

Business Results and Progress of Key Measures

First Half of FY2018 (FY Ending March 2019)

DOWA HOLDINGS CO.,LTD.

November 13, 2018

Overview of Consolidated Operating Results for FY2018 H1

Billion yen

	FY2017	FY2018		Change			
	H1 Results ①	Forecast on May 11 ②	H1 Results ③	Year-on-Year (③ - ①)		Forecast (③ - ②)	
Net Sales	219.3	229.0	221.8	2.5	1%	(7.1)	(3%)
Operating Income	14.6	14.5	9.3	(5.3)	(36%)	(5.1)	(35%)
Ordinary Income	17.2	17.5	12.8	(4.4)	(26%)	(4.6)	(27%)
Profit attributable to owners of parent	11.7	12.5	8.8	(2.8)	(24%)	(3.6)	(29%)

- ✓ In the first half of FY2018, profit fell year on year, especially in Nonferrous Metals, reflecting the impact of worsening of purchase conditions for raw material ore, resulting in operating income of 9.3 billion yen and ordinary income of 12.8 billion yen.

Foreign-exchange rate and Metal Prices

	FY2017			FY2018			
	H1 average	H2 average	Full Year average	H1 assumption	H1 average	H2 assumption	Full Year estimation
Exchange rate: (¥/\$)	111.1	110.6	110.9	110.0	110.3	110.0	110.1
Copper: (\$/t)	6,005	6,884	6,444	7,000	6,487	6,200	6,344
Zinc: (\$/t)	2,780	3,328	3,054	3,200	2,824	2,600	2,712
Indium: (\$/kg)	184	269	226	350	286	250	268

Forecast for FY2018

Billion yen

	FY2017 Results	FY2018 Forecast		Change			
		Announced on May 11 ②	Announced on Oct 29 ③	H1 (③ - ①)		Full year (③ - ②)	
Net Sales	454.7	475.0	455.0	2.0	0%	(20.0)	(4%)
Operating Income	30.9	32.0	24.5	(6.4)	(21%)	(7.5)	(23%)
Ordinary Income	36.3	38.0	30.0	(6.3)	(17%)	(8.0)	(21%)
Profit attributable to owners of parent	24.6	26.5	21.0	(3.6)	(15%)	(5.5)	(21%)

- ✓ In the second half, exchange rates and metal prices are expected to remain mostly unchanged from the level at the end of the first half.
- ✓ Demand for automobile-related products and other main products will be in line with expectations at the beginning of the fiscal year.

The market for silver powder is expected to start growing again from FY2019.

Make progress towards achieving the targets under Midterm Plan 2020 **by dealing with any issues that arise** and **steadily implementing growth measures** based on an assessment of changes in the business environment.

Recent Challenges and Opportunities and Initiatives for Achievement of Midterm Plan 2020

	Recent Challenges and Opportunities	Future Initiatives
Environmental Management & Recycling	• Fall in treatment unit price of low-contaminated PCB waste treatment	• Low-contaminated PCB waste: Expand licensed treatment volume/ Other waste: Increase treatment of waste with high treatment unit price
	• Business expansion in Southeast Asia	• Increase waste treatment through expansion of sites expansion and enhancement of treatment menu
	• Changing global waste treatment trends	• Expand business with waste treatment and recycling at core
Nonferrous Metals	• Stable raw material procurement	• Start operations in Los Gatos/ Increase collection of recycling materials
	• Increase of impurities in materials	• Strengthen impurities separation processes at Akita Zinc
Electronics Materials	• Improvement of profitability	• Develop and expand sales of new products using core technologies
	• Early commercialization of new products	• Concentrate management resources on products approaching commercialization stage
Metal processing	• Steadily capturing growing demand	• Expand sites in areas with demand, both in Japan and overseas
Heat Treatment	• Ensuring production capacity to meet demand	• Make timely capital investment at key sites
Company-wide	• Cost reductions	• Promote cost-cutting measures

Respond flexibly to various environmental changes based on measures incorporated in Midterm Plan 2020.

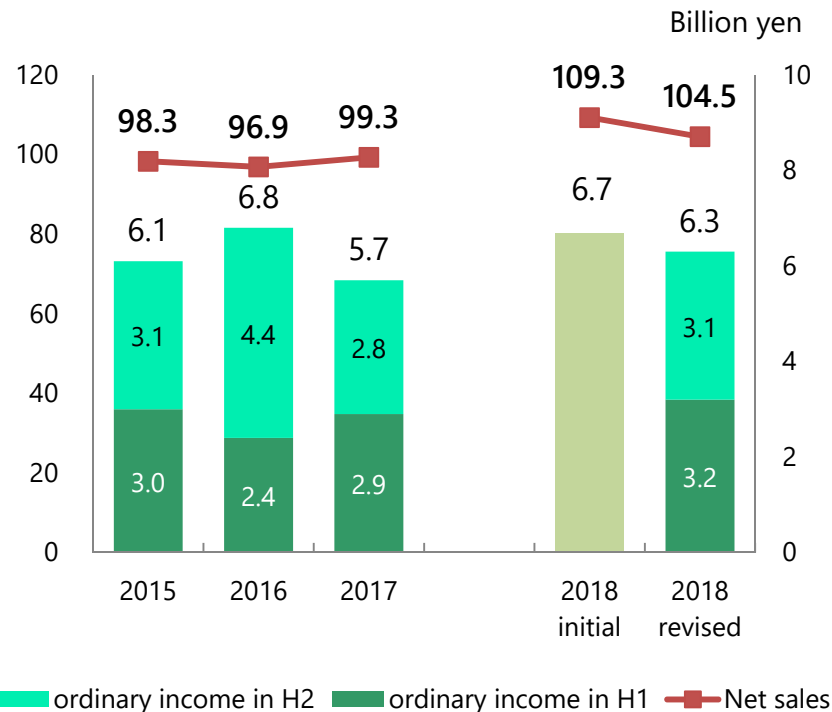
Progress of Key Measures in Each Segment

Environmental Management & Recycling (1) Overview of FY2018

Business Environment

- Waste: Waste emissions in Japan were steady.
In Southeast Asia, large projects came to an end and waste emissions held firm, especially in manufacturing industry.
- Materials: The collection environment improved.

