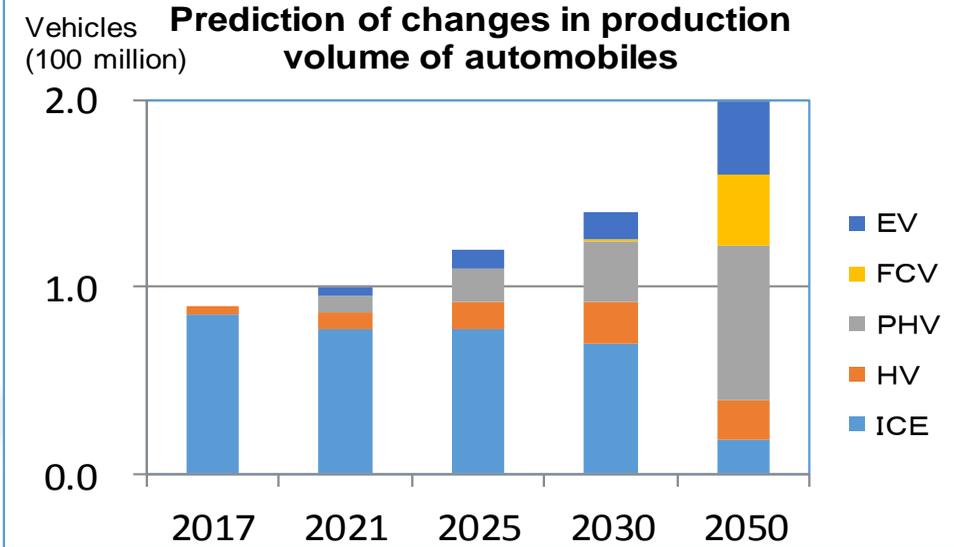


**Development of heat exchangers corresponding to the change of the markets and customers' needs**



# Market Trends and Strategic Products (Automobiles)

- The production volume of automobiles will increase and is expected to reach 200 million vehicles in 2050.
- The vehicle electrification ratio such as HV (hybrid vehicle) and EV (electric vehicle) will increase year by year, and electrically-powered vehicles are expected to account for about 30% in 2020 and more than 50% in 2030.
- Although gasoline and diesel vehicles will decrease gradually, they will not be reduced to zero even in 2050.



- Sales expansion of high performance compact T.RAD-SMART series for the expanding market.
- Development of the high-performance EGR cooler and motor oil cooler for fuel efficiency and vehicle electrification.

## T.RAD-SMART series



## EGR Coolers



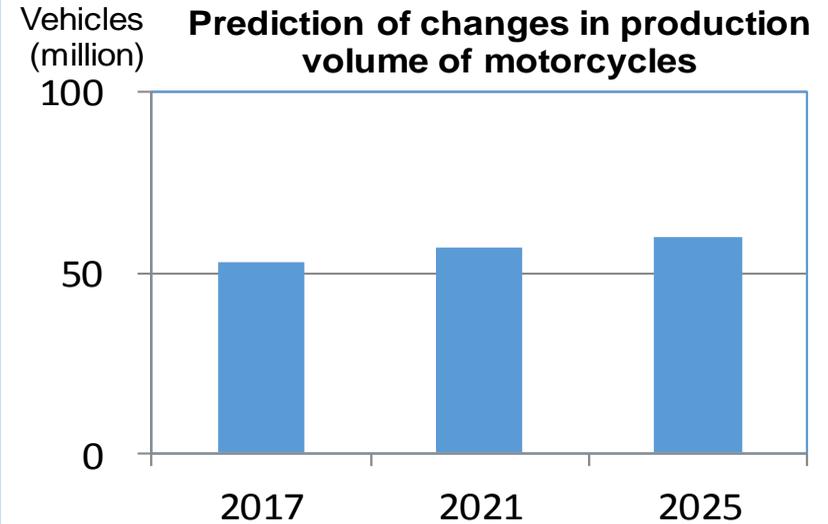
## Oil Coolers for Motors





# Market Trends and Strategic Products (Motorcycles)

- The production volume of motorcycles will increase and is expected to reach more than 60 million vehicles in 2025, of which about 40 million vehicles will be produced in India and ASEAN countries.
- Although electric vehicles will increase year by year, engine-powered vehicles will not decrease even in 2025.
- The ratio of water-cooled engines will increase and is expected to account for about 10 to 12% of engine-powered vehicles (7 million vehicle market).



- Sales expansion through the highest performance T.RAD-SMART as the top manufacturer of heat exchangers for motorcycles.
- Leading the market of heat exchangers for motorcycles with our unique array of products.

**T.RAD-SMART for motorcycle**



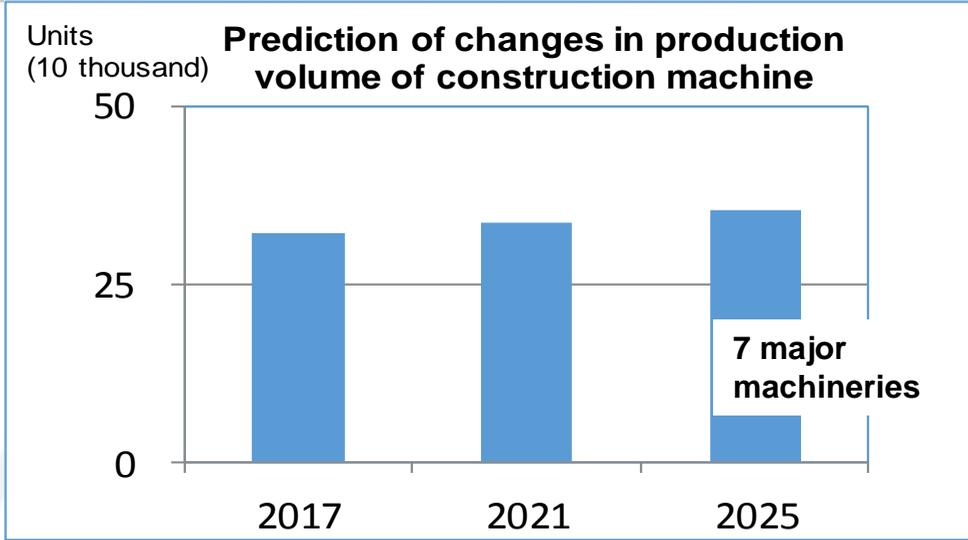
**Trapezoidal bent radiator**





# Market Trends and Strategic Products (Construction Machine)

- If steadily increased, the construction machine market is expected to reach 350 thousand units in 2025 and exhaust gas regulations will become increasingly strict along with it.
- It is predicted that the number of mining construction equipment will increase due to revitalization of the mining resources market.

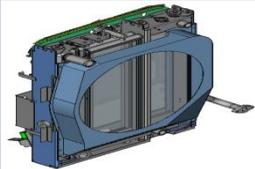


- An increased attachment of EGR coolers and charge air coolers to comply with exhaust emission regulations will increase demand for performance of radiators and oil coolers => resulting in an increased demand for high performance S-ACoM.
- With the completed development of the heat exchanger for mining construction equipment (T-MEX-C), its launch into the market will be started.

< S-ACoM >  
 T.RAD - SMART-Advanced Cooling  
Module

< T-MEX-C >  
 T.RAD Mining Machine Heat  
Exchanger

High performance  
 S—ACoM



Heat exchanger for  
 mining (T-MEX-C)

