

FY2019 1st Half Results

(from April 1, 2019 to September 30, 2019)

November 1, 2019



NGK INSULATORS, LTD.



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SINCE
100
YEARS

This is a translation of materials used for the analyst meeting held in Tokyo, Japan on November 1, 2019

This document contains forward-looking statements that are based on management's expectations, estimates, projection and assumptions that were available and reasonable at the time of release. Actual future results and trends may differ materially from those in the forecasts due to a variety of factors.

President
Taku Oshima

Agenda

Summary of financial results for FY2019 1st Half

(Ended September 30, 2019)

Forecast for FY2019

(Ending March 31, 2020)

Segment Information

Capital Expenditures & Depreciation Costs & R&D

Medium-term Plan (ROIC・Business Performance)

Financial Condition

(Capital Policy ・Cash Flow・Assets&Dividend)

	(¥ Bil.)	FY2018 1 st half	FY2019 1 st half		Growth ratio	
			April announcement		FX	
Net Sales		228.2	230.0	219.8	-3.2	−4%
Operating Income		35.7	27.0	31.6	-0.5	−11%
Ordinary Income		34.2	25.0	29.7		−13%
Profit Attributable to Owners of Parent		24.7	17.0	21.2		−14%
Exchange Rate	USD	¥110	(¥110)	¥109	−¥1	
	EUR	¥130	(¥125)	¥121	−¥9	

YOY (Year-Over-Year) change: Decrease in sales and income

- Power Sales of insulators decreased due to a decrease in sales volume caused by the dissolution of a Chinese manufacturing subsidiary.
- Ceramics Tightened emission regulations led to an increase in GPF (Gasoline Particulate Filters) along with an increase in sales and income.
- Electronics Sales decreased as a result of poor performance by Soshin Electric due to worsening market conditions. Income were roughly same as the last year.
- Process Technology Sales and income decreased due to a decrease in demand for products for semiconductor manufacturing equipment.
- Extraordinary Losses The deficit in the package business continues, with 1.4 billion yen of fixed asset impairment loss recorded.

Forecasts for FY 2019

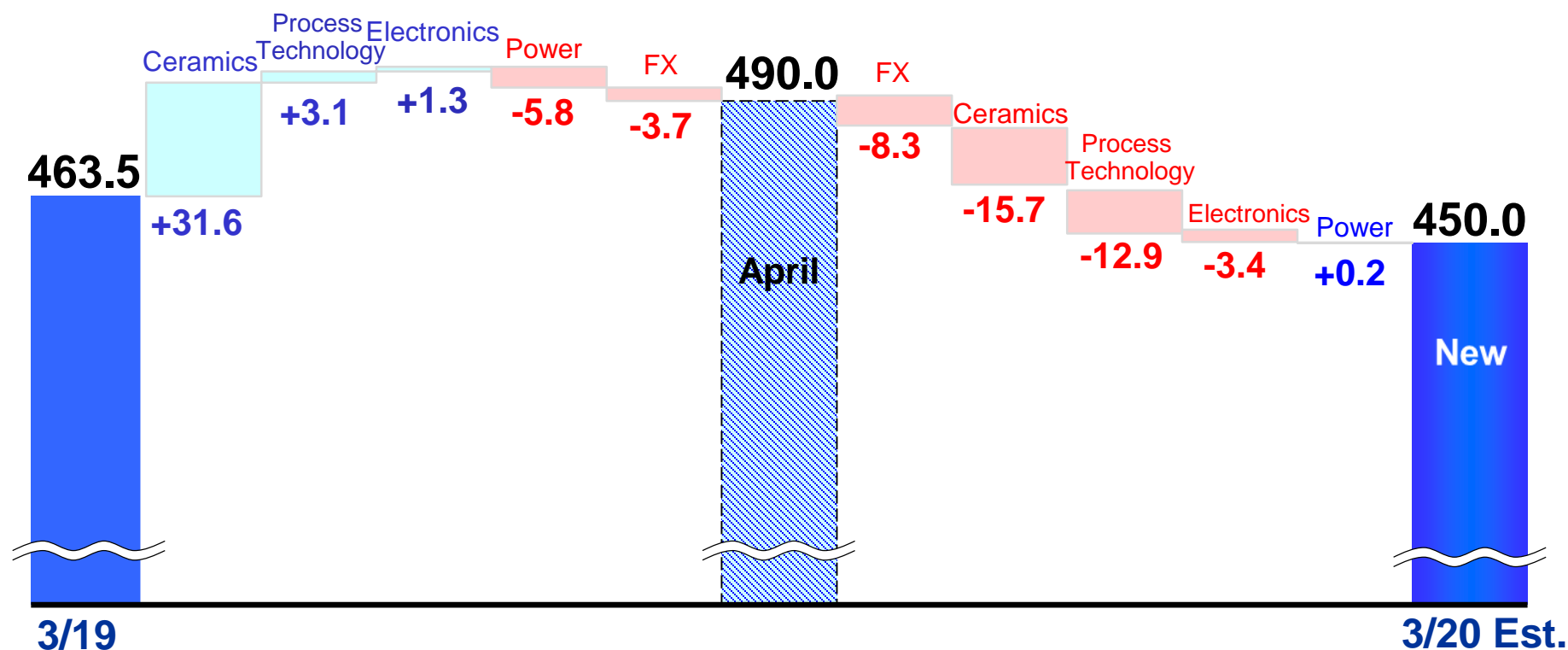
	(¥ Bil.)	FY2018	FY2019		Growth ratio
			April announcement		FX
Net Sales		463.5	490.0	450.0	-11.7 -3%
Operating Income		64.7	70.0	60.0	-2.7 -7%
Ordinary Income		64.4	71.0	60.0	-7%
Profit Attributable to Owners of Parent	Extraordinary Losses ¥14.8Bil.	35.5	47.0	42.0	+18%
Exchange Rate	USD	¥111	(¥110)	¥107	-¥4
	EUR	¥128	(¥125)	¥118	-¥10

YOY decrease in sales and income, increase in net profit.
Expected to fall significantly below April announcement.

- Power Sluggish demand for both insulators and NAS. A deficit reduction is expected due to cost reductions, etc.
- Ceramics Increased sales compared to the previous year as demand for GPF increased, but overall significantly lower than expected due to factors such as a decrease in passenger car sales. Income are expected to increase to the previous year.
- Electronics Income are expected to increase slightly to the previous year due to a slow market recovery caused by the US and China trade war.
- Process Technology YOY decline in sales and income due to continued adjustments made in capital expenditures for semiconductor equipment. The recovery of demand are expected to be delayed compared with previous forecast though recent signs of investment resumption.

Change Analysis: Sales

(¥ Bil.)



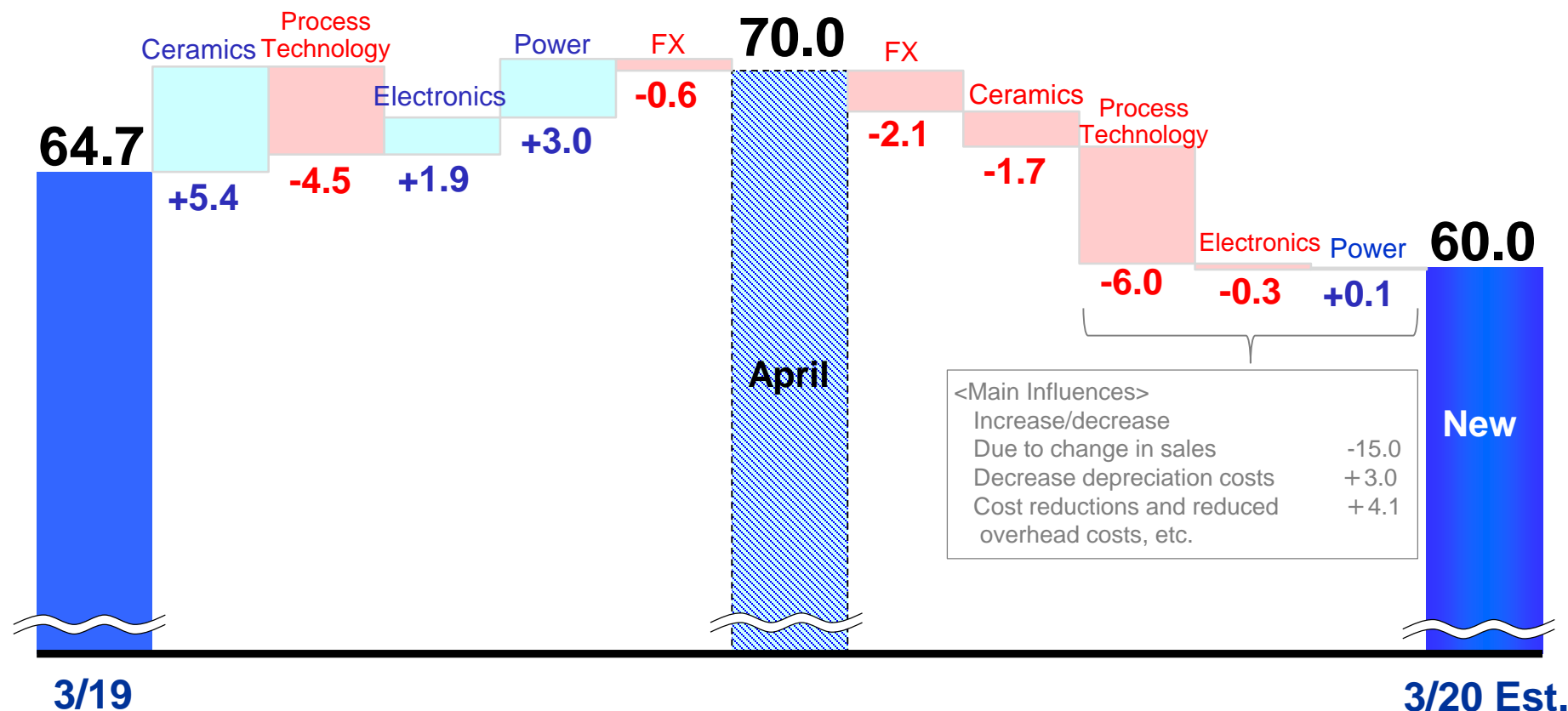
FX Rate 3/19
¥111/USD
¥128/EUR

April(3/20 Est.)
¥110/USD
¥125/EUR

New(3/20 Est.)
¥107/USD
¥118/EUR

Change Analysis: Operating Income

(¥ Bil.)