Net Sales & Ordinary Income



《Major Product Trends》

(FY2017 H1 = 100)

	FY2017		FY2018	
	H1	H2	H1	H2
Intermediated Waste Treatment Volume in Japan	100	95	99	100
Waste Treatment Amount in Southeast Asia	100	96	101	95
Recycling Materials Collection Volume (To Kosaka)	100	105	125	120

Overview of Second Half of FY2018

- Collection and treatment volumes of complex hazardous waste increase.
- Although treatment volume of low-contaminated PCB waste increases, treatment unit price falls.
- Overseas collection volumes of metal recycling materials increase.
- Treatment volumes of automobile shredder residues (ASR) and waste household electrical appliances increase in Japan.

Environmental Management & Recycling (2) Progress of Key Measure

Expansion of low-contaminated PCB waste treatment volume

Statutory deadline for disposal: March 2027
Growth in emissions is modest compared to estimated stock.

Promote expansion of licensed treatment volume of existing sites

Okayama site (July 2018)

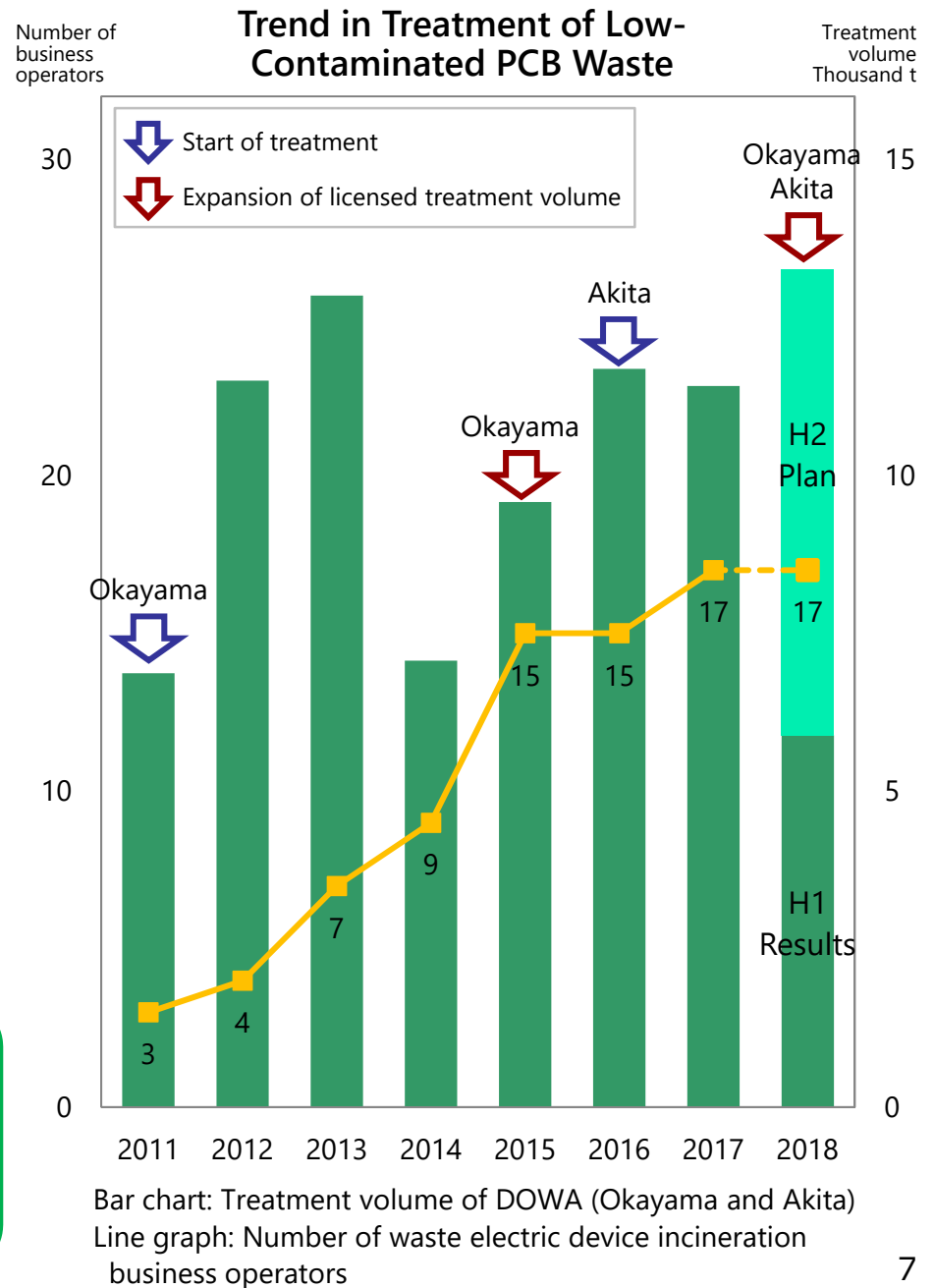
Expanded insulating oil treatment capacity (4.3→107.5t/day)
Acquired license for existing incinerator, enabled treatment using multiple incinerators.

Akita site (October 2018)

Expanded waste electric device treatment capacity (15→30t/day)

Strengthened ability to deal with large equipment,
Improved convenience for customers

→ Try to increase collection volumes from a wide range of customers.