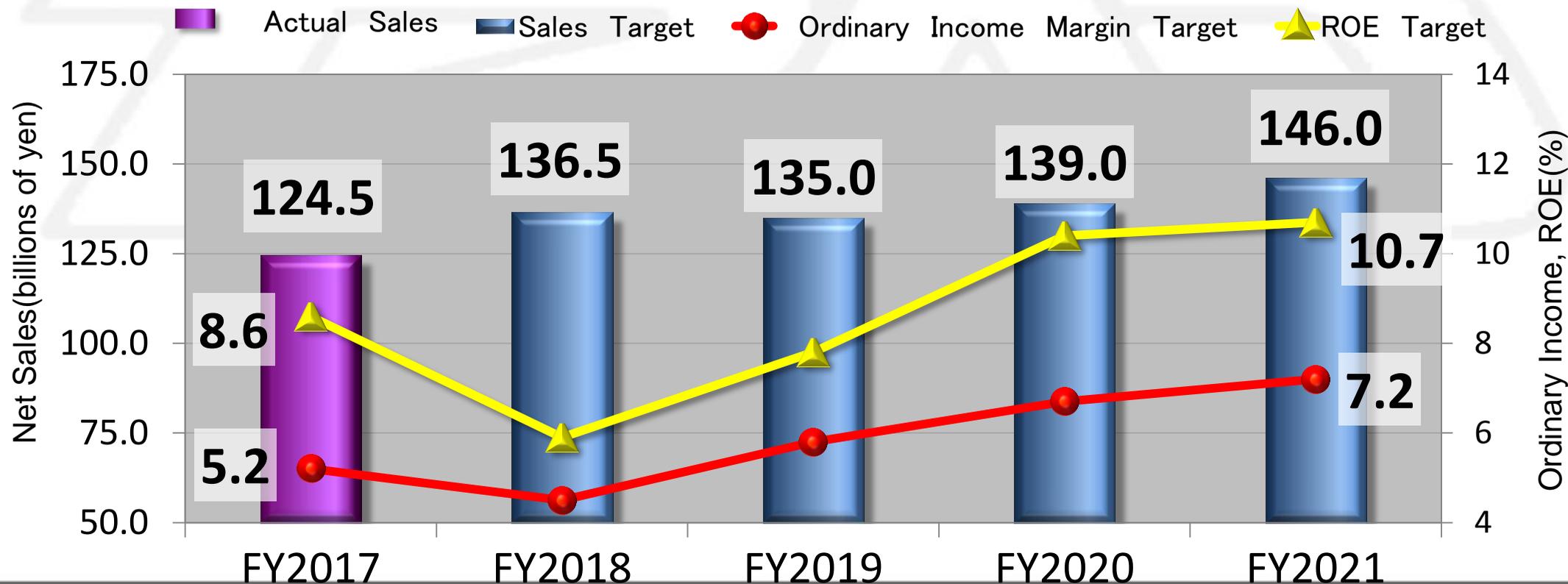




# T.RAD-11 Management Goal **【Consolidated】**

## ■ Business target for FY 2021

1. Ordinary Income : 7.2%      10.5billions of Yen
2. Net Sales : 146billions of Yen
3. ROE : 10.7%





# Topics



# Affiliation of Qingdao Toyo Heat-Exchanger Co., Ltd. as a subsidiary

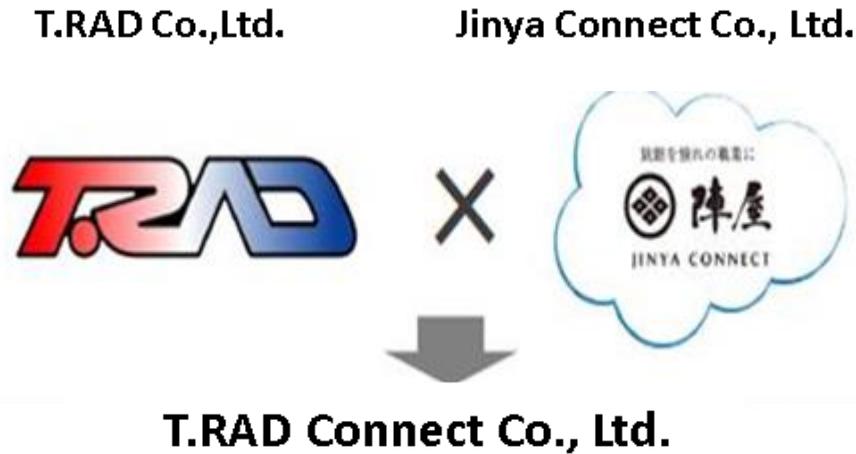
Following the affiliation of T.RAD (Zhongshan) Co., Ltd. and T.RAD (Changshu) Co., Ltd., the Qingdao Toyo Heat-Exchanger Co., Ltd. was affiliated as the third subsidiary in China in October, 2017.

<b>Purpose</b>	<b>Qingdao Toyo Heat Exchanger Co., Ltd. manufactures and sells heat exchangers for automobiles and trucks targeted on local customers in China. We reinforce the cooperation of our corporate group with the company and further expand our business.</b>
<b>Business</b>	<b>Manufacture and sales of heat exchangers for automobile</b>



<b>Location</b>	<b>Jimo Qingdao, Shandong, China</b>
<b>Registered</b>	<b>Total:692 Millions of Yen</b>
<b>Established</b>	<b>October9, 2017</b>
<b>Investment ratio</b>	<b>T.RAD Co., Ltd. 64% Donghua Automobile Industry Co., Ltd. 26% Mitsubishi Corporation RtM Japan Ltd. 10%</b>

## ◆ Company Profile



Company name	T.RAD Connect Co., Ltd.	
Capital	100 million JPY (Including capital reserve)	
Investment company	T.RAD Co.,Ltd.	51%
	Jinya Connect Co., Ltd.	49%
Business activities	Development and Sales of Cloud Applications	
Principal office	Aioi Nissay Dowa Insurance Shinjuku Bldg. 12F, 3-25-3, Yoyogi, Shibuya-ku, Tokyo	

## ◆ Purpose of the Establishment

The new company, by fusing T.RAD’s experienced heat-exchanger designing and production engineering technologies with Jinya Connect’s cloud application developing abilities, creates its own new cloud applications and business solutions through the use of IoT and/or AI. It will strive to become a system-developing company which can contribute to the society by introducing these applications and solutions not only within T.RAD Group, but also throughout a wider range in the world’s manufacturing and service industries.