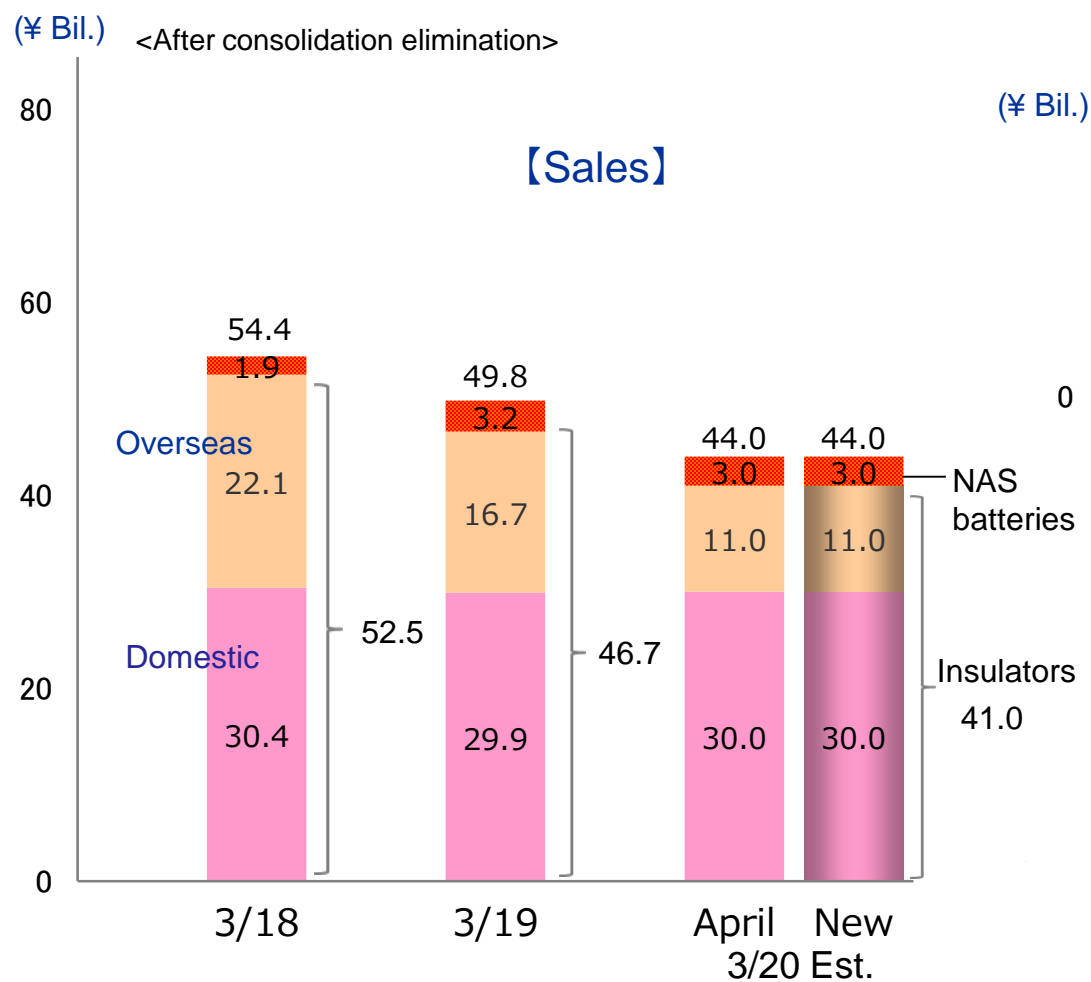


FX Rate 3/19
¥111/USD
¥128/EUR

April(3/20 Est.)
¥110/USD
¥125/EUR

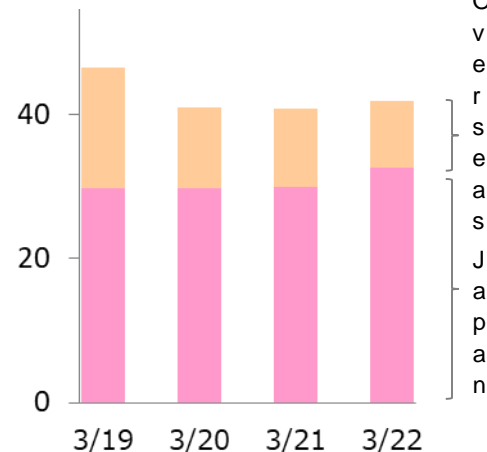
New(3/20 Est.)
¥107/USD
¥118/EUR

- **Insulators**
 - Domestically, electric utility companies will continue to restrain capital investment and demand remains weak. Performance in overseas is as per the April forecast as there have been no significant movements in export sales.
 - With slimming down of overhead costs and removal of some unprofitable products, both sales and income are expected to be at the same level as the April forecast.
- **NAS**
 - There are no changes to poor performance from the April forecast and the deficit is expected to continue.



■ Insulators Demand is forecast to remain sluggish both in Japan and overseas

Sales (¥ Bil.)



○ 【 Market environment 】

Japan : Even after the 2020 separation of electrical power production from power distribution and transmission, the demand for insulators will remain weak due to the restrained investment.

Overseas : North America ... Investment is concentrated around renewable energy and distribution facilities. Demand for the replacement of transmission and substation facilities is sluggish.

Asia ... Development of systems for power distribution in Taiwan and Southeast Asia has run its course.

The Company aims to restore profitability as soon as possible through slimming of overhead costs and improved productivity, etc.

■ NAS® Batteries Delay in rising demand due to changes in market environments both domestically and overseas

【 Market environment 】

Japan : With the separation of electrical power production from power distribution and transmission, adjustment of supply and demand for electricity is likely to shift from a method using storage batteries installed by the power company to a method through the market of supply/demand adjustment.

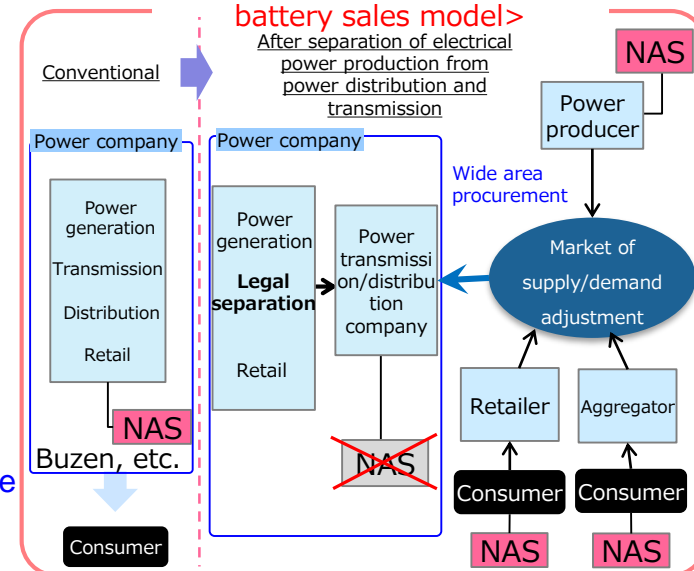
→Full-scale market transaction expected after 2024.

Overseas : Middle East...Due to changes in nuclear power plant operating plans, the need for storage batteries absorbing surplus renewable power has been pushed back.

Europe... The need for storage batteries continues due to rising renewable energy ratios.

In Japan, we will strengthen relationships with business operators with the aim of entering the market of supply/demand adjustment. Overseas, in addition to the Middle East, we will focus on expanding our business mainly around Europe in cooperation with BASF.

<Change in domestic storage battery sales model>



● Electronics Components

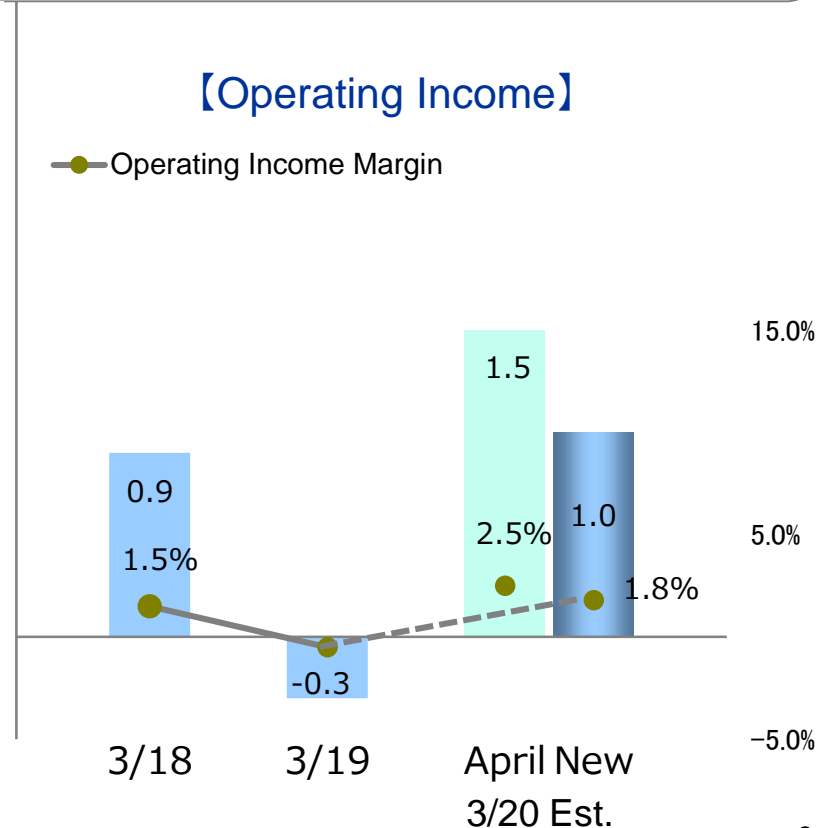
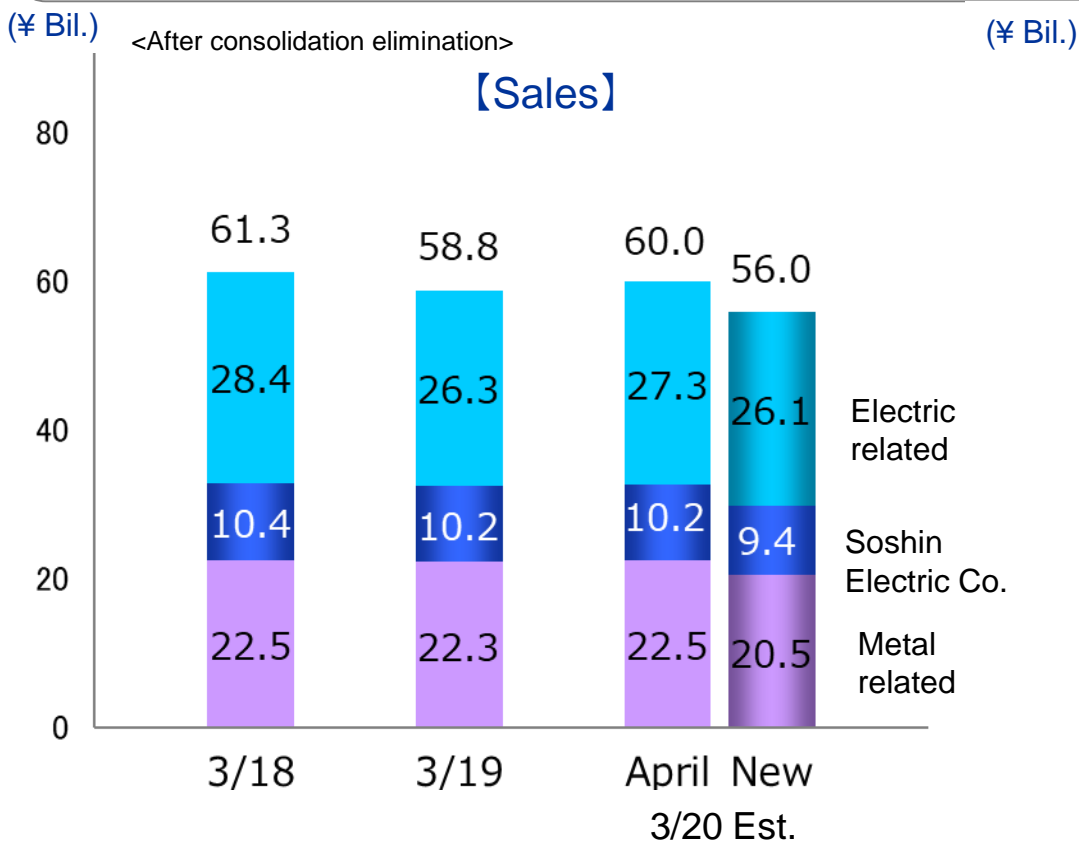
- Increased sales of piezoceramic actuators for HDDs continues.
- Lower sales and income are expected for package products due to a decrease in the sales amount of insulated heat dissipation circuit boards.

● Soshin Electric

- With a backdrop of sluggish market conditions for semiconductor manufacturing equipment and machine tools, decreased sales and a deficit are expected due to a decrease in demand for noise filters.

● Metal Related Products

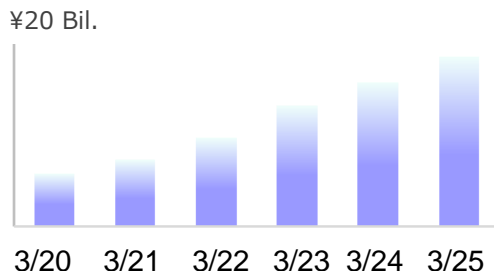
- Due to a slowdown in the global economy, sales and income are expected to decline together with decreased demand for wrought material for automobiles, industrial equipment, and home appliances in each region.



■ Bonded Wafer Products (Electronics Components)

The market for composite wafer products for high-functionality SAW filters with an improved temperature profile and frequency characteristics, fabricated by bonding wafers of differing material through proprietary technology, is forecast to expand with the spread of technologies to accelerate mobile communications.