Environmental Management & Recycling (3) Progress of Key Measure

Organic Cooperation in Domestic Business

A sustainable recycling-based society is being formed
→ Growing needs for resource recycling from waste and recycling.

Increase resource recovery from waste and recovery of valuable material through expansion of melting treatment and increased cooperation between Group companies.

■ Melting Treatment

Incinerated ash is recycled into construction materials and any metals contained in ash is separated and recovered and used as smelting raw materials.

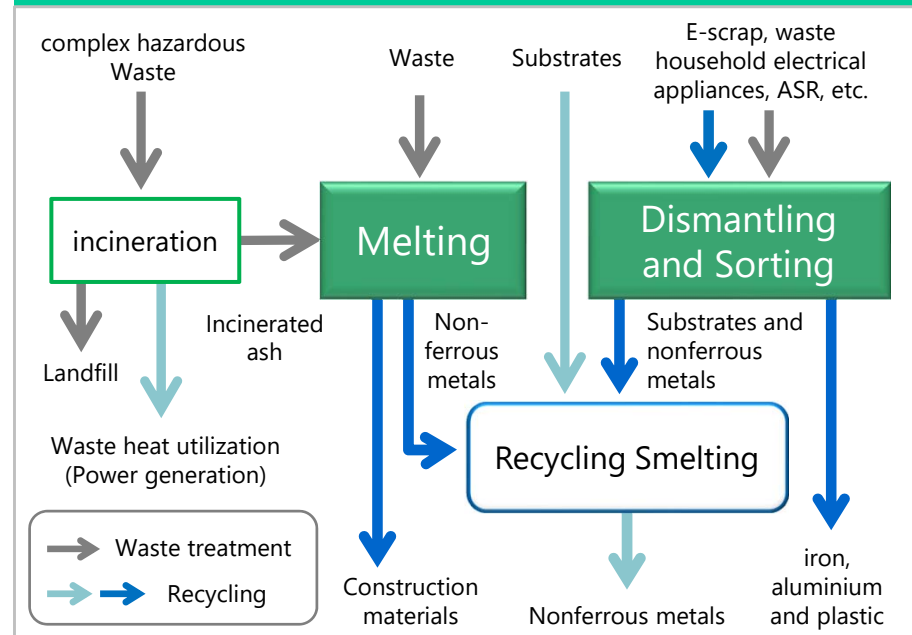
⇒ Completed establishment of two-site network and doubling of treatment capacity to promote expansion of collection volume.

■ Dismantling and Sorting

Expand items accepted by strengthening pre-treatment processes, and expand generation of smelting raw materials by strengthening sorting.

For iron, aluminum and plastic, promote refinement of sorting and seek to strengthen recovery and improve value as resources.

Scheme for Resource Recovery from Waste and Recycling

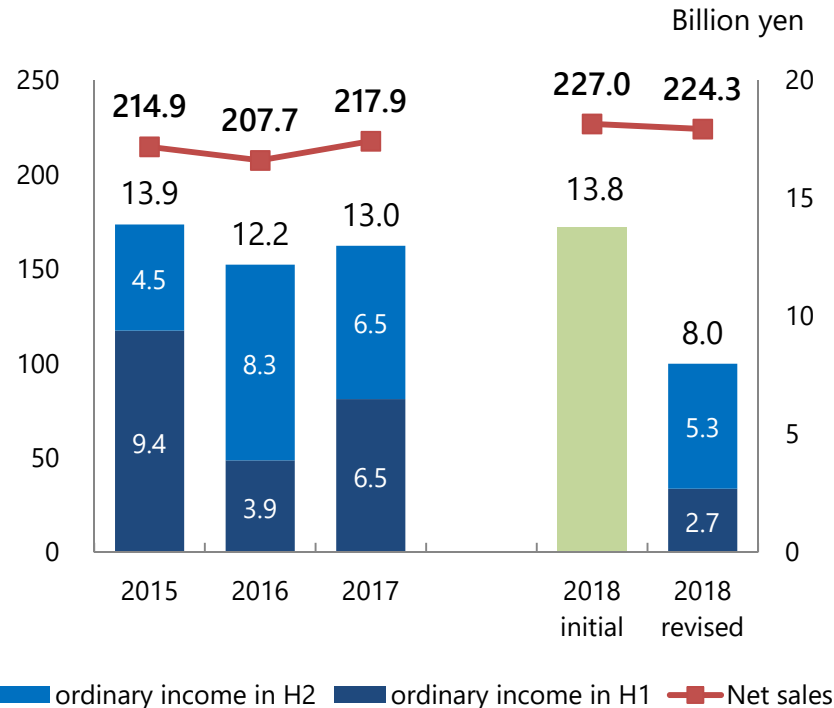


Nonferrous Metals (1) Overview of FY2018

Business Environment

- Prices for both base metals and precious metals were weaker on trade tensions.
- Demand for ingots was generally firm.

Net Sales & Ordinary Income



《Major Product Trends》

(FY2017 H1 = 100)

	FY2017		FY2018	
	H1	H2	H1	H2
Copper Production (Kosaka・Onahama)	100	85	84	92
Gold Production (Kosaka)	100	106	112	115
Zinc Production (Akita)	100	118	104	118

Overview of Second Half of FY2018

- Free metal income from major products such as zinc will decrease due to falling metal prices.
- Profits from own mines overseas will similarly decrease.
- Promote increased recovery of tin, which is a byproduct metal, and expansion of collections of zinc recycling raw materials.

Nonferrous Metals (2) Progress of Key Measure

Expansion of Zinc Business

Procurement of raw materials

Increase percentage procured from own mines to achieve stable procurement of concentrates.

Expand collections of recycling raw materials such as EAF dust.

Increased zinc production

Started work to strengthen processes for separation of impurities from raw materials at Akita Zinc and a recycling pre-treatment site.

