FY2018 Results
(from April 1, 2018 to March 31, 2019)

April 26, 2019

NGK INSULATORS, LTD.

This is a translation of materials used for the analyst meeting held in Tokyo, Japan on April 26, 2019

President

Taku Oshima

SINCE 1919 YEARS

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.

Agenda

Summary of financial results for FY2018

(Ended March 31, 2019)

Forecast for FY2019

(End in March 31, 2020)

Segment Information

Capital Expenditure & Depreciation Cost

New products / R&D

Financial Condition

(Cash flow/ROIC/Total Assets&ROE/EPS&Dividend)

FY2018 Consolidated Financial Results

(¥Bil.)	FY2017	FY2018 March announcement	FY2018	Growth ratio	
Net Sales	451.1	462.0	463.5	FX −12	+3%
Operating Income	70.0	63.0	64.7	−8	-8%
Ordinary Income	70.6	63.0	64.4		-9%
Profit Attributable to Owners of Parent	45.8	34.5	35.5		-22%
Exchange Rate USD	¥111	(¥111)	¥111		±¥0
Exchange Rate EUR	¥129	(¥129)	¥128		-¥1

Higher sales, lower income compared with the last year

Recorded highest sales*

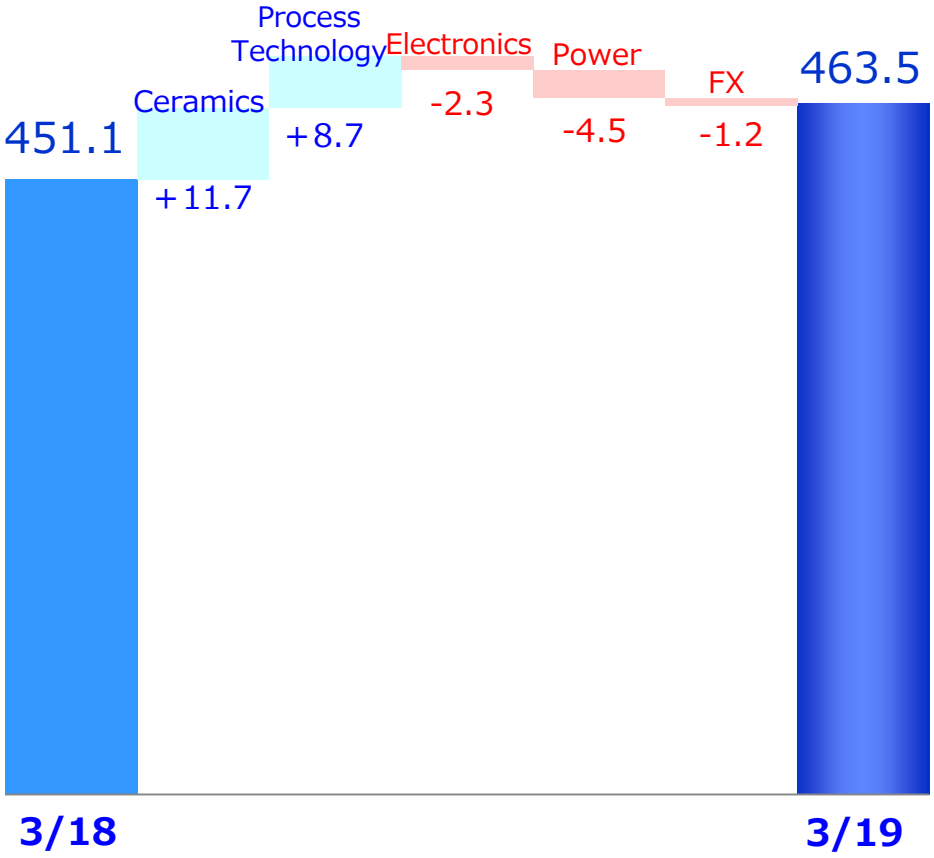
*Net sales ¥451.1 Bil (FY2017)