(Expected sales of Bonded Wafer Products)



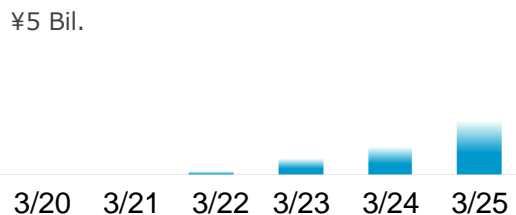
3/20 3/21 3/22 3/23 3/24 3/25

Increasing production capacity in response to increased demand.

■ FGaN Wafer (Electronics Components)

GaN wafers for high-luminance laser projector light sources. With the start of mercury regulations under the Minamata Convention at the end of 2020, demand is expected to gradually increase as an alternative to ultra-high pressure mercury lamps.

(Expected sales of FGaN Wafer)

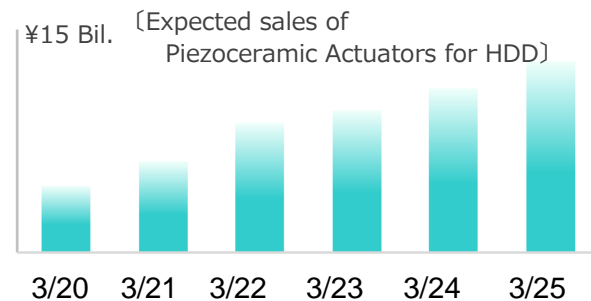
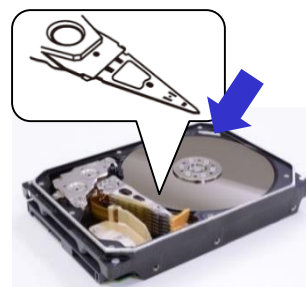


3/20 3/21 3/22 3/23 3/24 3/25

Received the Grand Prize in the electronic materials for semiconductors category at the 25th Semiconductor of the Year Awards 2019 (Electronic Device Industry News). Aim to capture demand by establishing mass production technology for low-defect, high-quality wafers using our patented superior crystal growth method (liquid phase method).

■ Piezoceramic Actuators for HDD(Electronic Components)

A piezoceramic actuators for large-capacity HDDs primarily used in nearline servers for data centers. With the spread of video data, IoT sensing, etc., the amount of data generated will increase dramatically in the future, and so mid- to long-term investment in data centers is expected to expand.

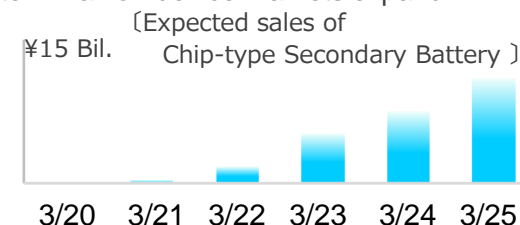


3/20 3/21 3/22 3/23 3/24 3/25

Demand expected to increase due to increases in HDD capacity, increasing production capacity both in Japan and overseas.

■ Chip-type Secondary Battery (EnerCera®) (Electronics Components)

A lithium-ion secondary battery that is small, thin, features a large capacity, and has high heat resistance, with a positive electrode material using crystal-orientation technology. Demand is expected to increase as the smart card and wearable terminal IoT device markets expand.



3/20 3/21 3/22 3/23 3/24 3/25

Won the Grand Prize award in the Device and Technology category at CEATEC held in October 2019. Positive evaluations have continued since receiving the CES Innovation Award in December of last year. Sample shipments are steadily increasing. Promoting the preparation for mass production of pouch-type (for cards) and an expanded coin-type lineup.

● Ceramic for Semiconductor Manufacturing Equipment (SPE-related products)

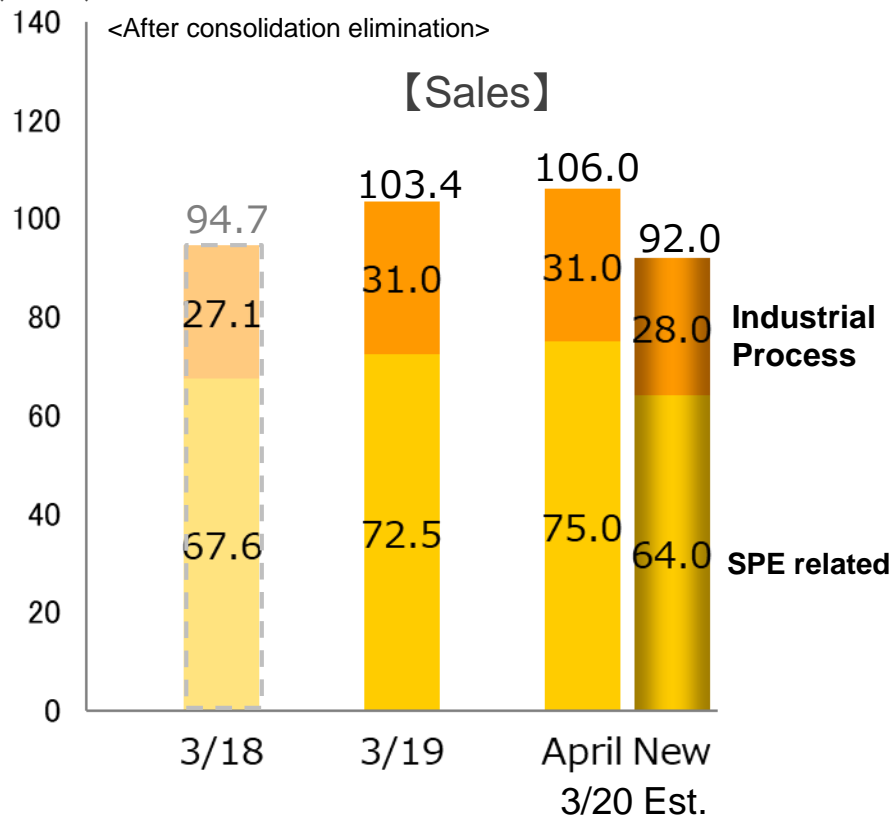
- Capital expenditures for semiconductor equipment turned poor due to a lack of smartphone demand, delayed recovery from investment in data centers, etc.

Although recent signs of resumption of investment such as memory prices stop declining, the demand recovery expected in the April forecast has been delayed, and sales and income are also expected to be lower than previous forecast.

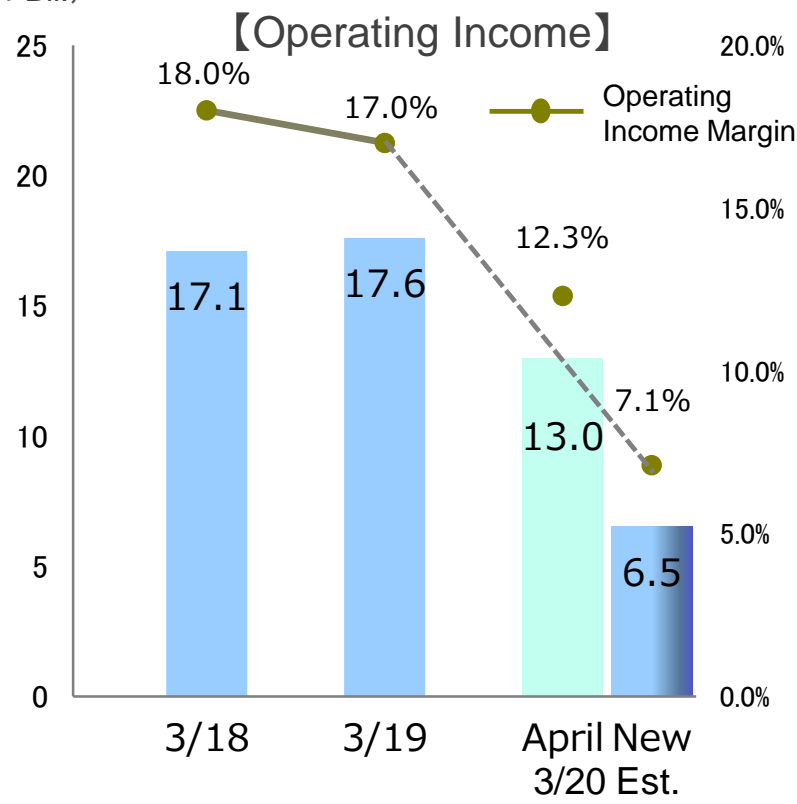
● Industrial processes

- Sales and income centered around heating equipment are expected to decline due to the curbing of capital expenditures by domestic and overseas electronic and electronic material manufacturers, as well as intensified competition regarding combustion furnaces for cathode materials used in lithium-ion batteries.

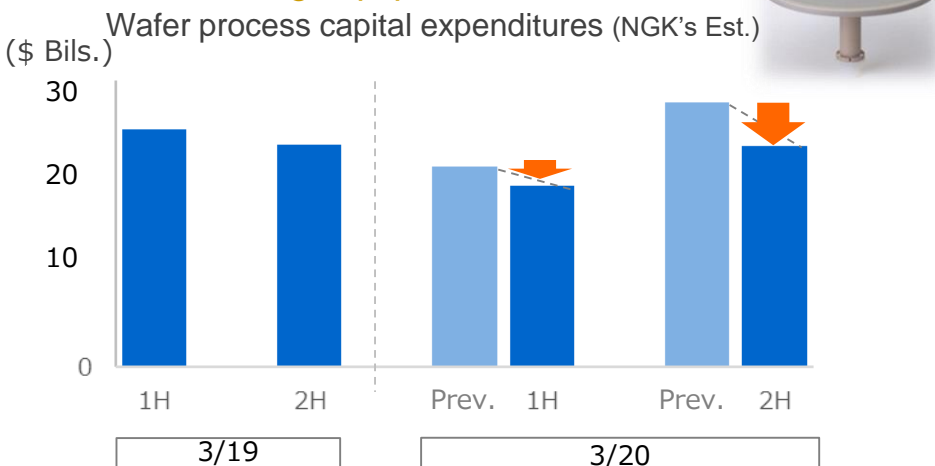
(¥ Bil.)



(¥ Bil.)



■ Ceramics Components for Semiconductor Manufacturing Equipment

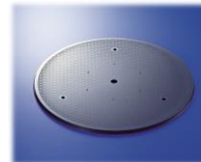


NGK's Ceramics Components for Semiconductor Manufacturing Equipment

Susceptors



Heater (AlN)



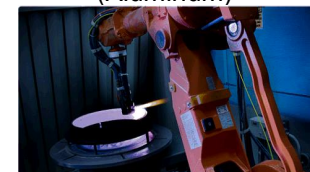
Electrostatic chuck (Alumina, AlN)

(Japan)

Chamber components



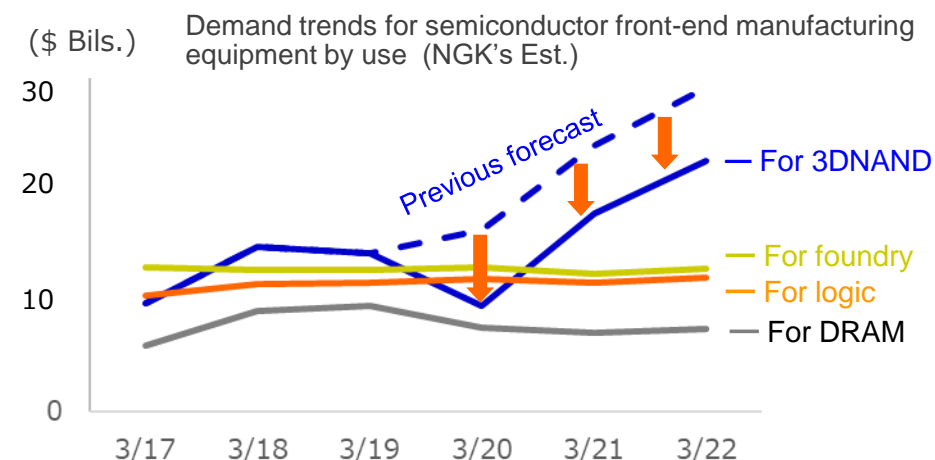
Chamber Components (Aluminum)



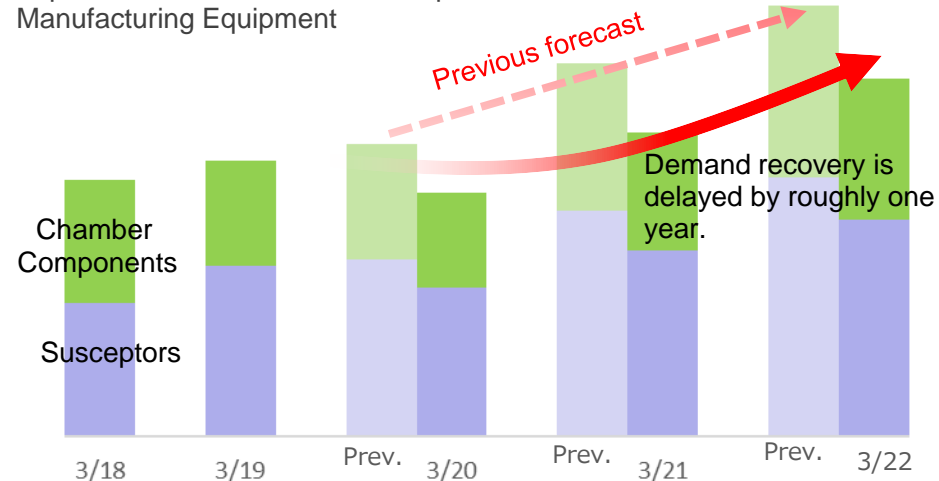
Chamber Components (Aluminum, thermal spraying)

(U.S.)