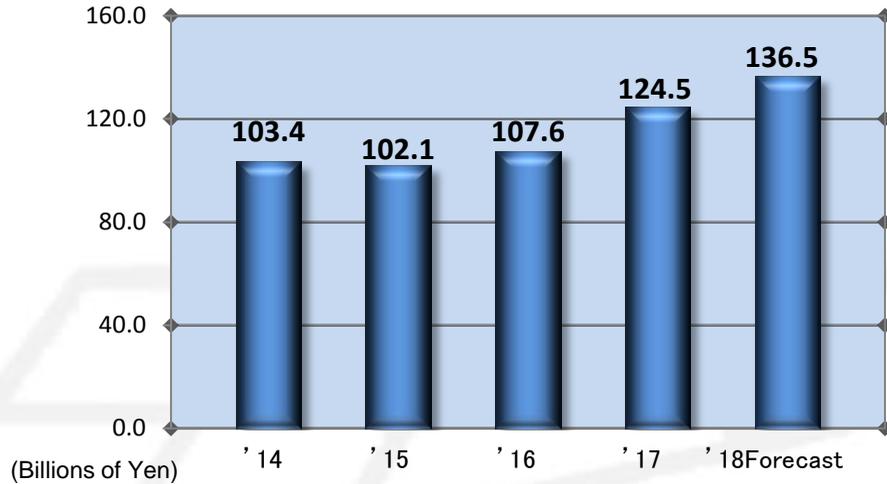


# FINANCIAL RESULTS FOR FY2017

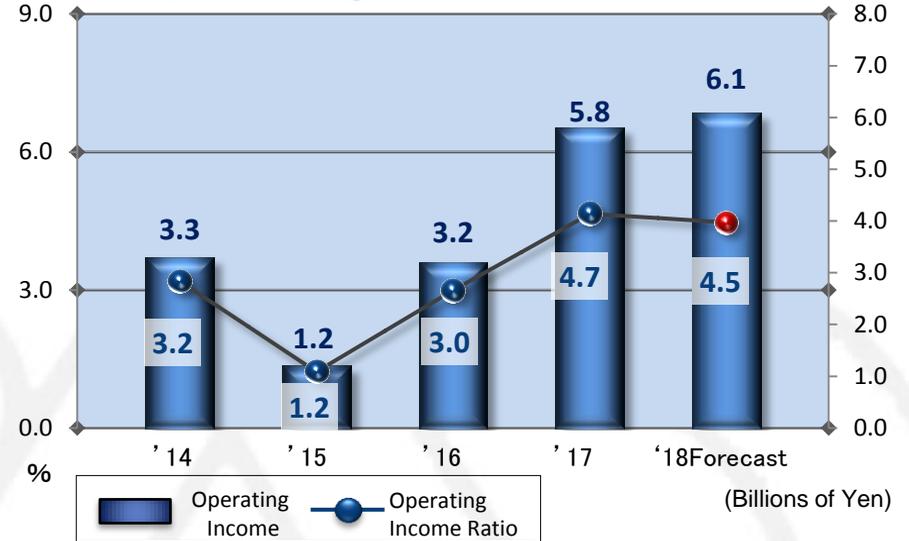


# Financial Results (Consolidated)

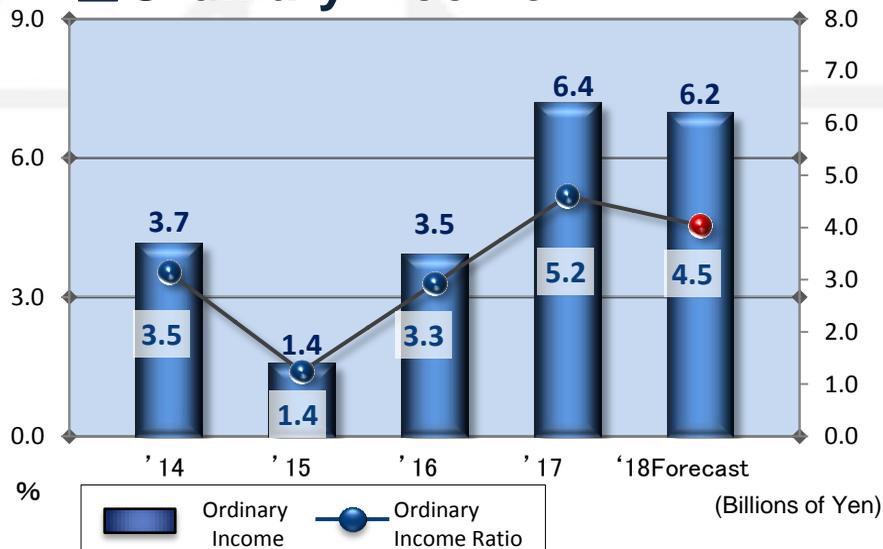
## Net Sales



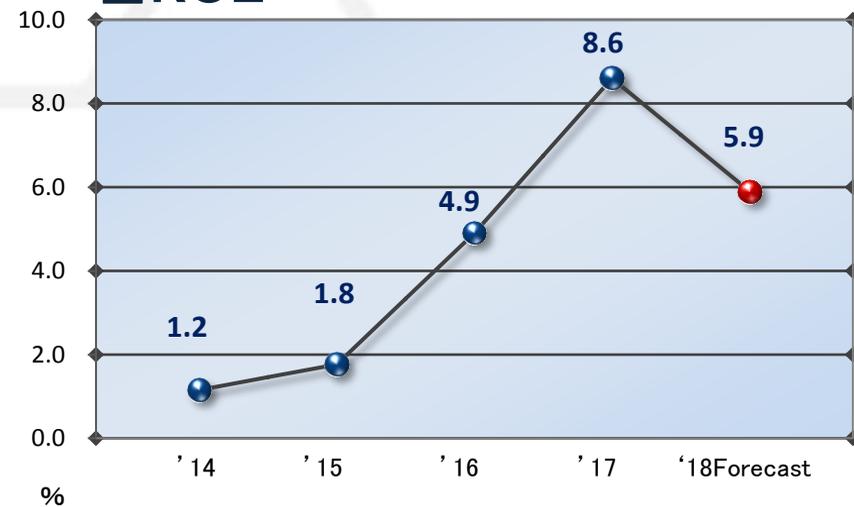
## Operating Income



## Ordinary Income



## ROE





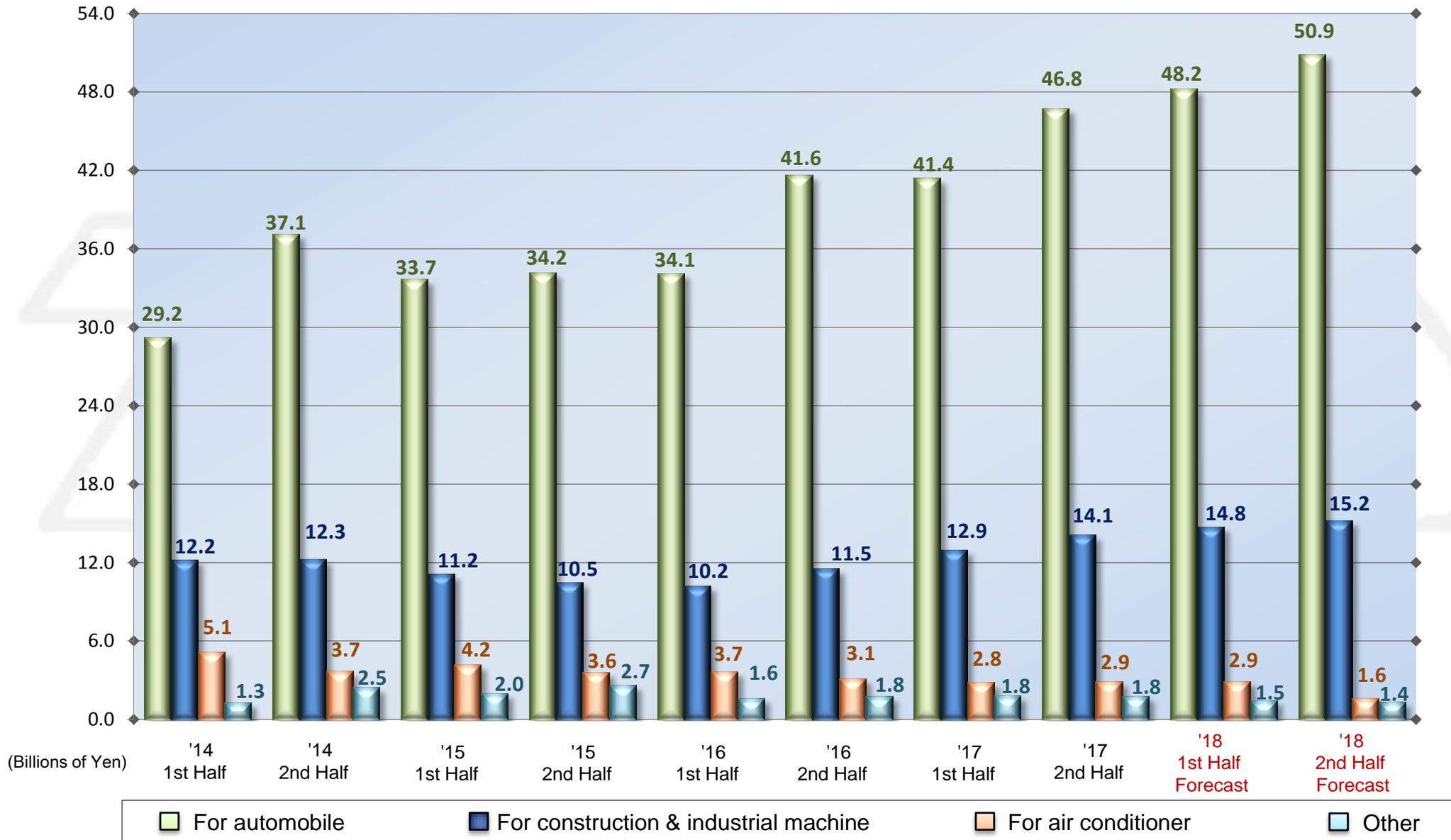
# Financial Results and Forecast

(Billions of Yen)

		FY2016		FY2017		FY2018 Forecast		Increase, Decrease (-)			
		Amount	%	Amount	%	Amount	%	'17-'16	%	'18 Forecast -'17	%
Net Sales	Consolidated	107.6	100.0%	124.5	100.0%	136.5	100.0%	16.9	+15.7%	12.0	+9.6%
	Non-Consolidated	56.8	100.0%	63.5	100.0%	65.8	100.0%	6.7	+11.8%	2.3	+3.6%
Operating Income	Consolidated	3.2	3.0%	5.8	4.7%	6.1	4.5%	2.6	+80.1%	0.3	+5.3%
	Non-Consolidated	0.8	1.4%	0.6	1.0%	0.5	0.8%	-0.2	-23.4%	-0.1	-17.4%
Ordinary Income	Consolidated	3.5	3.3%	6.4	5.2%	6.2	4.5%	2.9	+81.9%	-0.2	-3.8%
	Non-Consolidated	2.9	5.0%	4.0	6.3%	3.0	4.6%	1.2	+40.9%	-1.0	-25.5%
Profit attributable to owners of parent	Consolidated	2.0	1.9%	3.7	3.0%	2.7	2.0%	1.7	+82.6%	-1.0	-26.8%
	Non-Consolidated	1.9	3.4%	2.7	4.3%	0.4	0.6%	0.8	+42.4%	-2.3	-85.2%



# Semi Annual Sales by Application (Consolidated)





# Business results of the segment

(Billions of Yen)

	Net Sales					Operating Income(Loss)				
	FY2016 Results	FY2017 Results	FY2018 Forecast	Increase /Decrease ('17-'16)	Increase /Decrease ('18 Forecast-'17)	FY2016 Results	FY2017 Results	FY2018 Forecast	Increase /Decrease ('17-'16)	Increase /Decrease ('18 Forecast-'17)
	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount	Amount
<b>Japan</b>	51.5	56.9	58.9	5.3	2.0	0.8	0.6	0.3	-0.2	-0.3
<b>USA</b>	26.0	30.2	31.1	4.2 (-0.8)	0.8 (-1.7)	-0.3	0.7	1.2	1.0 (-0.01)	0.5 (-0.04)
<b>Europe</b>	3.9	4.1	4.2	0.3 (+0.4)	0.1 (-0.0)	-0.3	-0.5	-0.7	-0.2 (-0.02)	-0.2 (+0.00)
<b>Asia</b>	15.6	17.1	17.8	1.4 (+0.4)	0.8 (-0.5)	1.0	2.1	2.3	1.1 (+0.03)	0.2 (-0.06)
<b>China</b>	9.6	15.2	23.6	5.6 (+0.3)	8.4 (-0.3)	1.7	2.7	2.9	1.0 (+0.06)	0.2 (-0.06)
<b>Other</b>	1.0	1.0	0.9	-0.0	-0.1	0.4	0.2	0.2	-0.2	0.0
<b>Total</b>	107.6	124.5	136.5	16.9 (+0.4)	12.1 (-2.6)	3.2	5.8	6.1	2.6 (+0.05)	0.3 (-0.15)

※Europe(Czech, Russia, Germany), Asia(Thailand, Indonesia, Vietnam), Other(The other Subsidiaries in Japan)

※Increase/Decrease figures in parentheses are the amount for effect of foreign exchange fluctuations