→ Expand zinc production capacity to 220,000/year (FY2020)

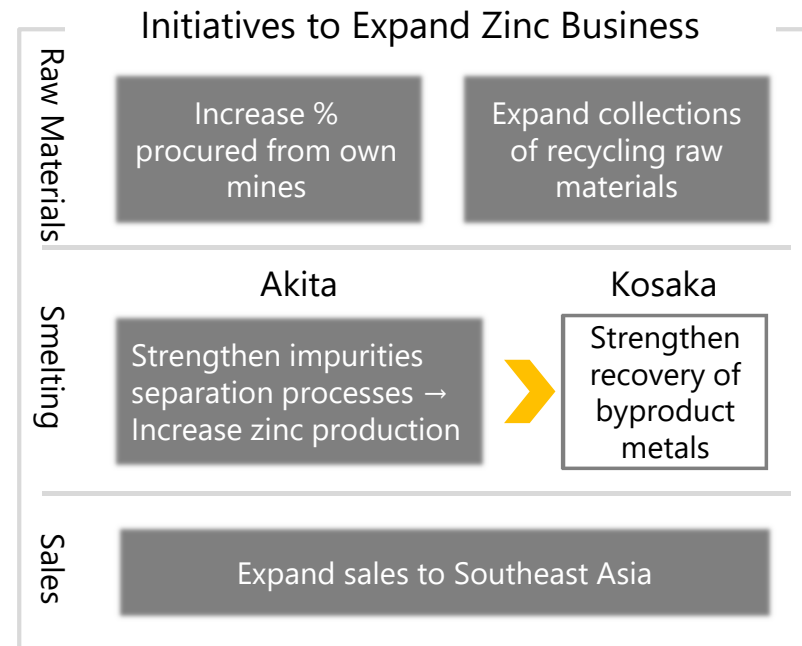
Expansion of sales to growing markets

Expanded production capacity of Thailand processing site

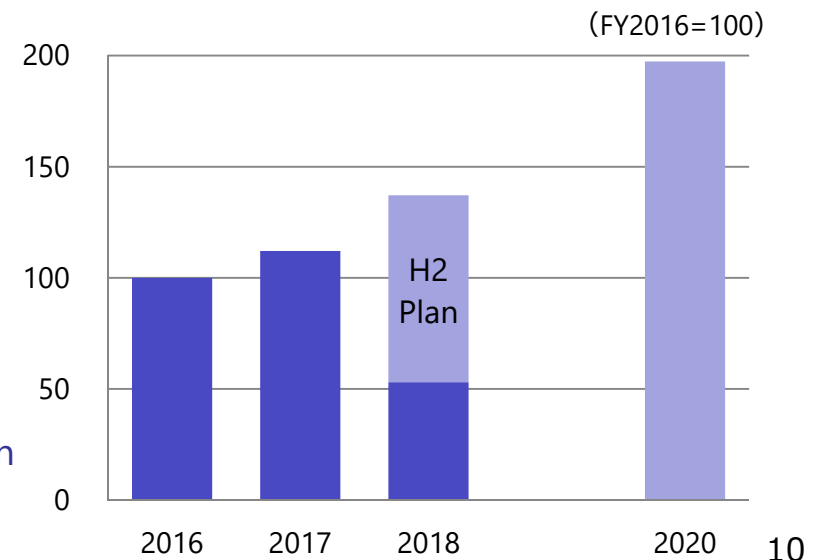
FY2018: Completed expansion to 22,000t/ year,

Started administrative procedures for expansion to 30,000t/ year in FY2019 H2

Expand sales for hot-dip galvanizing for automobile parts in Southeast Asia.



Sales Volume of Thailand Processing Site



Nonferrous Metals (3) Progress of Key Measure

Promotion of Resource Development

Los Gatos Silver-Zinc-Lead project (Mexico)

Construction progressing according to schedule.

FY2019

- Q2: Plan to start production of concentrates
- H2: Plan to start treatment at Akita Zinc

Increase percentage of procurement from own mines (20%→40%)
Stable procurement of high content zinc and silver concentrates



Los Gatos Project-Status of Construction

Palmer Zinc and Copper Project (Alaska)

FY2018: Promotion of prospecting activities

- Ore reserve: Increase from 8 million t to 10 million t
- Further expansion of prospecting area, construction of road to planned site of pit mouth and incidental facilities

From FY2021: Aim to start F/S



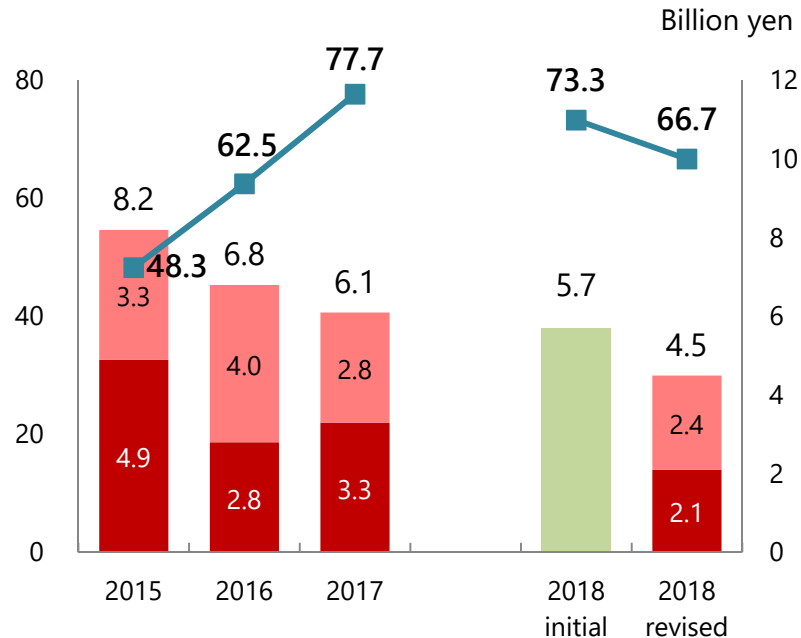
Palmer Project

Electronics Materials (1) Overview of FY2018

Business Environment

- Demand for LEDs for proximity sensors decreased.
- Solar panel market is currently in adjustment phase and is expected to start growing again from FY2019.