For the 2nd half of this year, capital expenditures for semiconductor equipment is expected to recover, but the degree of recovery is expected to fall below that of the April forecast.



Expected Sales of Ceramics Components for Semiconductor Manufacturing Equipment



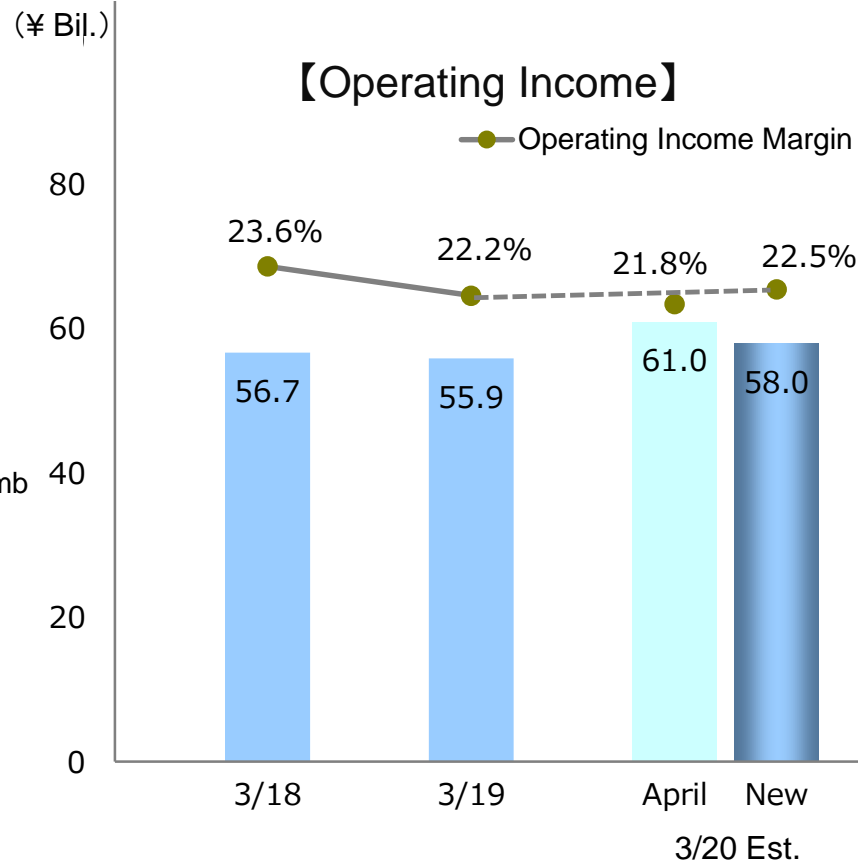
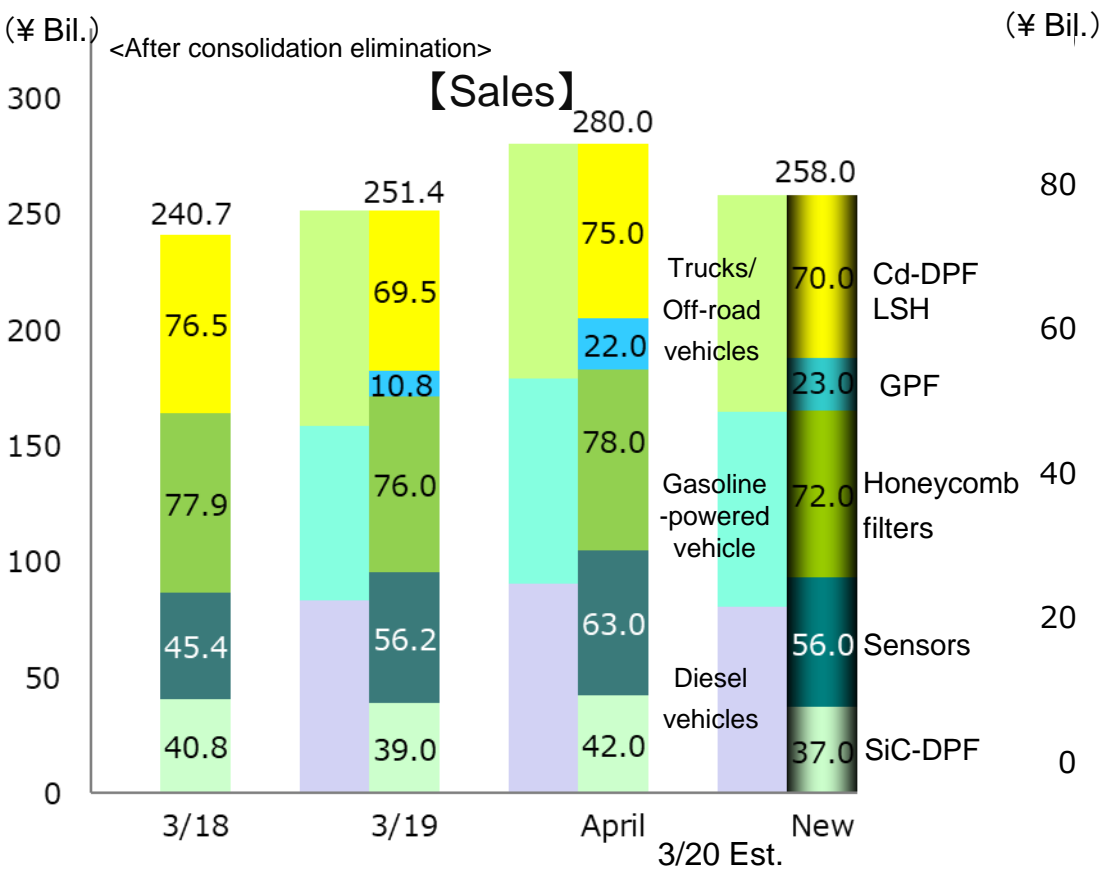
Demand recovery is delayed by roughly one year.

3D-NAND investment will decline significantly in the fiscal year ending March 2020.

There have been no changes to the view that memory-related investments will recover and expand in the mid- to long-term.

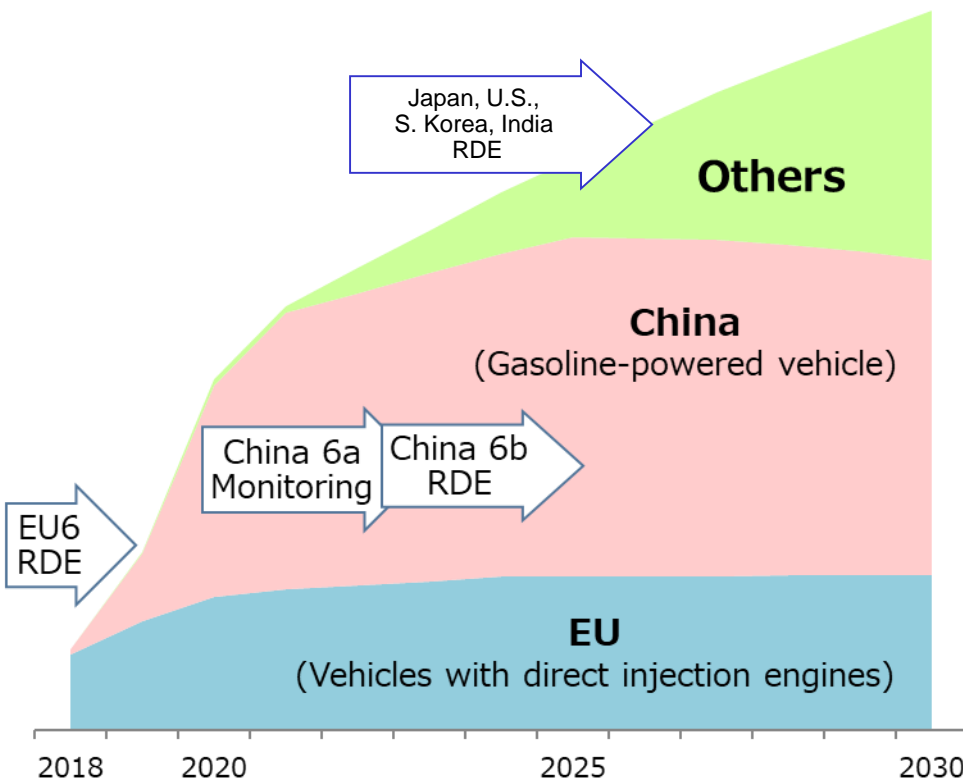
Completed start-up of the new plant in Tajimi City in preparation for demand recovery for memory-related investment / manufacturing equipment from the next fiscal year. The schedule is being reviewed for future investment to increase production in accordance with the recovery situation.

- Automotive-related : Although GPF demand is firm due to tightened emission regulations, the other products demand have weakened significantly compared to the April forecast due to decreased passenger car sales and postponement of tightening emission regulations for trucks. Sales and income are expected to decrease compared to the previous forecast.
- Honeycomb : Demand is expected to decline against the backdrop of reduced passenger car sales in the Chinese and European markets.
- GPF : Despite a decline in passenger car sales in the European market, demand increase due to a higher ratio of gasoline passenger cars in Europe.
- Cd-DPF/LSH : Demand is expected to decrease due to postponement of preceding application of China VI regulations for trucks.
- SiC-DPF/Sensors : In addition to decreased sales of passenger cars in the European market, demand decreased due to a lower ratio of diesel cars. In addition to decreased sales of diesel cars, demand for sensors is expected to decrease due to delay regarding an increase in the total number of sensors installed per vehicle.



Total Demand Forecast of GPF

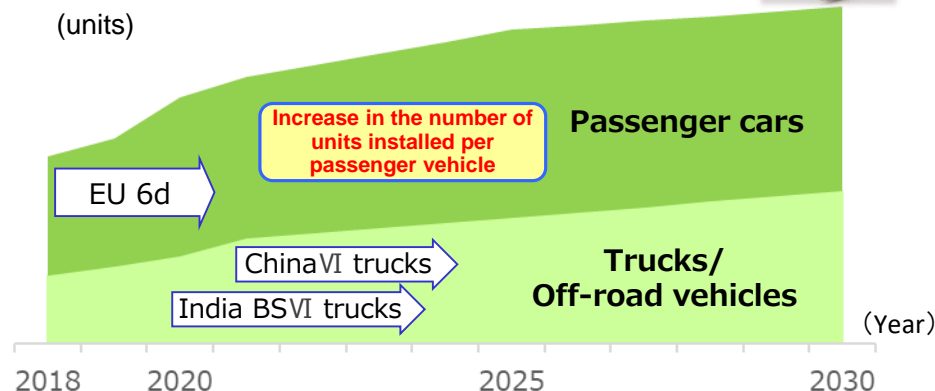
(number of pieces)



In addition Europe, demand will increase rapidly in conjunction (Year) with the tightening emission regulations (country 6a, b) in China. From 2025, demand for GPF in China will gradually decrease due to the promotion of EVs, while emission regulations are becoming more strict in Japan, the US, South Korea, and India, and so overall demand is expected to increase.