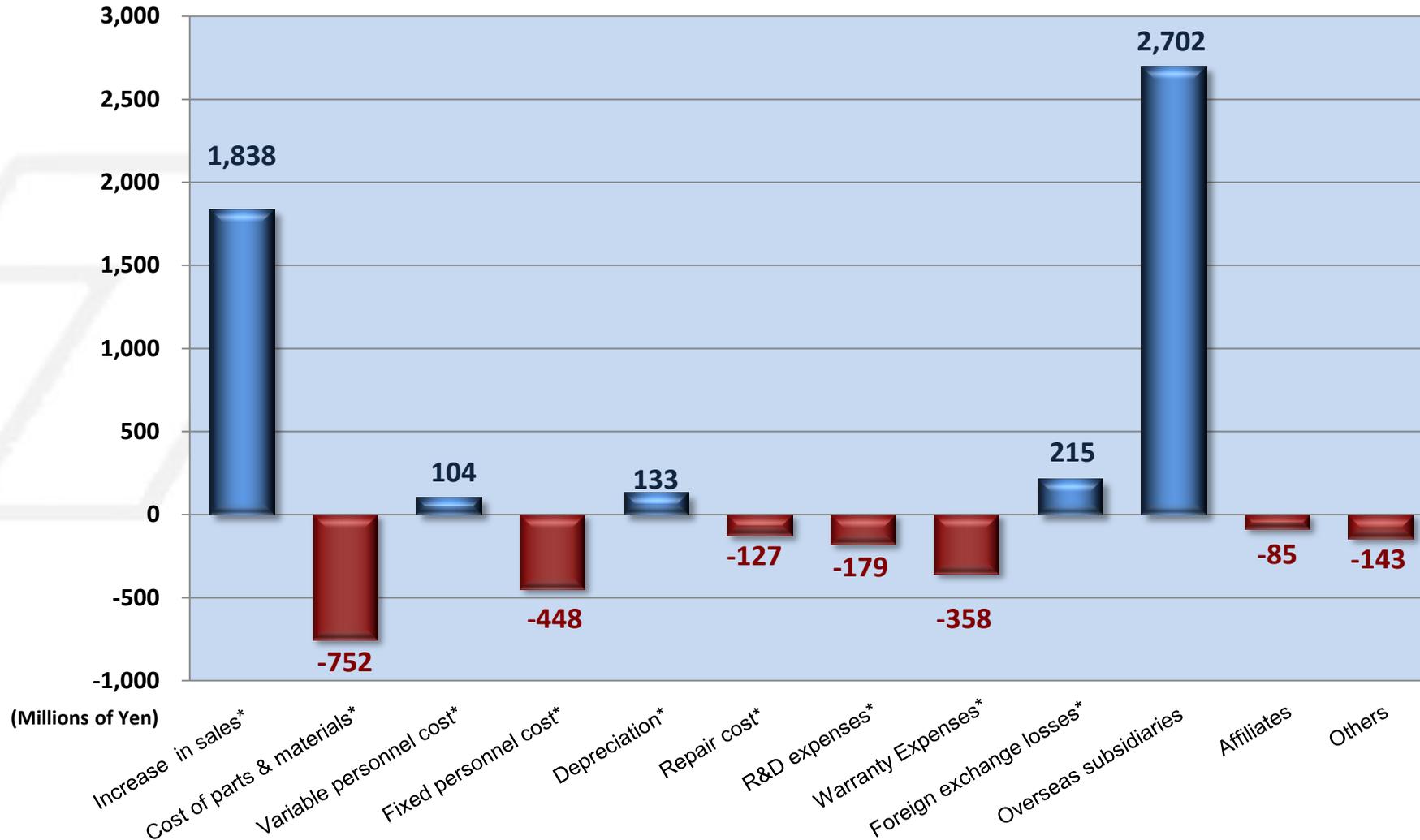
Exchange Rate (Dec.2017⇒Dec.2018 Forecast) USD: 113.05⇒106.75, THB: 3.46⇒3.41, CNY: 17.30⇒16.94,

CZK: 5.16⇒5.18, IDR: 0.0083⇒0.0078, VDN: 0.0050⇒0.0047, EUR: 134.95⇒131.46, RUB: 1.96⇒1.82



# Analysis of Increase Factor of the Consolidated Ordinary Income (FY2017 vs. FY2016)

Increase in the consolidated ordinary income by ¥2,900 million



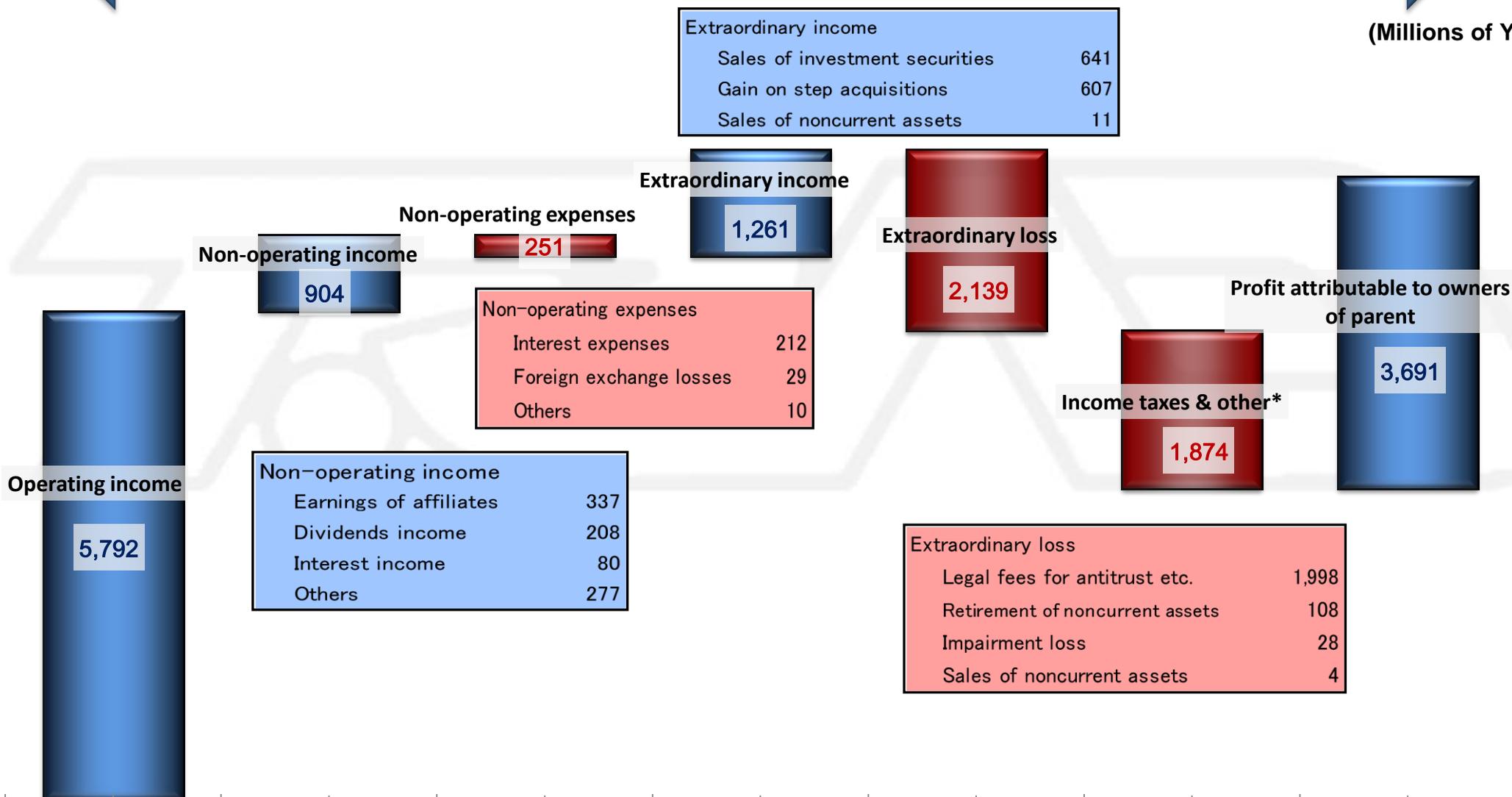
(\*Fluctuation factor of non-consolidated)



# Non-operating Income/Expenses and Extraordinary Income / Loss for FY2017 (Consolidated)

Operating Income → Profit attributable to owners of parent  
5,792 → 3,691

(Millions of Yen)