Net Sales & Ordinary Income



■ ordinary income in H2 ■ ordinary income in H1 — Net sales

《Major Product Trends》

(FY2017 H1 = 100)

	FY2017		FY2018	
	H1	H2	H1	H2
LED Sales Volume	100	111	101	76
Silver Powder Sales Volume	100	91	80	85
Income from new products (e.g. evaluation sample incomes)	100	148	152	179

Overview of Second Half of FY2018

- Demand for silver powder is expected to recover from the second half as inventory adjustments come to an end and the production ratio of new solar panels increases.
- Focus on sales expansion of new products such as Deep Ultraviolet LEDs, Short-wavelength-infrared LEDs and Conductive atomized powder.

Electronics Materials (2) Progress of Key Measure

Sales Expansion of Silver Powder for New Solar Panels

The reduction in subsidies for solar panels in China will have a greater impact on the conventional type of panels than the new type.

→ New solar panels have greater power output per unit area and the shift to the new solar panels is expected to further accelerate in the future.

Development and sales expansion of optimal silver powder for new panels.

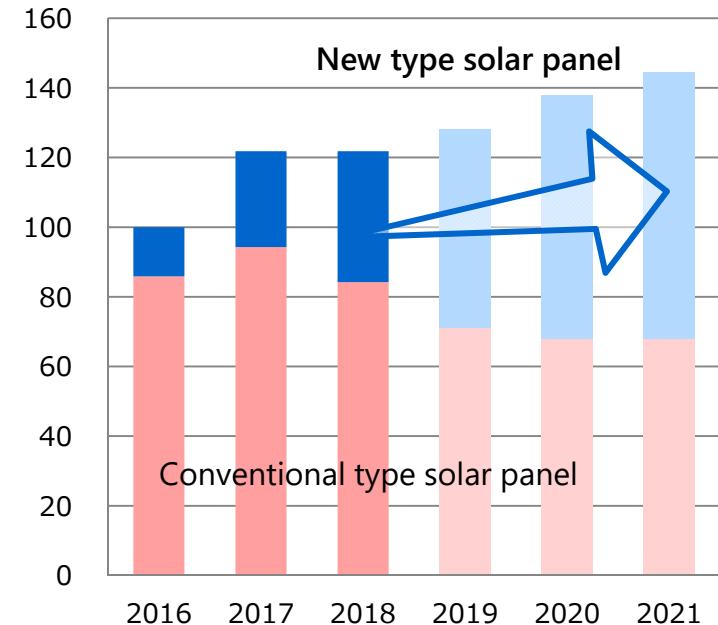
→ Control characteristics such as powder particle size, shape and size distribution to realize high conductivity retention and finer electrical wiring.

Sales Expansion of Fuel Cell Materials

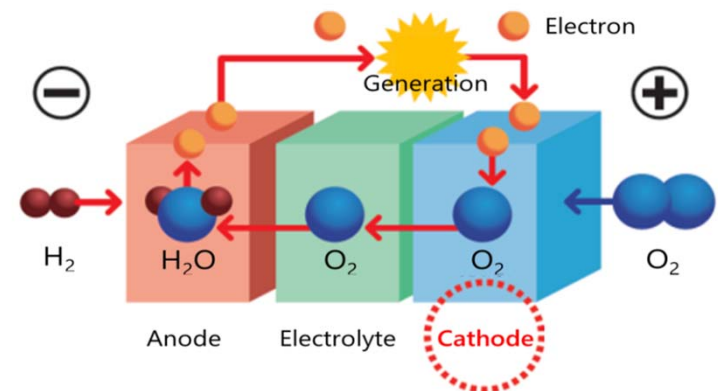
Obtained approval and started mass production in second half of FY2017.

Plan to further increase volume by expanding customers in FY2018.

Crystalline Silicon Solar Panels Installed Worldwide



Fuel Battery Mechanism and Role of Our Products



Material for cathode that ionizes oxygen required to generate power

Electronics Materials (3) Progress of Key Measure

Sales Expansion of Conductive Atomized Powder

Telecommunications Sector

Advances in IoT, construction of base stations for 5G, and development of multifunctional terminals with higher processing speeds are picking up pace.