Total demand forecast of Sensors

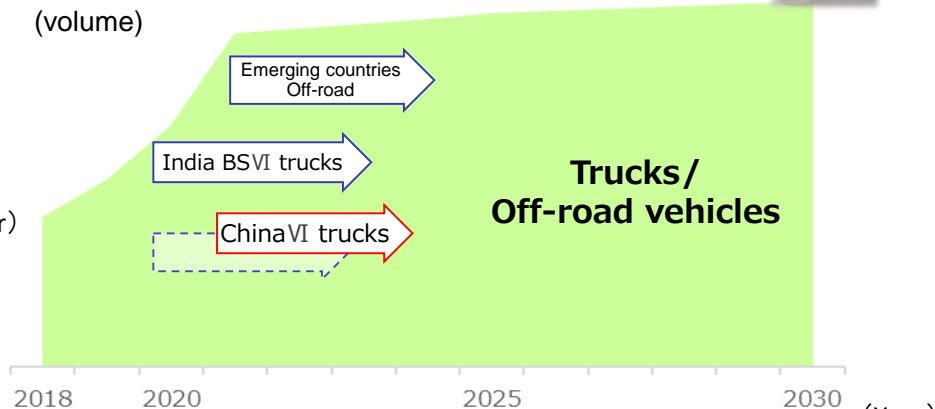
(units)



Although demand for diesel passenger cars will decrease in Europe, mid- to long-term demand is expected to increase due to an increase in the number of sensors installed per passenger vehicle due to stricter emission regulations and an increase in the number of vehicles overall in emerging countries.

Total demand forecast of Cd-DPF

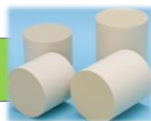
(volume)



Growth in demand will be delayed due to the postponement of the China VI regulations, but demand will increase in India and emerging countries in addition to China in the medium term.

Total Demand Forecast of Honeycomb

(number of pieces)



Decrease due to replacement with GPF

Passenger cars

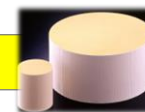
(Year)

2018 2020 2025 2030

Linked with the number of new vehicle sales worldwide. Demand is forecast to decrease after 2025 due to replacement with GPF, but the ratio of thin-walled, high-porosity and high-value-added products is forecast to increase as a result of CO2 emissions regulations and an increase in HVs.

Total demand forecast of LSH

(number of pieces)



Emerging countries Off-road

India BSVI trucks

China VI trucks

Increase in the number of units

Trucks / Off-road vehicles

(Year)

2018 2020 2025 2030

Demand is expected to increase as the number used per truck increases due to stricter regulations.

Total demand forecast of SiC-DPF

(volume)



China VI trucks

India BSVI

Trucks / Off-road vehicles

Diesel Vehicles

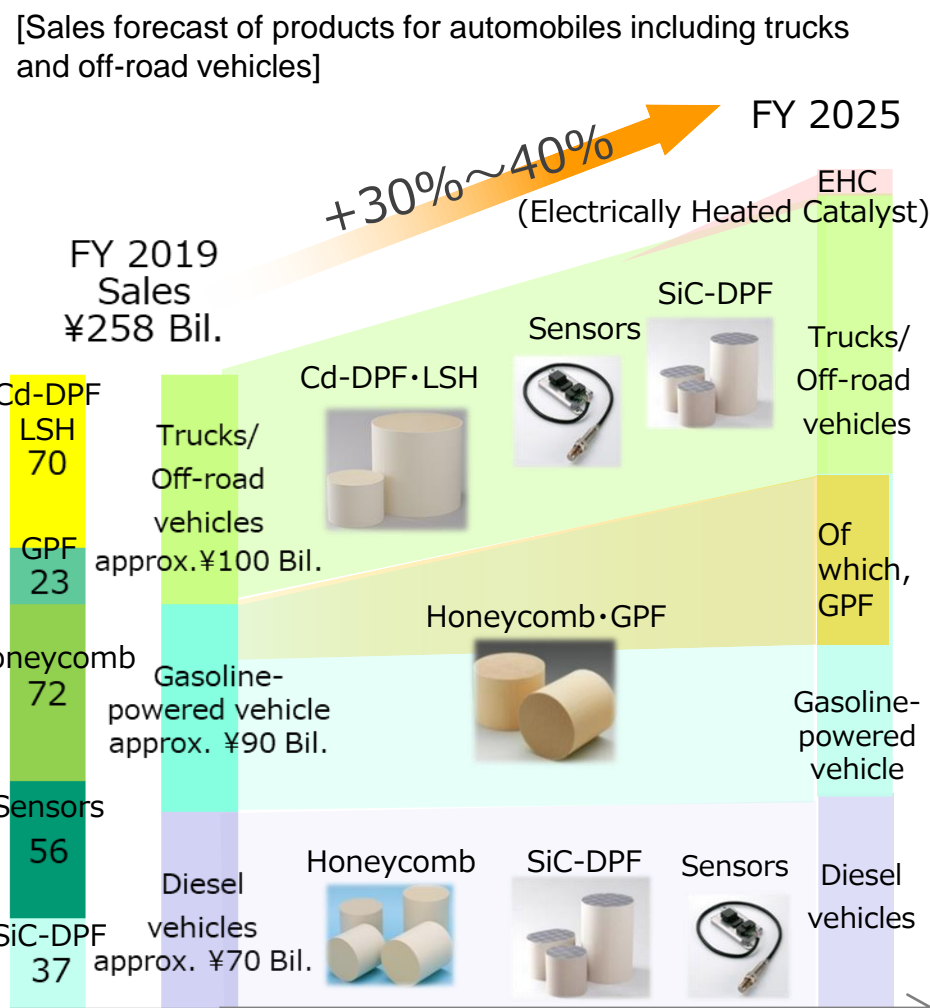
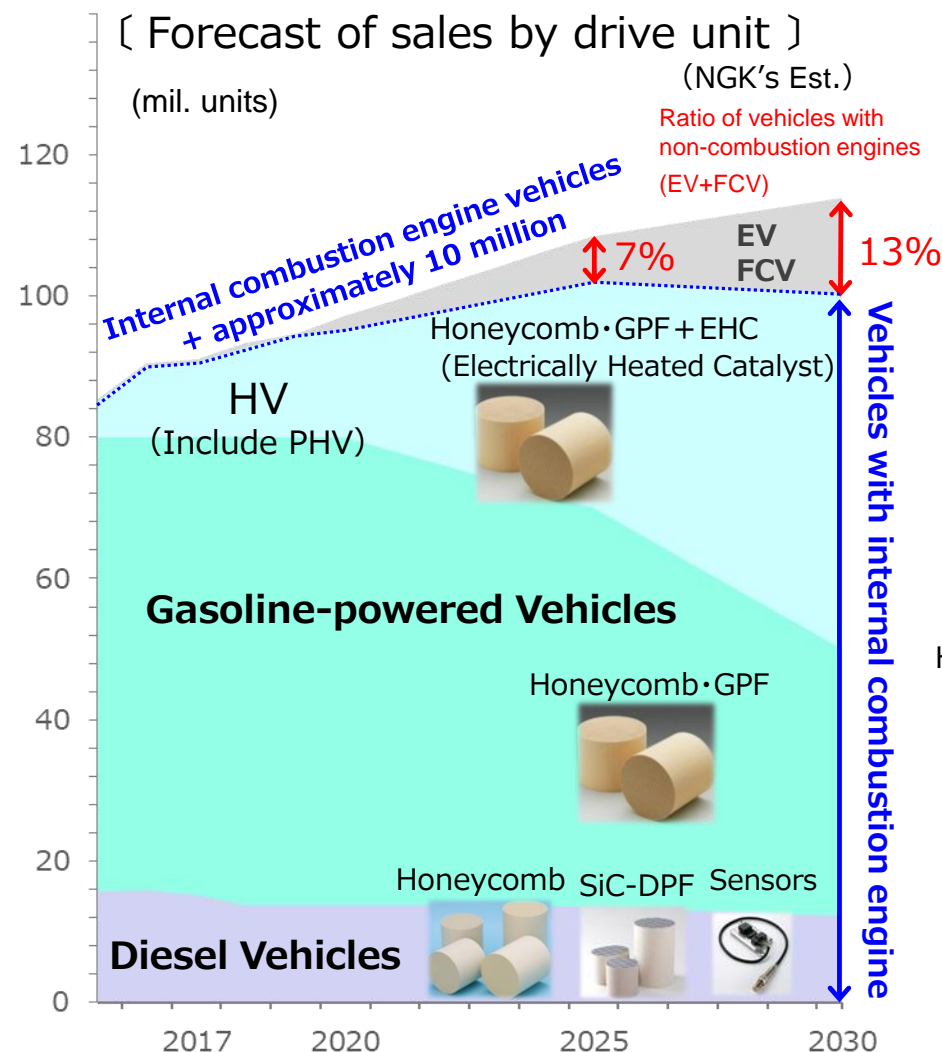
(Year)

2018 2020 2025 2030

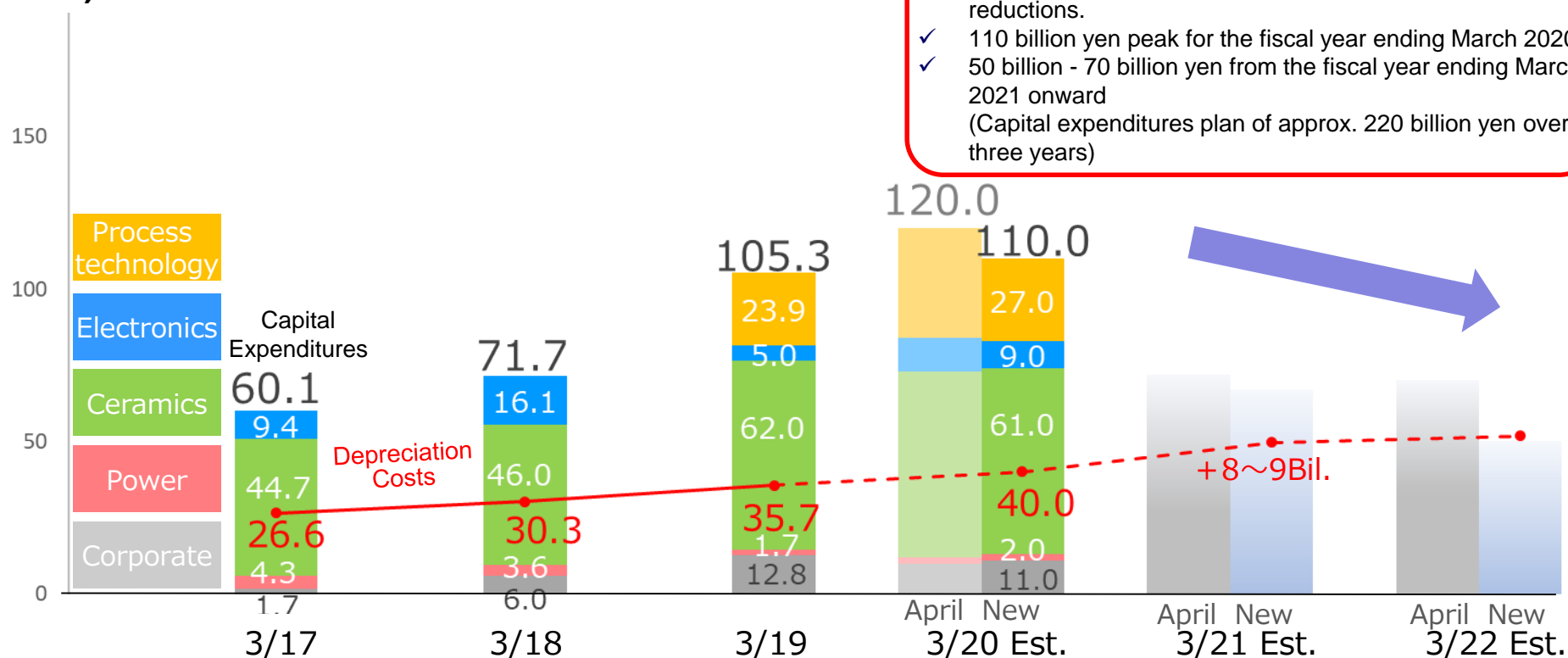
In Europe, demand for products for diesel passenger cars will decrease while that for trucks/off-road vehicles rise. Sales to markets in emerging countries will expand, due to tightened emission regulations. Demand for SiC-DPF is expected to increase moderately until 2025.