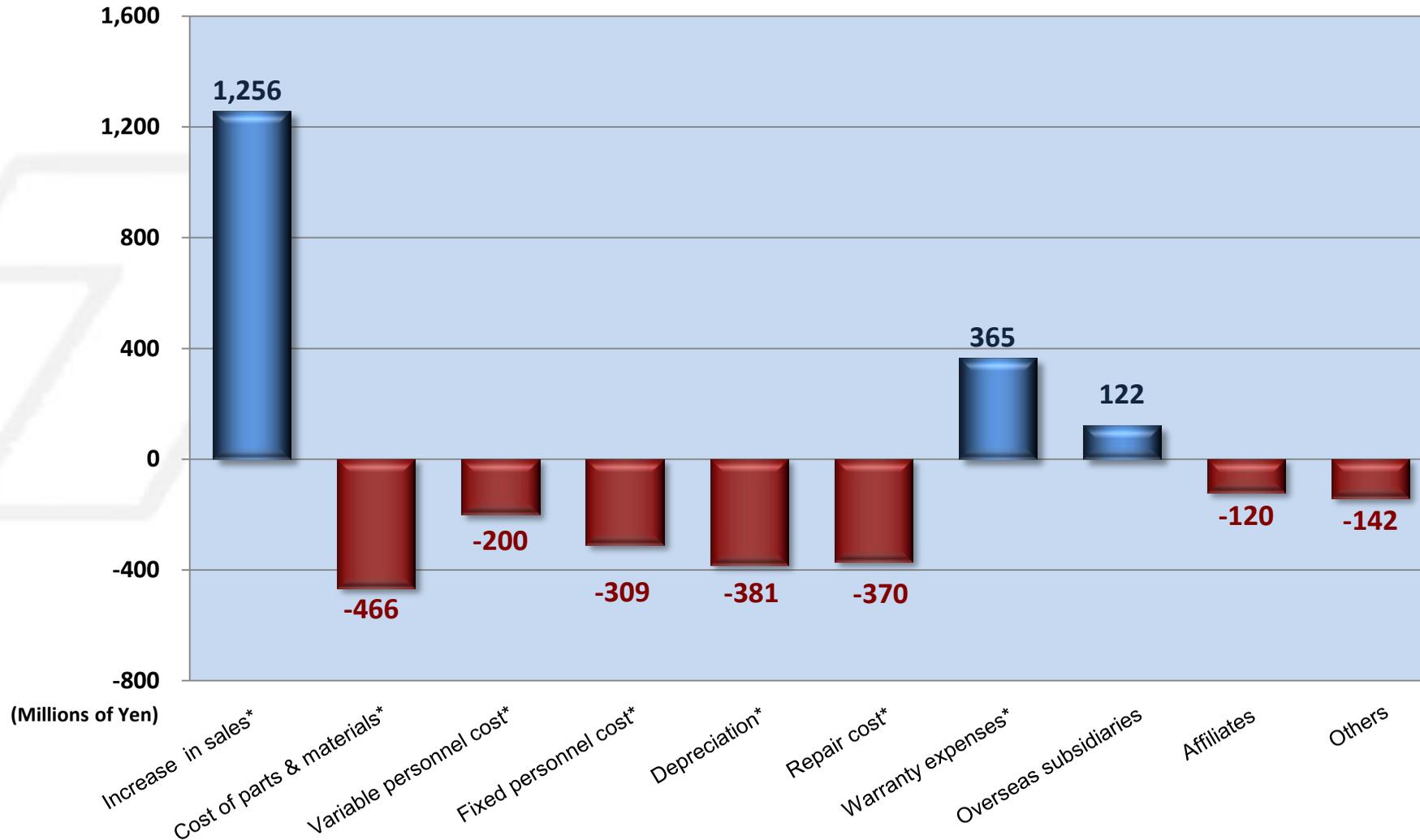


\* Income taxes & other include Profit attributable to non-controlling interests.



# Analysis of Increase Factor of the Consolidated Ordinary Income (FY2018 Forecast vs. FY2017)

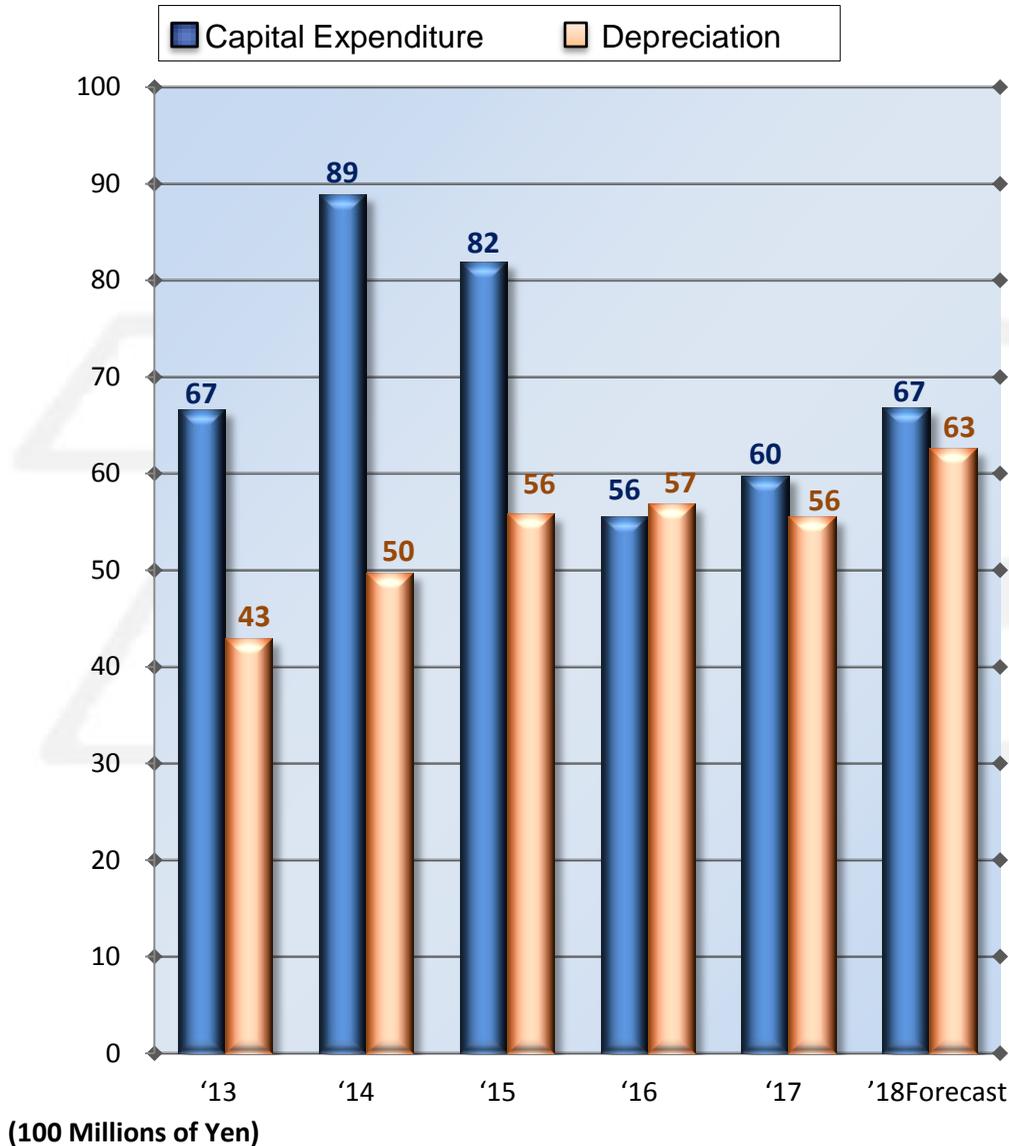
Decrease in the consolidated ordinary income by ¥245 million



(\*Fluctuation factor of non-consolidated)



# Capital Expenditure & Depreciation



## Capital Expenditure by region (100 millions of Yen)

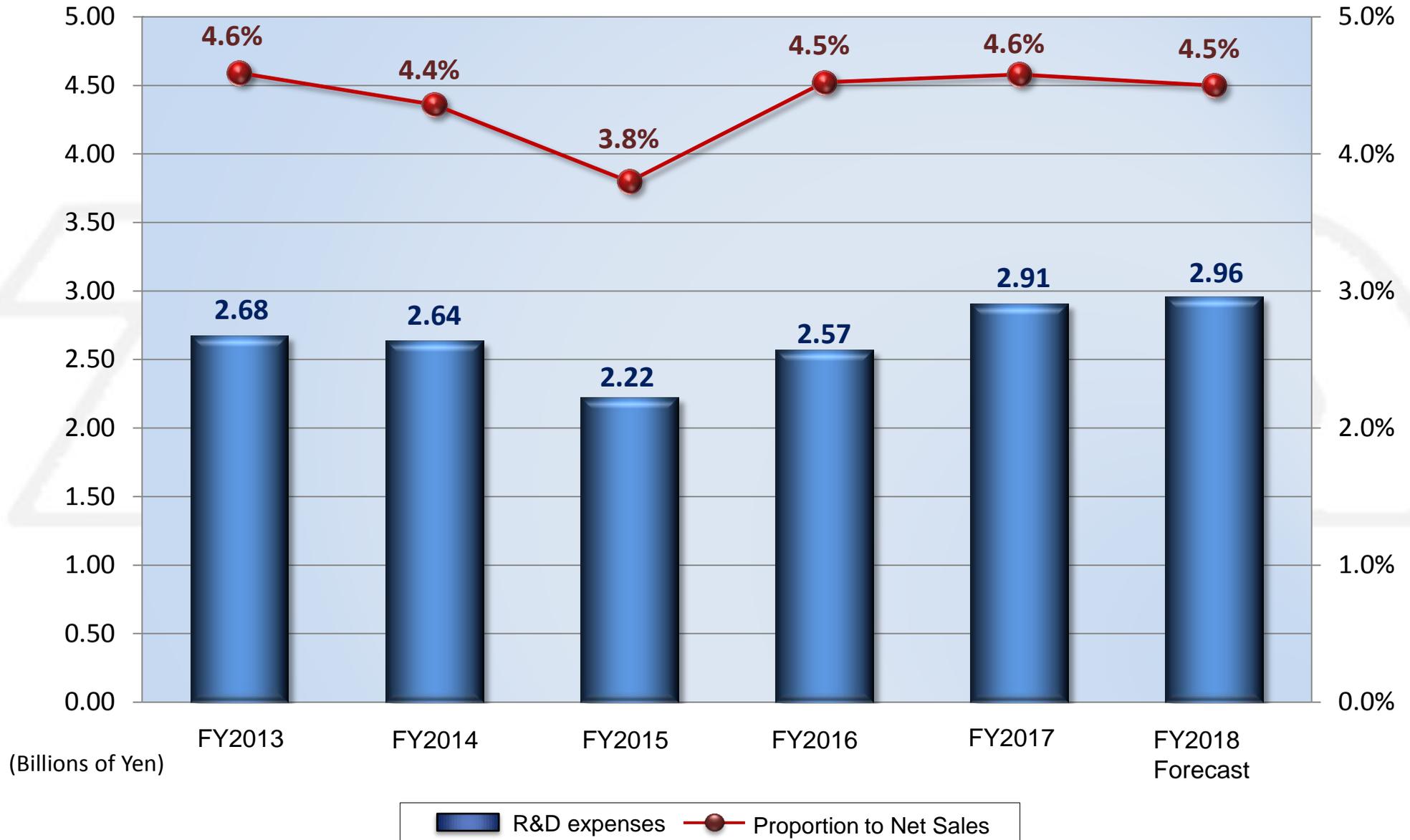
	FY2017		FY2018 Forecast	
	Capital Expenditure	Share	Capital Expenditure	Share
Japan	37.4	62.6%	37.6	56.3%
USA	11.1	18.5%	9.3	13.9%
Europe	4.3	7.3%	5.1	7.7%
China	2.0	3.3%	2.1	3.1%
Thailand	2.6	4.4%	10.3	15.4%
Indonesia	1.9	3.2%	1.6	2.3%
Vietnam	0.4	0.7%	0.9	1.3%
<b>Total</b>	<b>59.8</b>	<b>100.0%</b>	<b>66.8</b>	<b>100.0%</b>