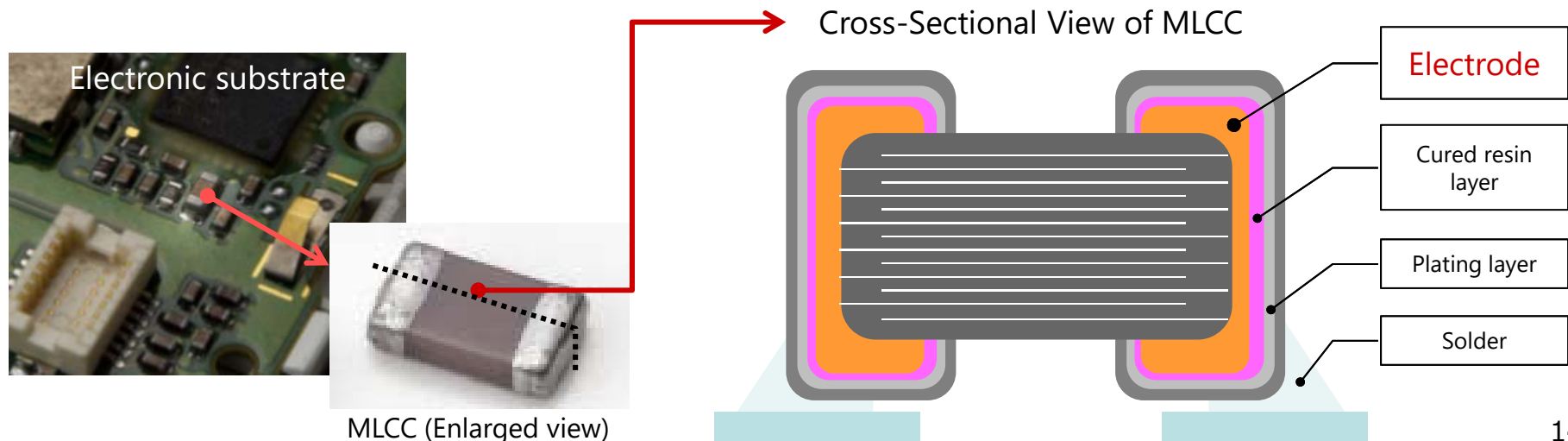
- Number of electronic components used per device/terminal is increasing.
- Electronic components are being downsized and property requirements of materials for electrodes are becoming more sophisticated.

Conductive atomized powder for electrodes

Use proprietary technology to realize both micronization and high conductivity

→ Acquire customer approval, start mass production, and aim for profitability by FY2020.

■ Example of Use of Multilayered Ceramic Chip Capacitor (MLCC)

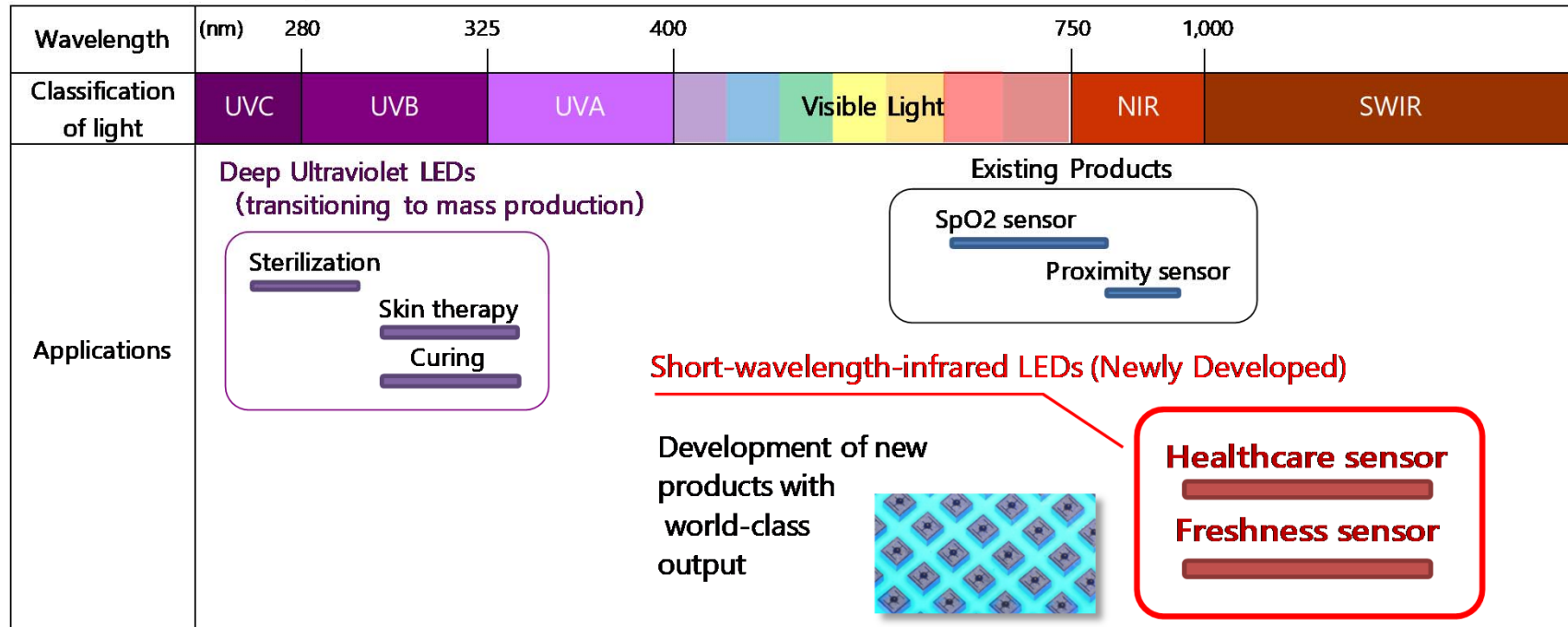


Electronics Materials (4) Progress of Key Measure

Development of New LEDs for Expansion of Applications

Use technology for precisely controlling wave lengths to promote development of new LEDs in wavelength regions where there are technology seeds and needs.

Our LED Product Lineup



Applications for Short-wavelength Infrared LEDs

Measurement of blood glucose levels without the need to take blood through a wearable device

Simple and immediate measurement of produce freshness

→ Start sample shipments, and aim for commercialization by FY2020.