Medium- and Long-Term Forecast of Passenger Car Power Train

- The ratio of non-internal combustion engine vehicles (EVs, fuel battery vehicles) remains unchanged from the previous forecast and will likely account for 7 to 13% even some time between 2025 and 2030. The market for internal combustion automobiles equipped with our products is expected to remain at around 100 million vehicles per year.
- In addition to growth of GPF, sensors, and DPF for trucks/off-road vehicles, we aim to expand sales over the long term by introducing new products for HVs and PHVs.



(¥ Bil.)



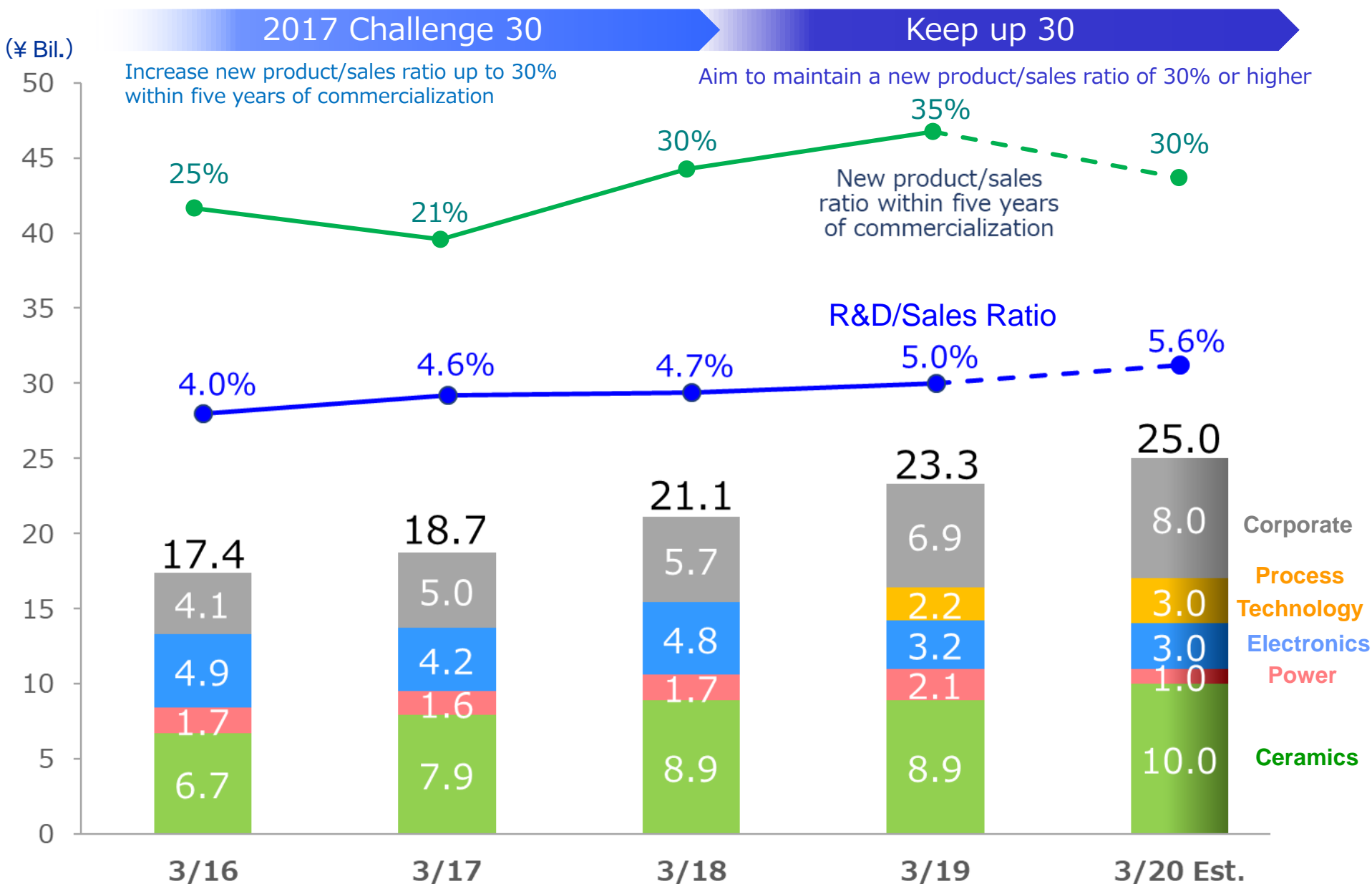
Komaki, Chita and Tajimi(Susceptors) : ¥40.0 Bil.
Tajimi Plant : Production started in April 2019.

Increase of capacity of plant
in Thailand ¥16.0 Bil.
Production started in April 2019.

2nd plant in China(GPF) : ¥33.0 Bil.
Scheduled operation in December 2019.

Increase of capacity of Sensors : ¥14.0 Bil.
Plant in Ishikawa scheduled operation in January 2019,
plant in Poland Scheduled operation in September 2020.

- ✓ Defer investments in accordance with changes and cost reductions.
- ✓ 110 billion yen peak for the fiscal year ending March 2020
- ✓ 50 billion - 70 billion yen from the fiscal year ending March 2021 onward
(Capital expenditures plan of approx. 220 billion yen over three years)

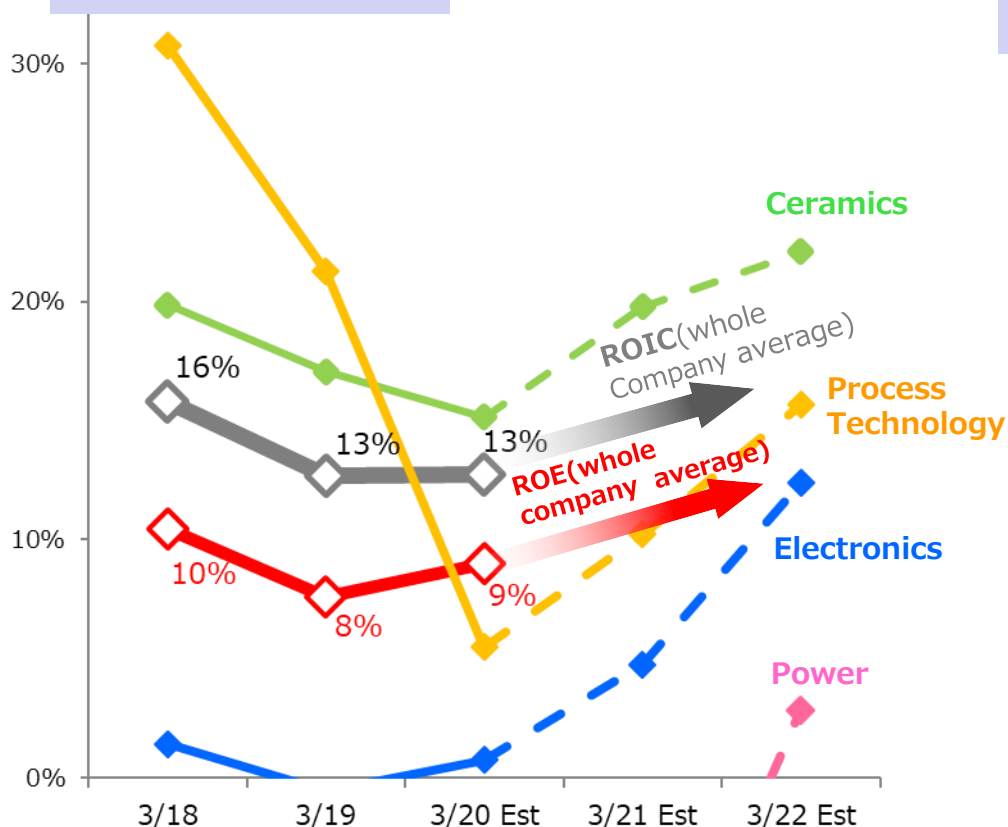


Return on Invested Capital (ROIC)

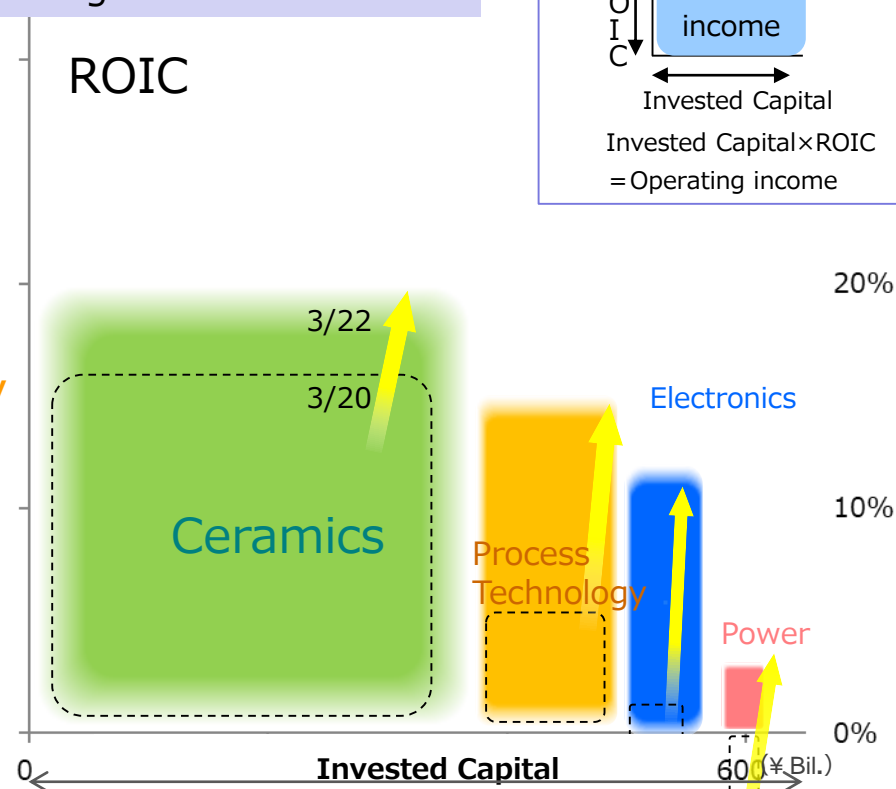
$$\text{Return on invested capital (NGK-version ROIC}^* 1) = \underbrace{\frac{\text{Operating income}}{\text{Net sales}}}_{\text{Return on turnover (Profitability)}} \times \underbrace{\frac{\text{Net sales}}{\text{Business assets (sales receivables + inventories + fixed assets)}^*}}_{\text{Business assets turnover rate (Efficiency)}}$$

* 1: Calculated based on business assets (sales receivables + inventories + fixed assets) that can be managed by business departments rather than capital and liabilities.