## Depreciation by region (100 millions of Yen)

	FY2017		FY2018 Forecast	
	Depreciation	Share	Depreciation	Share
Japan	27.3	49.2%	30.3	48.3%
USA	11.3	20.3%	12.6	20.1%
Europe	1.5	2.7%	2.8	4.5%
China	4.5	8.1%	6.7	10.6%
Thailand	5.1	9.3%	4.7	7.6%
Indonesia	4.0	7.1%	3.7	6.0%
Vietnam	1.9	3.4%	1.8	2.9%
<b>Total</b>	<b>55.5</b>	<b>100.0%</b>	<b>62.6</b>	<b>100.0%</b>



# R&D Expenses (Non-Consolidated)





## Appendix

# Introduction of Our Company



# Global Network: Worldwide Business with 5 Regional Bases



**● Subsidiaries**

**● Offices in Europe • R&D center**

**● Joint Ventures**

<b>【North America】</b>	<b>【China】</b>
T.RAD North America, Inc. (USA)	T.RAD (Zhongshan) Co., Ltd.(China)
Tripac International Inc. (USA)	T.RAD (Changshu) Co., Ltd. (China)
	Qingdao Toyo Heat-Exchanger Co., Ltd. (china)
<b>【Asia】</b>	<b>【Europe】</b>
T.RAD (THAILAND) Co.,Ltd. (Thailand)	T.RAD Czech s.r.o. (Czech)
PT.T.RAD INDONESIA (Indonesia)	TRM LLC(Russia)
T.RAD(VIETNAM)Co., Ltd. (Vietnam)	

T.RAD Co., Ltd. Europe Representative Office (Germany)
North America T.RAD R&D Center (USA)
TACO/T.RAD R&D Centre(India)
T.RAD (Changshu) R&D Center Co., Ltd. (China)

TORC Co.,Ltd. (Thailand)
TATA Toyo Radiator Ltd. (India)



# Domestic Network

## ● Research & Development Offices

H.E. Development Dept.(Construction Machine) Research & Development Dept. Prototyping & Testing Dept.	Kanagawa
H.E. Development Dept. Prototyping & Testing Dept. Functional Component Development Dept. Production Engineering Center	Aichi
Functional Component Development Dept. Production Engineering Center	Shiga

## ● Production Bases

Hatano Works	Kanagawa
Nagoya Works	Aichi
Shiga Works	Shiga



Hatano Works



Nagoya Works



Shiga Works

## ● Sales Offices

Automotive Dept.	Tokyo, Aichi
Construction/off-Highway Dept.	Kanagawa
Osaka Sales Dept.	Osaka

## ● Head Office

Head Office	Tokyo
-------------	-------

## ● Subsidiaries

T.RAD Connect Co., Ltd.	Tokyo
Towa Unyu Co., Ltd. Towa Kosan Co., Ltd.	Aichi

## Automobiles

Development of products  
in consideration for environment

## Household Energy



## Construction Machinery

Products in which our company  
has a high share

## Motorcycles





# Vehicles and machinery in which our company products are used.(1/2)



HONDA "ODESSEY"



HONDA FCEV "CLARITY"



HONDA "VESEL "



TOYOTA "PRIUS "



DAIHATSU "TANTO "



DAIHATSU "COPEN "



TOYOTA "LAND CRUISER "



FORD "FOCUS "



TOYOTA "HIACE VAN "



FUSO "SUPER GREAT "



HINO "DUTRO "



Polaris "RANGER"



HONDA "Gold Wing"



HONDA "Africa Twin"



TOYOTA Lift Tracks



KOMATSU Mining Trucks



KOMATSU Wheel Loaders



KOMATSU Hyd. Excavators



KOMATSU Crawler Dozers



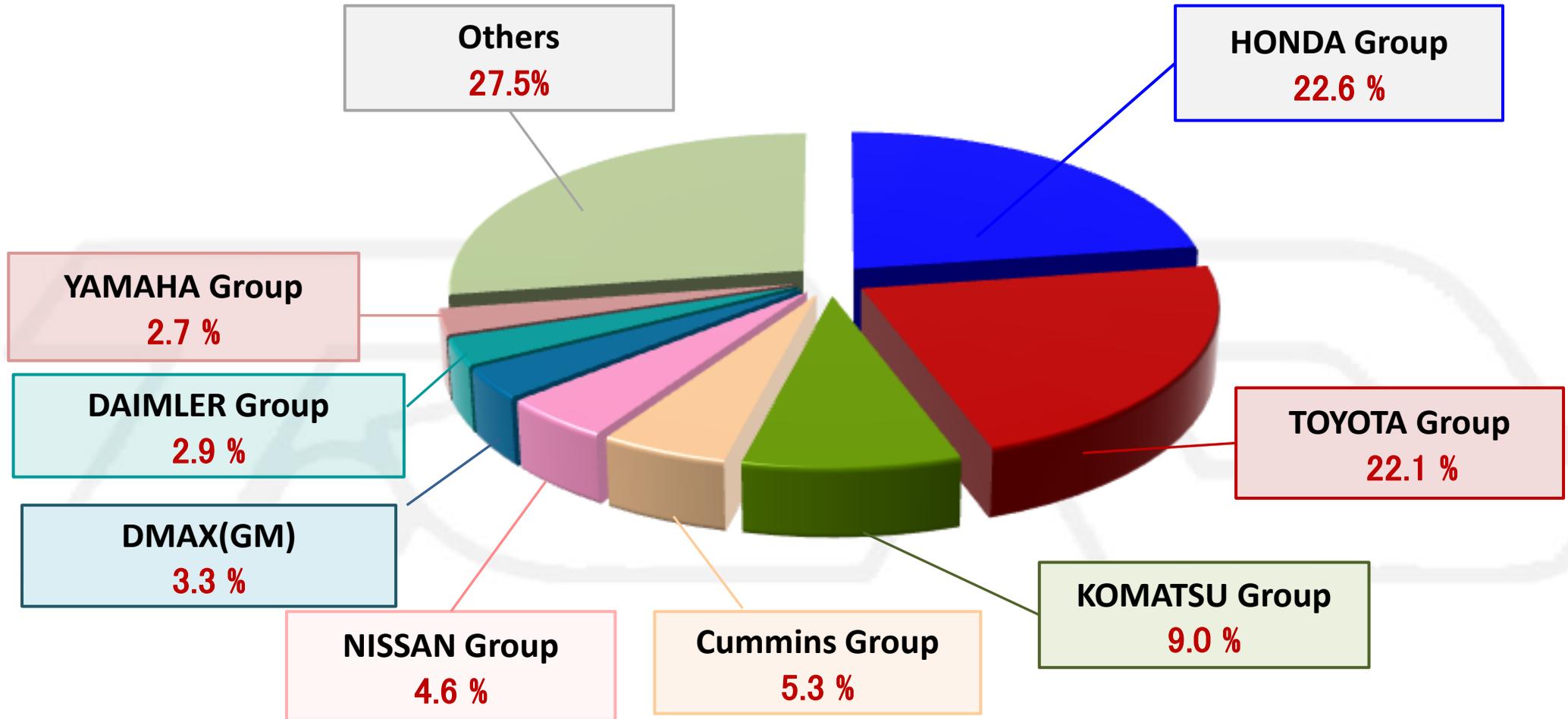
YAMAHA Marine Jet



AISIN Gas Heat Pump Modules



AISIN Fuel Cell Modules "ENE-FARM"