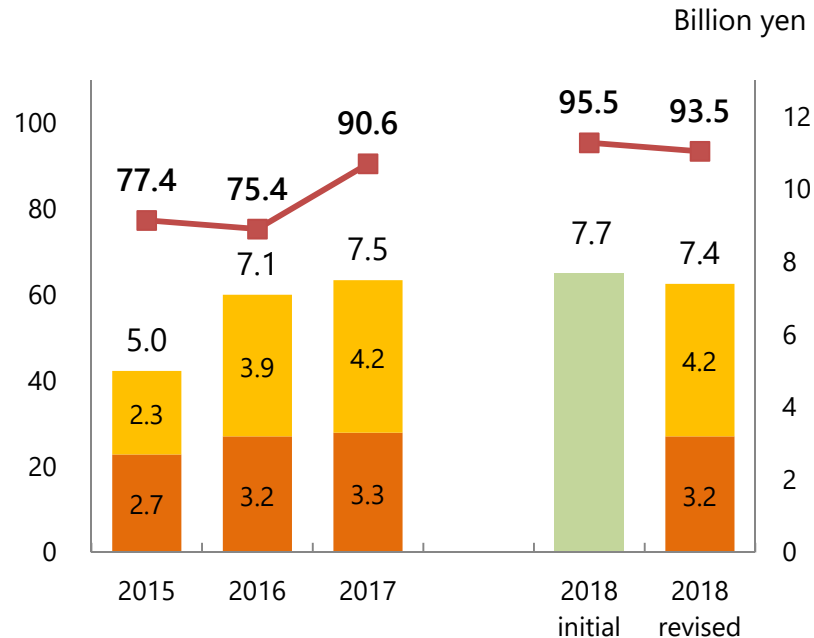


Metal Processing (1) Overview of FY2018

Business Environment

- Demand for major products expanded due to development of electrified, intelligent automobiles and advances in IoT.
- Growth in demand for smartphone-related products slowed.

Net Sales & Ordinary Income



■ ordinary income in H2 ■ ordinary income in H1 — Net sales

《Major Product Trends》

(FY2017 H1 = 100)

	FY2017		FY2018	
	H1	H2	H1	H2
Copper Alloy Sales Volume (For Automobile)	100	106	102	110
Copper Alloy Sales Volume (For IoT devices)	100	101	104	105

Overview of Second Half of FY2018

- Demand remains firm especially for products for automobiles, and production remains at a high level.
- Make capital investments to expand production capacity at major sites to better meet strong demand.

Metal Processing (2) Progress of Key Measure

Strengthening of Copper Rolled Products Business in China

Changes in market for copper rolled products for automobiles

Increase in electronic parts due to spread of EVs and HVs and advances in IoT

→ Increase in amount of copper rolled products used per vehicle

Increase in consumers' vehicle safety awareness

→ Demand for tin plated copper rolled parts for automotive connectors will continue to increase in the future because tin plating improves corrosion resistance.

In China, demand for local procurement of automotive parts is growing due to growing domestic demand.



Copper rolled product being tin plated

■ Establishment of new site

Established new copper rolled products tin plating site in Nantong, and plan to start operations at site from October 2019.

Second largest processing site in China after site in Shanghai.

→ Try to expand sales in Chinese market where demand is growing.



Metal Processing (3) Progress of Key Measure

Sales Expansion of Metal-Ceramics Substrates

Expand sales of products for rail, EVs and HVs

Together with demand for power modules used in industrial equipment and wind and solar power, the market for power modules for rail, EVs and HVs is expanding.



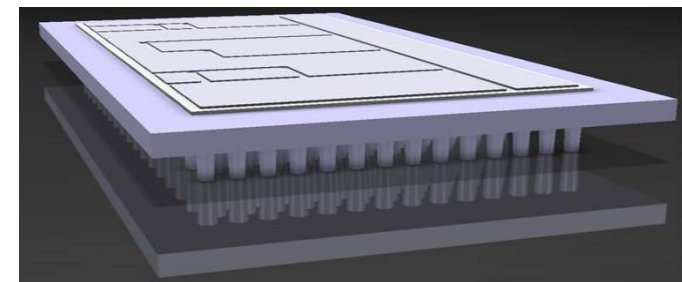
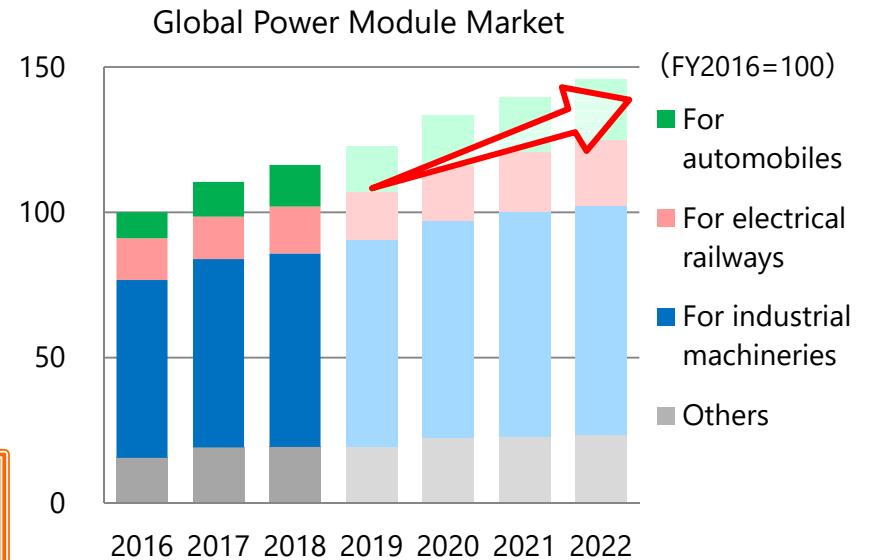
Property requirements of substrates for power modules are increasing (compact and lightweight design, superior reliability and heat dissipation)

→ Development and mass-production of metal-ceramics substrates

Use in products for EVs and HVs overseas is increasing

Expand production facilities to meet further demand growth (construction of 1st stage production line is complete)

→ Carry out gradual expansion according to demand, and expand production capacity to more than 3 times current capacity in several years from now