ROIC transition

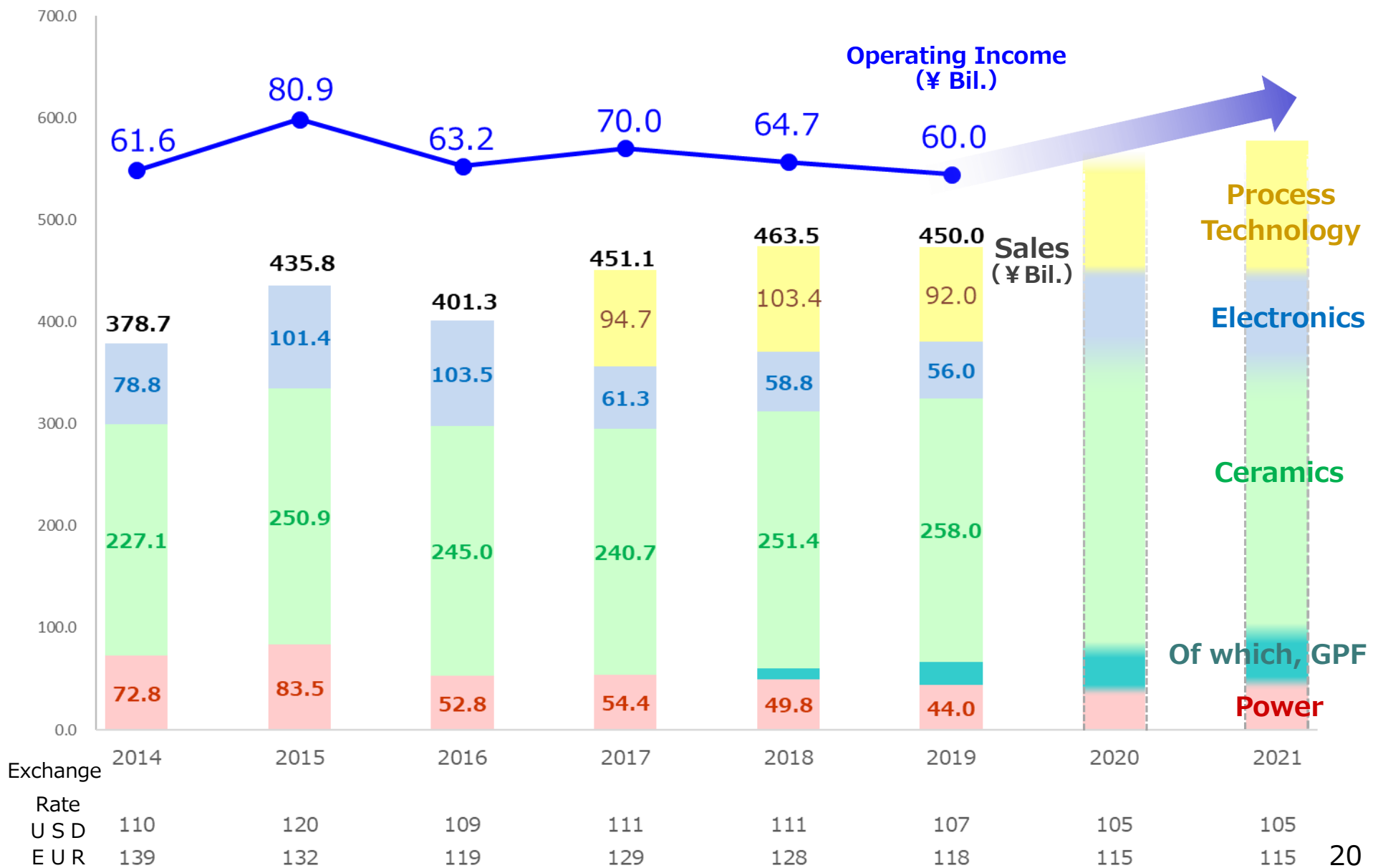


Operating income image of business unit

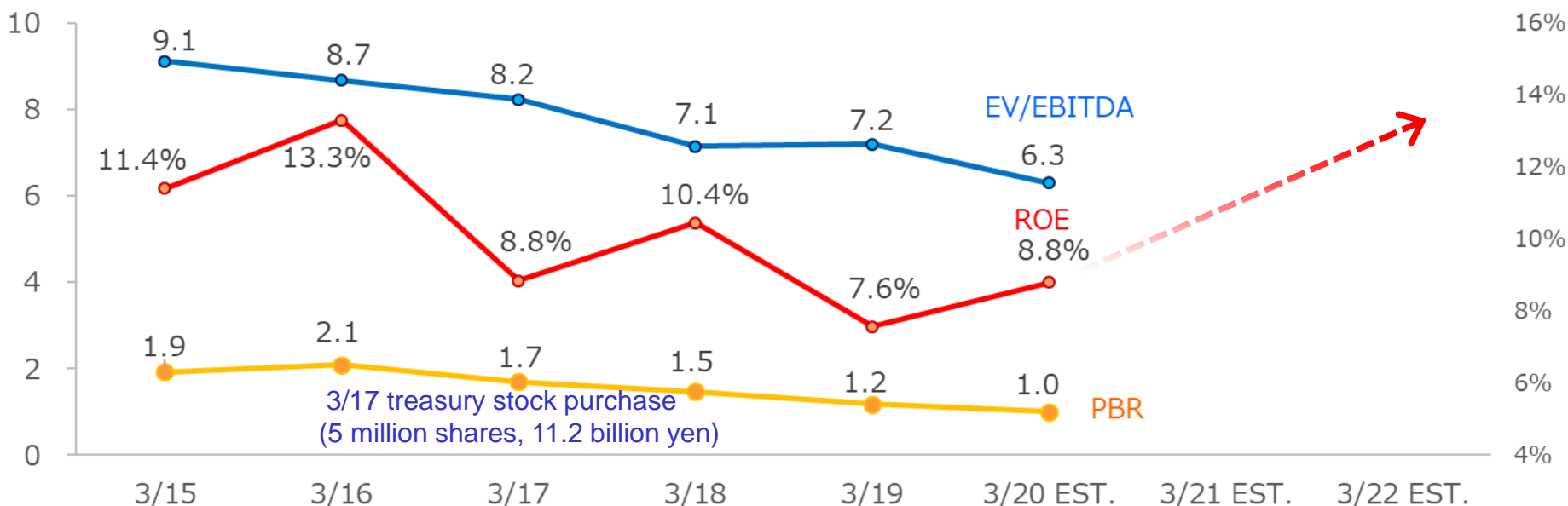


Target management with NGK ROIC for each business as an important factor in improving company-wide ROE

Consolidated performance trends



- ✓ Achieve both profitability exceeding capital costs and financial soundness. Proactive shareholder returns from a mid- to long-term perspective.
- ✓ Maintain sound levels of profitability, capital turnover, and financial leverage consistent with business strategy.



- Although mid- to long-term growth is expected, for the current fiscal year profitability has declined and ROE has fallen below 10%.
- However, in addition to the possibility of securing more liquid funds than the previous forecast by [deferring capital expenditures, etc.](#), we will promote [the sale of strategically held stock](#). Improve the capital efficiency due to [purchase and cancel treasury stock](#).

<Outline for purchase and cancel of NGK treasury stock>

Max. number of shares purchased: **7 million shares**

Max. acquisition price: **10 billion yen** (market purchase)

Period: 11/1/2019~2/21/2020

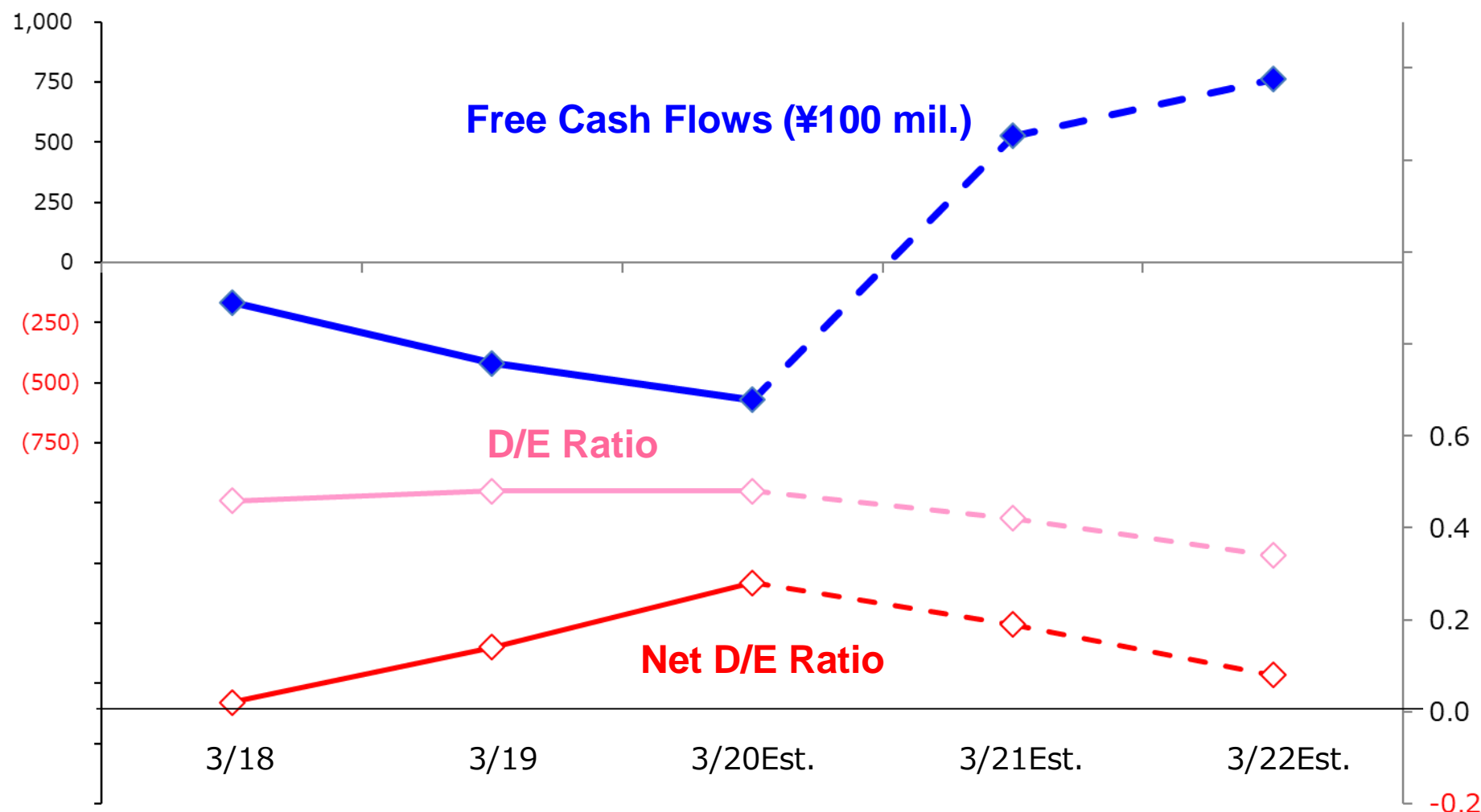
Scheduled date for stock cancelation: 3/31/2020

<Application for METAWATER tender offer>

Shares offered: **2 million shares** (if all shares are purchased)

Public offering price / sale price: @3402 yen / **6.8 billion yen**

Period: 10/30/2019~11/27/2019



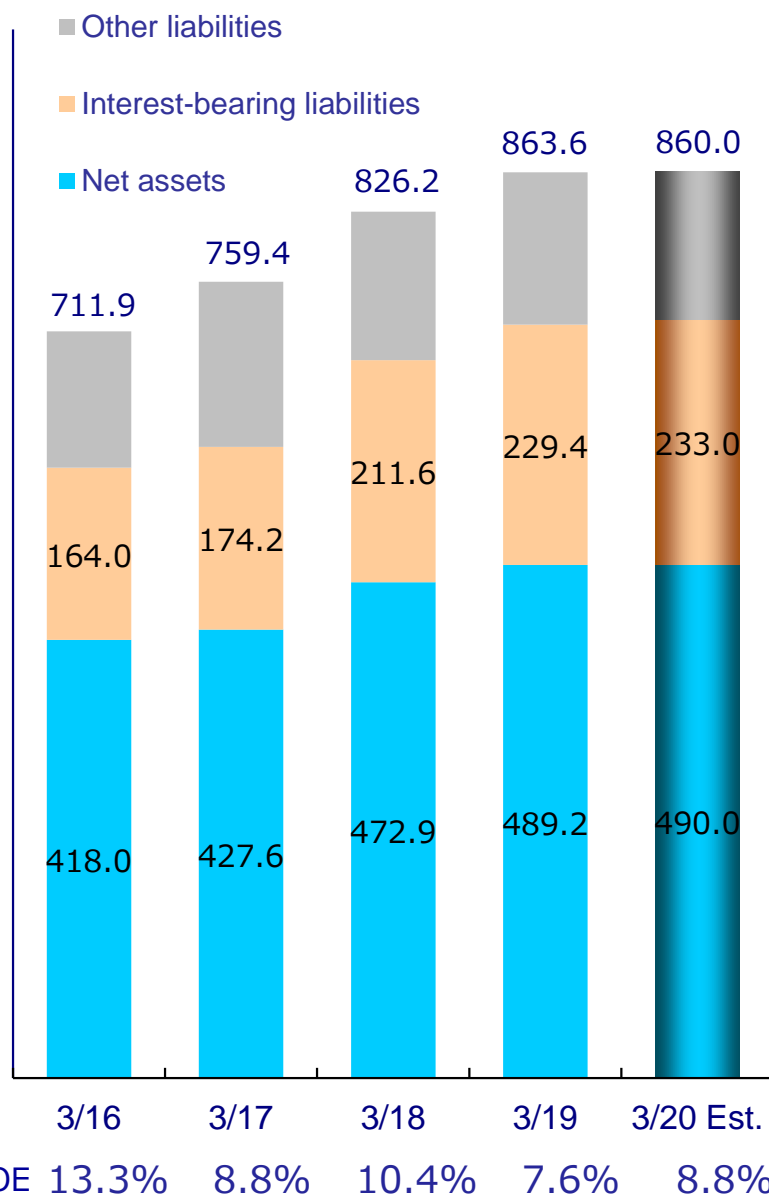
- With capital expenditure preceding, interest-bearing liabilities will exceed outstanding funds for a while.
Free cash flow is forecast to turn positive in FY ending March 2021.
- Equity ratio of 50% or higher and D/E ratio of about 0.4 will be maintained.