**Our independent mobility and advanced technologies  
⇒ Adopted by international industry leaders**



# Sales by Application and Product FY2017(Consolidated)

## Sales by Application

For Air Conditioner Products  
4.6%

For others  
2.9%

For Charge Air Coolers  
6.1%

For Construction Machinery  
21.7%

For Automobiles  
61.1%

For Motorcycles  
9.7%

For EGR Coolers  
14.8%

## Sales by Product

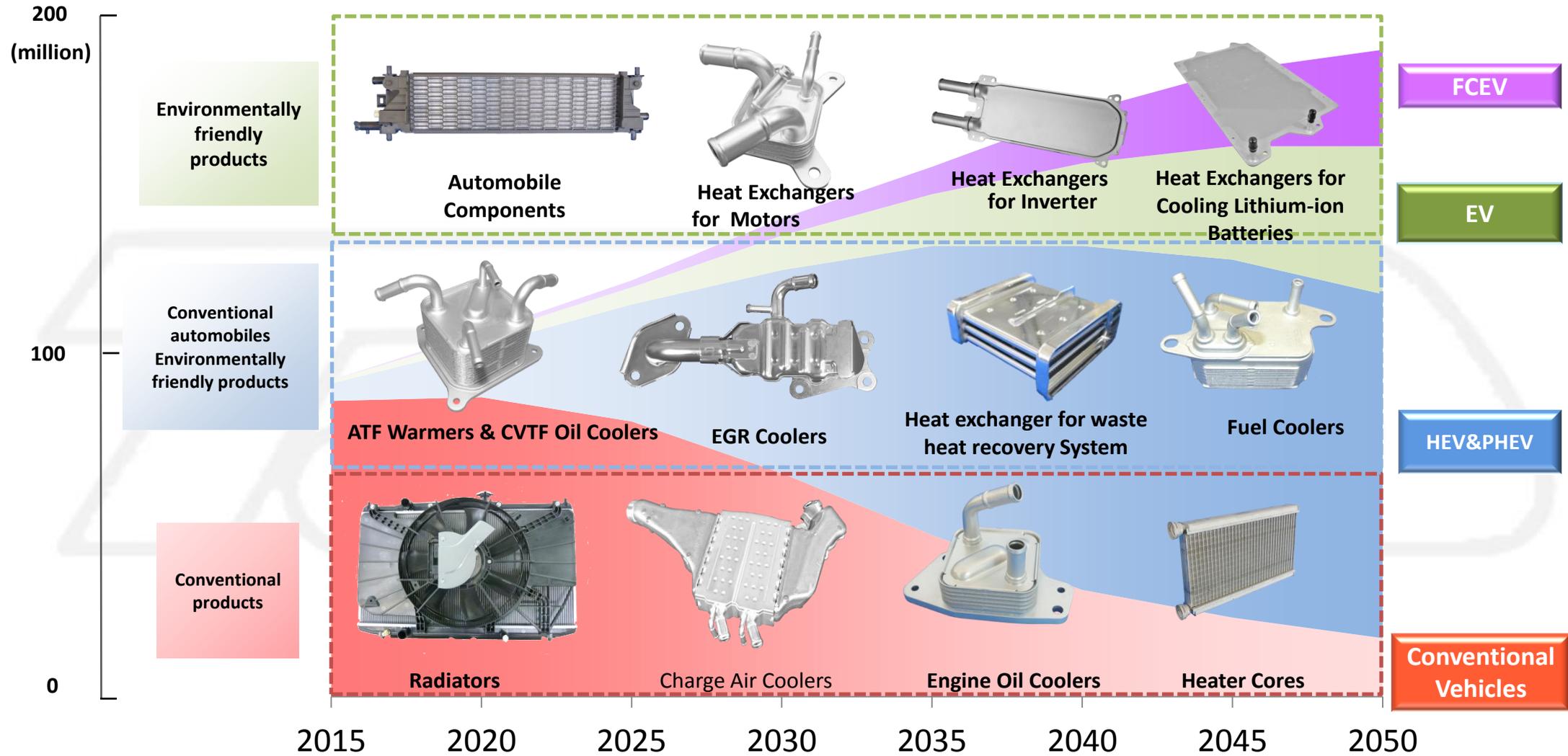
For FinCoil  
4.5%

For others  
10.1%

For Radiators  
48.1%

For Oil Coolers  
16.4%

Balanced not only one particular industry and products



Development of heat exchangers corresponding to the change of the markets and customers' needs



# Automobile Components

Name	Function
Radiator	To cool cooling water increased in temperature by the engine.
Charger Air Cooler	To cool intake air increased in temperature by being pressurized by a supercharger such as a turbocharger.
Engine Oil Cooler	To cool engine oil increased in temperature by the engine
Heater Core	To heat indoors by allowing a part of cool cooling water increased in temperature to flow.
ATF Warmers & CVTF Oil Coolers	To heat lubricants for AT and CVT during warming-up and cool down at high temperatures.
EGR Cooler	To cool high-temperature exhaust gas when re-circulating a part of exhaust gas.
Heat Exchangers for Waste Heat Recovery	To recover heat within exhaust gas in HEV and reuse for heating and quick warming of the engine.
Fuel Cooler	To cool fuel increased in temperature by being pressurized by the fuel injection pump.
Radiator for Auxiliary System	To cool cooling water increased in temperature by the heat exchanger for auxiliary equipment such as an inverter.
Heat Exchangers for Motors	To cool circulating oil for cooling the motor.
Heat Exchangers for Inverter	To cool inverters used in HEV and EV.
Heat Exchangers for Cooling Lithium-ion Batteries	To cool lithium ion batteries used in HEV and EV.

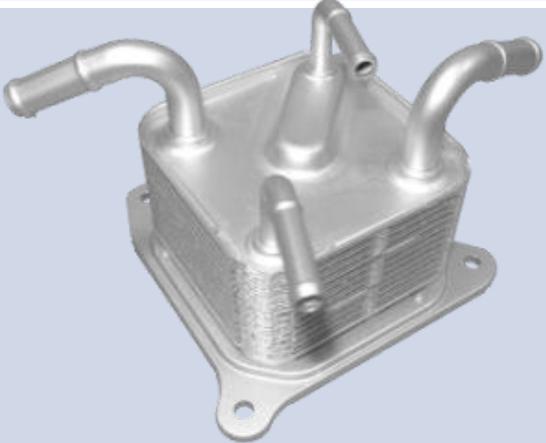
### Features of the product

- ◆ Achieved reduction of the number of parts and low cost for existent header-less EGR Coolers by adoption in tank-less structure
- ◆ Horizontal expanding to each TNGA2.5 engine composition and destination
- ◆ Achievement of considerably small and compact size by high density core
- ◆ Promoting for adoption expansion in gasoline engine vehicles as an important component for improvement in fuel efficiency
- ◆ Global development at each base in Japan and North America (North America Autumn 2018~SOP)

	High-performance new core (compared to our existent products)	Appearance
Performance ratio	110 or more	
Weight ratio	80 or less	

## Features of the product

- ◆ High-performance inner fins make the cooler significantly smaller and lighter.
- ◆ Round/square/rectangular shapes are available.
- ◆ Support for various models such as those for transmissions, motors for hybrid vehicles, and engines
- ◆ Global development at three bases in Japan, China and North America

	High-performance new core (compared to our conventional products)	Appearance
Performance ratio	110 or more	
Weight ratio	90 or less	



### Features of the product

### *SliM* & *Advanced Radiator Technology*

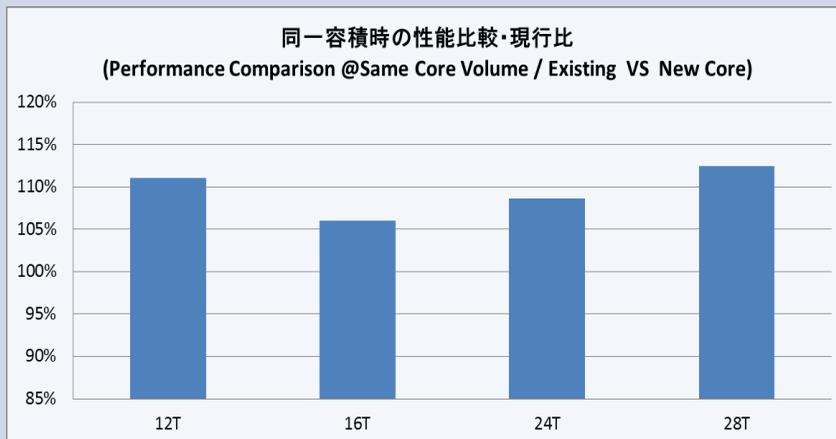
- ◆ Support for all radiators such as those for motorcycles, light automobiles and large trucks(serialized)
- ◆ Improvement of fin tubes makes the radiator lighter drastically, yet high-performance.
- ◆ Development of high-strength materials that can be globally launched
- ◆ Reduction of power consumption by making production lines more compact

### T.RAD-SMART (compared to our conventional products)

### T.RAD-SMART Appearance

Performance ratio

■ Qv : 6~12%UP



Weight ratio

90 or less

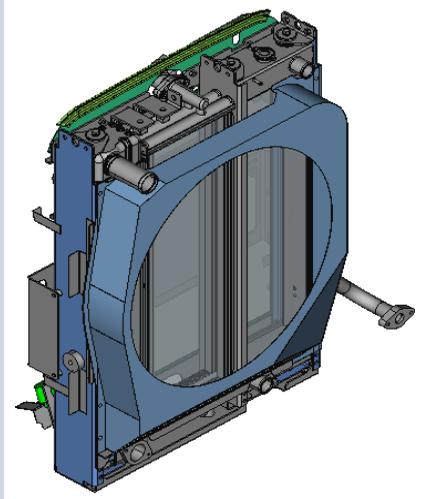
### Features of the product

#### 【S-ACoM : SMART-Advanced Cooling Module】

- ◆ Improvement of fin tubes makes the radiator lighter, yet high-performance.
- ◆ Durability increased substantially due to the improvement of the shape of fin tube
- ◆ Reduction of power consumption by making production lines more compact