Integrated Metal-Ceramics Substrates



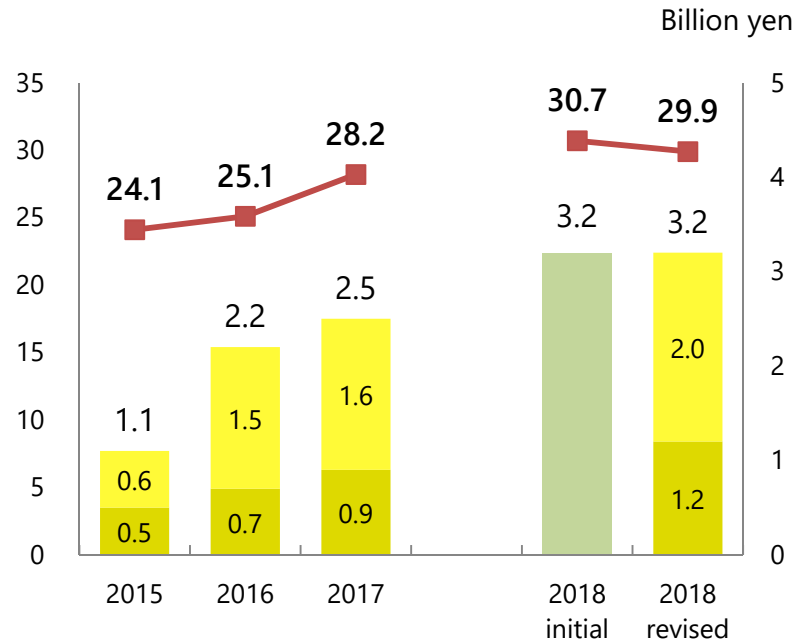
DOWA Power Device where expansion of production facilities is underway

Heat Treatment (1) Overview of FY2018

Business Environment

- Global automobile production continued to show modest growth, driven by India and Southeast Asia.
- Demand for heat treatment increased due to the global spread and expansion of automatic transmission vehicles with many parts.

Net Sales & Ordinary Income



ordinary income in H2
 ordinary income in H1
 Net sales

《Major Product Trends》

(FY2017 H1 = 100)

	FY2017		FY2018	
	H1	H2	H1	H2
Heat Treatment Sales Amount	100	111	111	115
Industrial Furnaces Sales Amount	100	127	104	145

Overview of Second Half of FY2018

- For both heat treatment and industrial furnaces, demand is firm, underpinned by firm automobile production.
- Implement business expansion measures overseas, where demand for local procurement of heat treatment will grow future.

Heat Treatment (2) Progress of Key Measure

Expansion of Heat Treatment Business Overseas

Production sites of automakers and auto parts makers are shifting overseas.

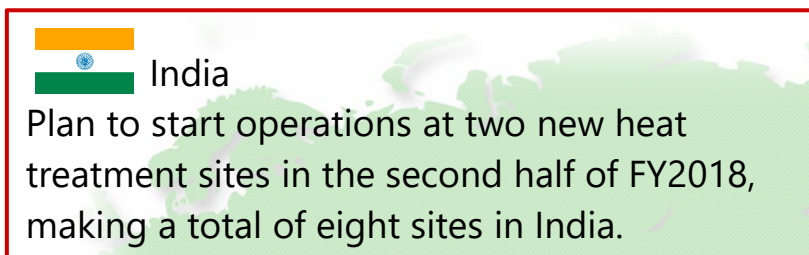
Business Model


- Expand heat treatment and equipment sales and maintenance business
- Network of 13 sites across 6 countries

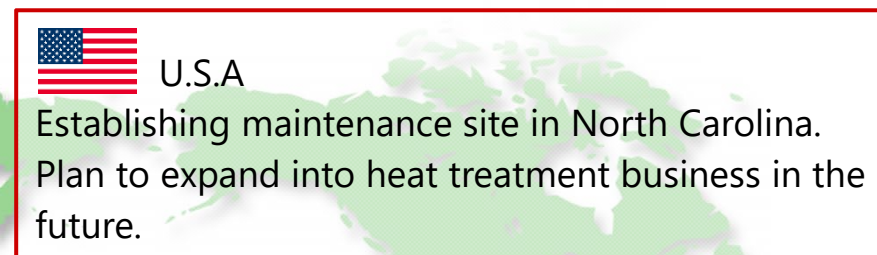
Strengthen overseas business through both reinforcement of existing business and expansion of new business


Measures to expand business

● Existing site ● Existing site to be strengthened ● New site



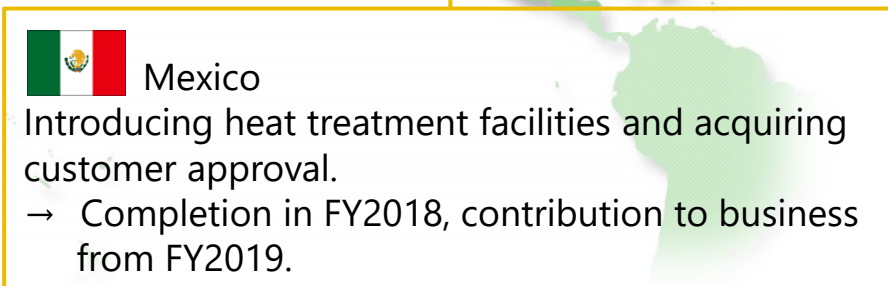
 India
Plan to start operations at two new heat treatment sites in the second half of FY2018, making a total of eight sites in India.




 U.S.A
Establishing maintenance site in North Carolina. Plan to expand into heat treatment business in the future.



 China
Expand heat treatment facilities to meet growing demand in the local market.



 Mexico
Introducing heat treatment facilities and acquiring customer approval.
→ Completion in FY2018, contribution to business from FY2019.

DOWA

* Forward-looking statements made in this document, such as business forecast, are based on the information available at this time and on certain premises that the Company assumes to be reasonable. Actual performance may differ materially from such forecasts due to a variety of factors.