Summary of Cash Flows

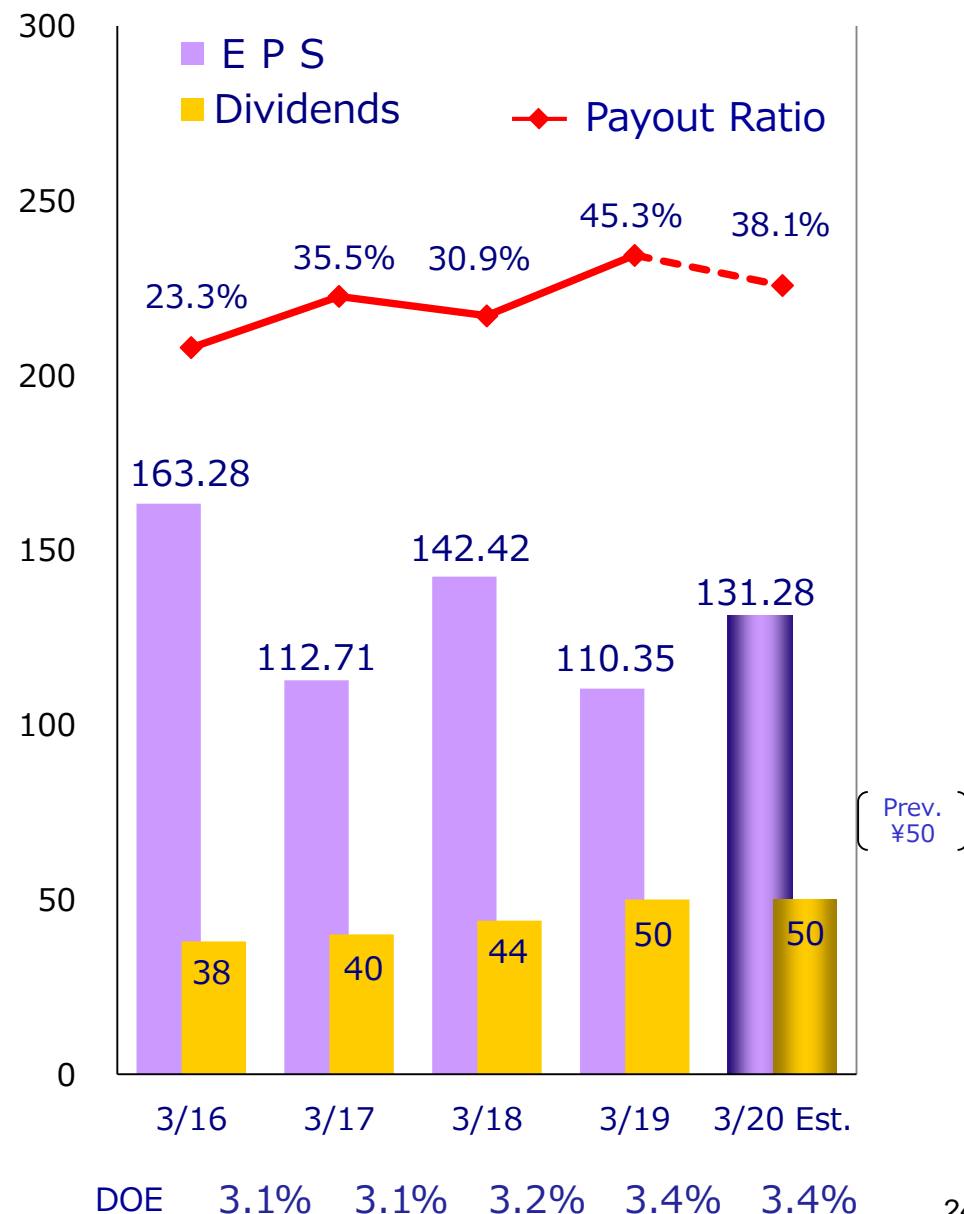
(¥ Bil.)

	3/18	3/19	3/20 Est.
Operating Activities	50.6	61.2	52.0
Investing Activities	-49.4 Investment -68.8	-109.7 Investment -104.1	-73.0 Investment -110.0
Financing Activities	22.5 New loans +42.4 Repayment -6.8	3.6 New loans +31.9 Repayment -10.8	-20.0 New loans +34.0 Repayment -29.0 Treasury stock purchase -10.0
Effect of Exchange Rate Changes on Cash & Cash Equivalents	1.5	-1.0	-3.0
Net Change in Cash & Cash Equivalents	25.2	-45.9	-44.0
Cash & Cash Equivalents-at the End of Year	169.9	124.0	80.0

(¥ Bil.)



(¥)

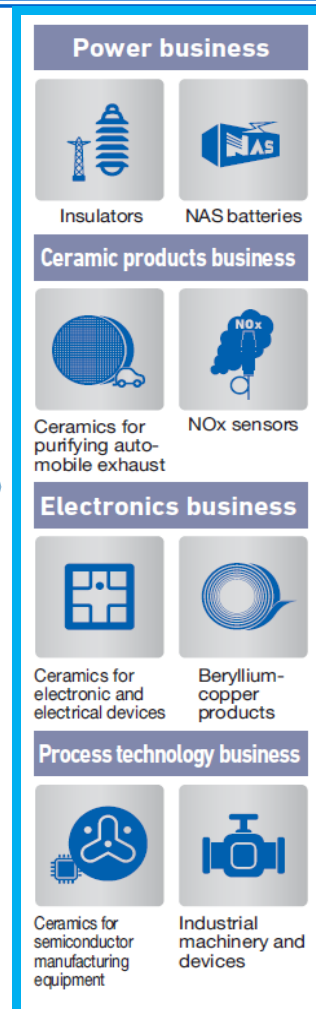
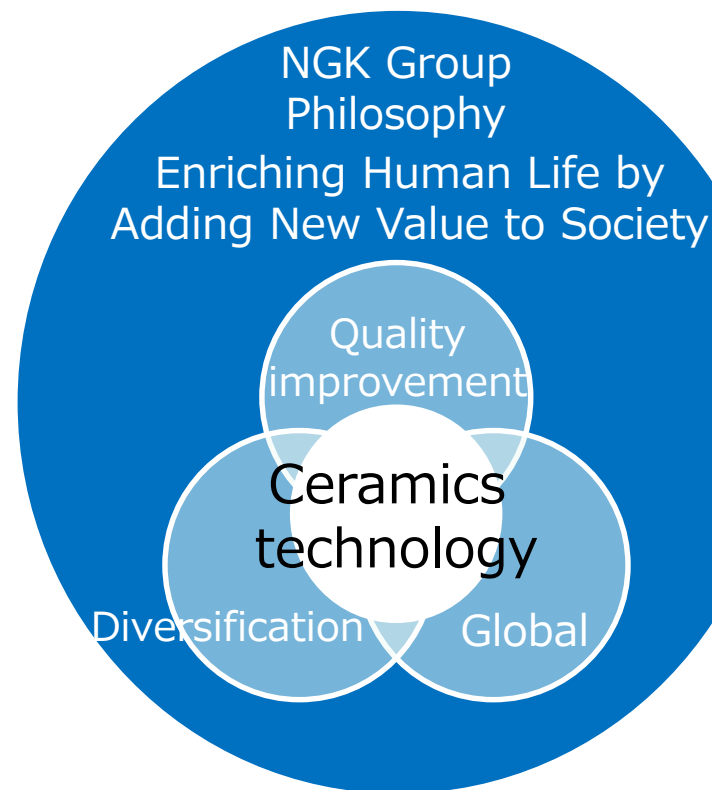


Sales by Product (Annual)

<After Consolidation Elimination>	3/17	3/18		3/19	3/20 EST.
		Old Segment	New Segment		
Insulators	51.6	52.5	52.5	46.7	41.0
NAS	1.3	1.9	1.9	3.2	3.0
Power Business	52.8	54.4	54.4	49.8	44.0
Honeycomb filters	77.0	77.9	77.9	76.0	72.0
GPF		76.5	76.5	10.8	23.0
Cd-DPF / LSH				69.5	70.0
SiC-DPF	38.2	40.8	40.8	39.0	37.0
Sensors	38.0	45.4	45.4	56.2	56.0
Industrial Process	23.9	27.1			
Ceramics Business	245.0	267.8			
Metal related	20.3	22.5	22.5	22.3	20.5
SPE related	46.4	67.6			
Electric related	27.4	28.4			
Soshin Electric CO.	9.4	10.4	10.4	10.2	9.4
Electronics Business	103.5	129.0	61.3	58.8	56.0
Industrial Process			27.1	31.0	28.0
SPE related			67.6	72.5	64.0
Process Technology Business			94.7	103.4	92.0
Total	401.3	451.1	451.1	463.5	450.0

Sales by Product (Semi Annual)

<After Consolidation Elimination>	3/19		3/20 Est. (¥ Bil.)	
	1 st . Half	2 nd . Half	1 st . Half	2 nd . Half
Insulators	23.1	23.5	20.2	20.8
NAS	1.1	2.1	0.4	2.6
Power Business	24.2	25.6	20.6	23.4
Honeycomb filters	38.4	37.6	37.2	34.8
GPF			9.3	13.7
Cd-DPF / LSH	38.1	42.1	34.2	35.8
SiC-DPF	18.8	20.2	18.8	18.2
Sensors	27.3	28.9	28.8	27.2
Ceramics Business	122.6	128.8	128.2	129.8
Metal related	10.8	11.5	9.9	10.6
Electric related	14.3	12.2	14.0	12.1
Soshin Electric CO.	5.1	5.0	4.4	5.0
Electronics Business	30.3	28.6	28.3	27.7
Industrial Process	13.5	17.4	12.9	15.1
SPE related	37.6	34.9	29.8	34.2
Process Technology Business	51.1	52.3	42.7	49.3
Total	228.2	235.3	219.8	230.2



Values provided by the NGK Group

CLEAN ENERGY

INDUSTRY, INNOVATION AND INFRASTRUCTURE

CLIMATE ACTION

SUSTAINABLE CITIES AND COMMUNITIES

GOOD HEALTH AND WELL-BEING

LIFE BELOW WATER

CLEAN WATER



This year's topics

- ✓ Selected for the fourth consecutive year as a constituent company in the "DJSI Asia Pacific"*(2019/9/19 release)
- ✓ Obtained the highest level of "Eruboshi", "Grade 3", as a company with excellent implementation of initiatives for the active participation of women, certified by the Minister of Health, Labour and Welfare (2019/8/29 obtained)

MEMBER OF
Dow Jones Sustainability Indices

In collaboration with **SAM**
a RobecoSAM brand



The purpose of this brief is information disclosure for better understanding of NGK Group's policies, projections and financial condition.

This brief does not solicit buying and selling of NGK's shares.

The figures included in this brief, including the business performance targets and figures, are all projected data based on the information currently available to the NGK Group, and are subject to variable factors such as economic conditions, competitive environments and future demands.

Accordingly, please be advised that the actual results of business performance may differ substantially from the projections described here.



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