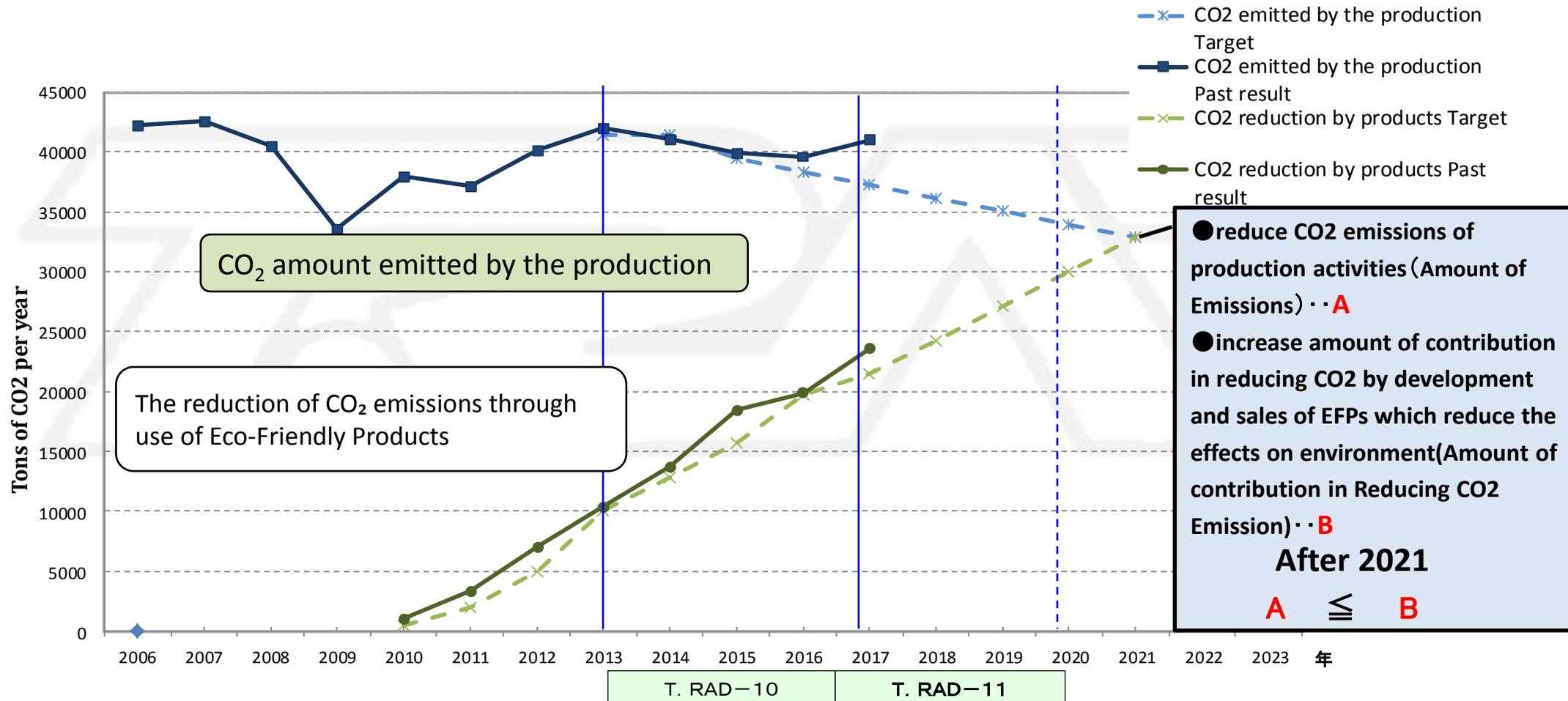
#### 【T-MEX: T.RAD Mining Machine Heat Exchanger】

- ◆ Enter the Super Large Construction Machines Market(Mining Machines Market) with newly developed heat exchangers that allow tube replacement

	S-ACoM	mining machinery(T-MEX)
Appearance		 <p>Outline size 2.5m x 2.5m</p>

## (1) Reduction in CO2 Emission : T.RAD-11

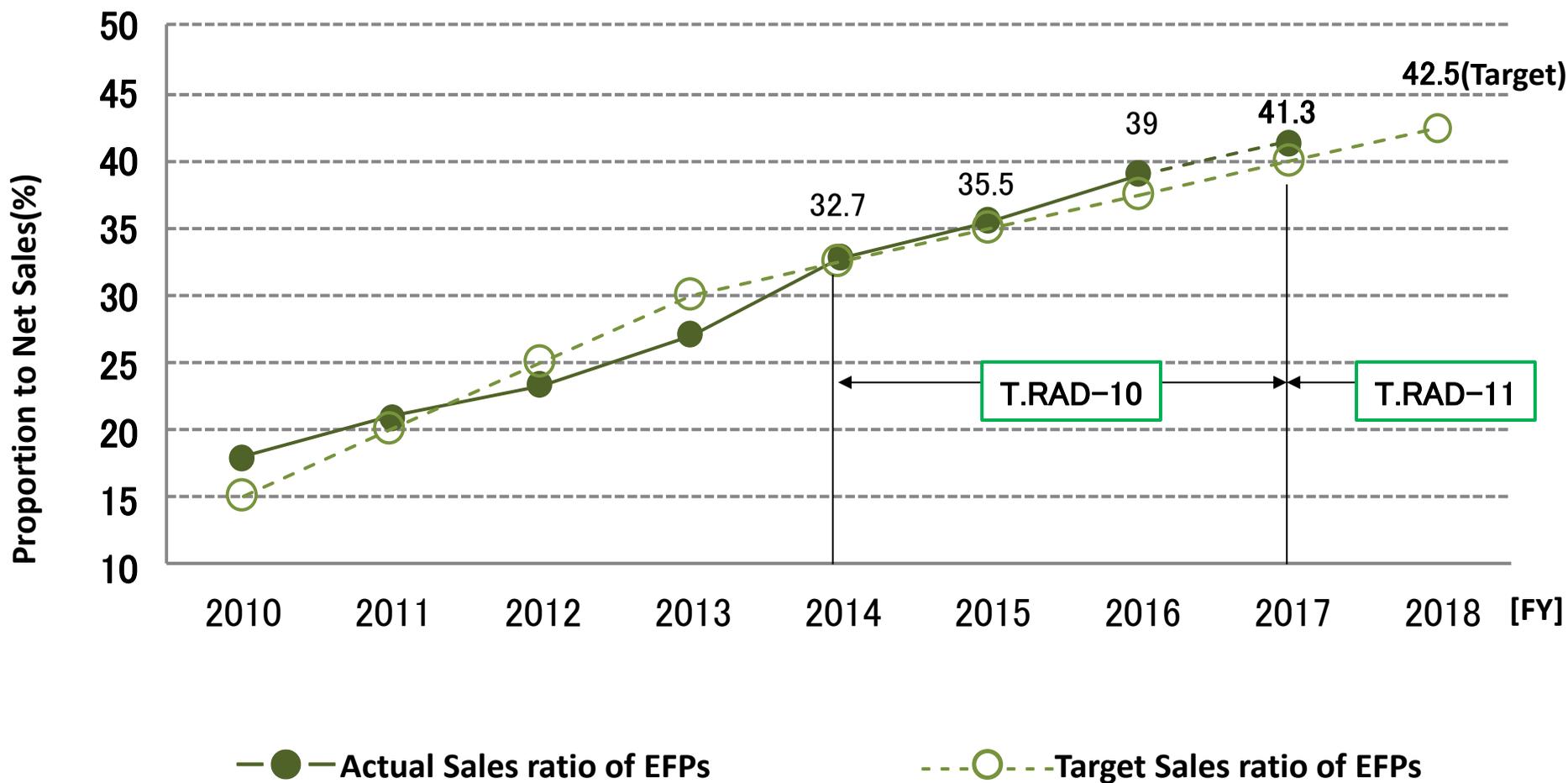
By FY2021, reduction in Emissions of production activities  $\leq$  Contributions to Reducing CO2 by Eco-friendly Products





# Environmental Vision

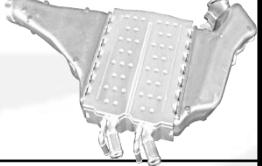
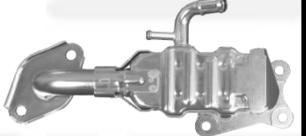
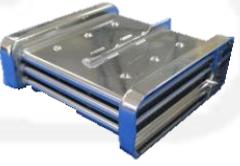
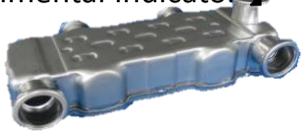
(2) Sales expansion targets of Eco-friendly Products: T.RAD-11  
Promotion of sales increase more than 42.5% by FY2018





# The Best 8 Sales of Eco-friendly Products

【The Standard of Our Eco-friendly Products】 Product Environment Indicator (=newly / conventional Eco-efficiency)  $\geq 1.2$   
 Eco-efficiency = Product Value / Environmental Load (=Performance Ratio x Cost Ratio / CO2 Ratio x Weight Ratio x Substance of Concern)

rank	Products Type	Product environmental indicator and appearance of product	rank	Products Type	Product environmental indicator and appearance of product
1	High Performance Radiators	【Product environmental indicator】 1.35 	5	Mission Oil(ATF) Coolers/Warmers	【Product environmental indicator】 1.61 
2	Charge Air Coolers for automobiles	【Product environmental indicator】 1.28 	6	Radiators for motorcycles	【Product environmental indicator】 1.20 
3	EGR Coolers	【Product environmental indicator】 2.58 	7	Exhaust Heat Recovery for automobiles	【Product environmental indicator】 1.34 
4	Case-less Oil Coolers	【Product environmental indicator】 1.22 	8	Heat Exchangers for Household Fuel Cells	【Product environmental indicator】 1.39 

Thought about our Product Environmental Indicator  $\Rightarrow$  Setup according to the guideline of Japan Auto Parts Industries Association(JAPIA)

Eco-efficiency =

Product Value

Rise

Usability, High performance, Low cost

Environmental Load

Lower

Worming

Resource depletion

Substance of concern



## Contact information

### Human Resources & General Affairs Department

[infoh@trad.co.jp](mailto:infoh@trad.co.jp)

03-3373-2106 (Direct number )

### Finance & Accounting Department

03-3373-2138 (Direct number )



**T.RAD Co., Ltd.**

URL : <http://www.trad.co.jp/>