- ■ Power: Deficit increased due to the large impact of a decline in domestic and overseas demand for insulators.
- ■ Ceramics: Sales increased with the increase in volume of GPF and sensors, as a result of tighter emissions regulations. Profits decreased due to the increase in depreciation and development costs.
- ■ Electronics: While demand for piezoceramic actuators for HDD and wafers increased, demand for ceramic packages declined due to a slowdown of the investment in mobile phone base stations in China. As a result, sales decreased and a deficit was recorded.
- ■ Process Technology: Demand for products for semiconductor manufacturing equipment slowed in the second-half period. However, sales increased from the previous period and profits increased slightly.
- ■ Extraordinary loss: An impairment loss of ¥10.9 billion and loss on business of subsidiaries and associates ¥3.0 billion, following dissolution of a subsidiary in China.

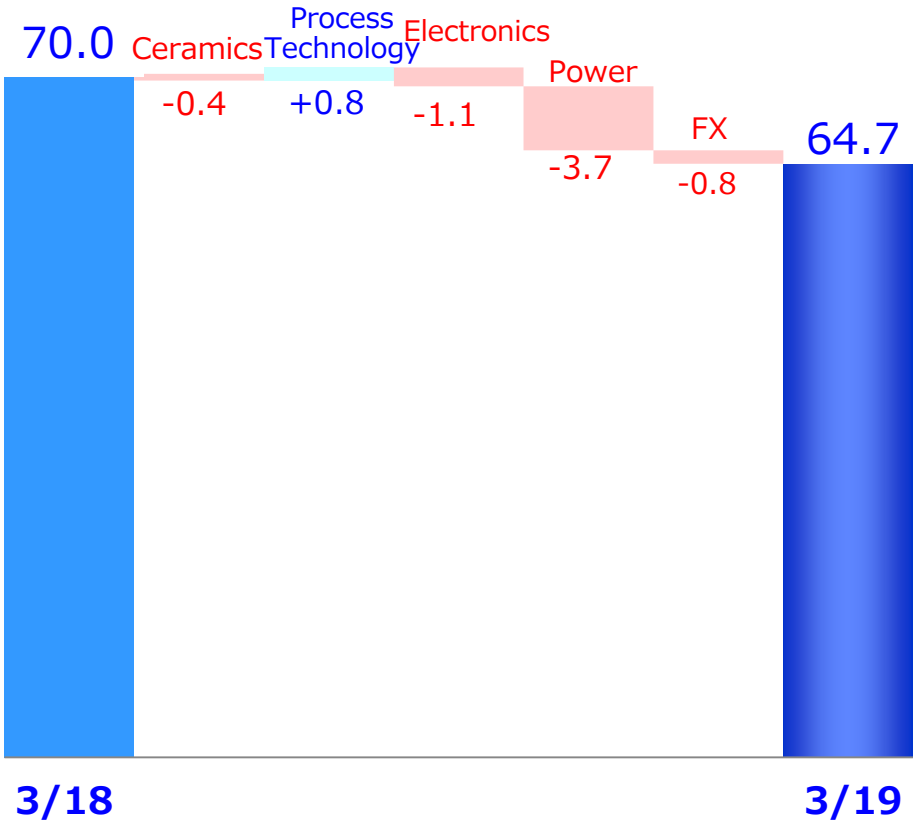
Change Analysis for FY2018

(¥ Bil.)

Sales



Op. Income



	3/18	3/19
FX Rate	¥111 /USD ¥129 /EUR	¥111 /USD ¥128 /EUR

Forecasts for FY 2019

(¥Bil.)	FY2018	FY2019	Growth ratio
Net Sales	463.5	490.0	+6%
Operating Income	64.7	70.0	+8%
Ordinary Income	64.4	71.0	+10%
Profit Attributable to Owners of Parent	35.5	47.0	+32%

Exchange Rate				
	USD	¥111	¥110	-¥1
	EUR	¥128	¥125	-¥3

Higher sales* and income compared with the last year

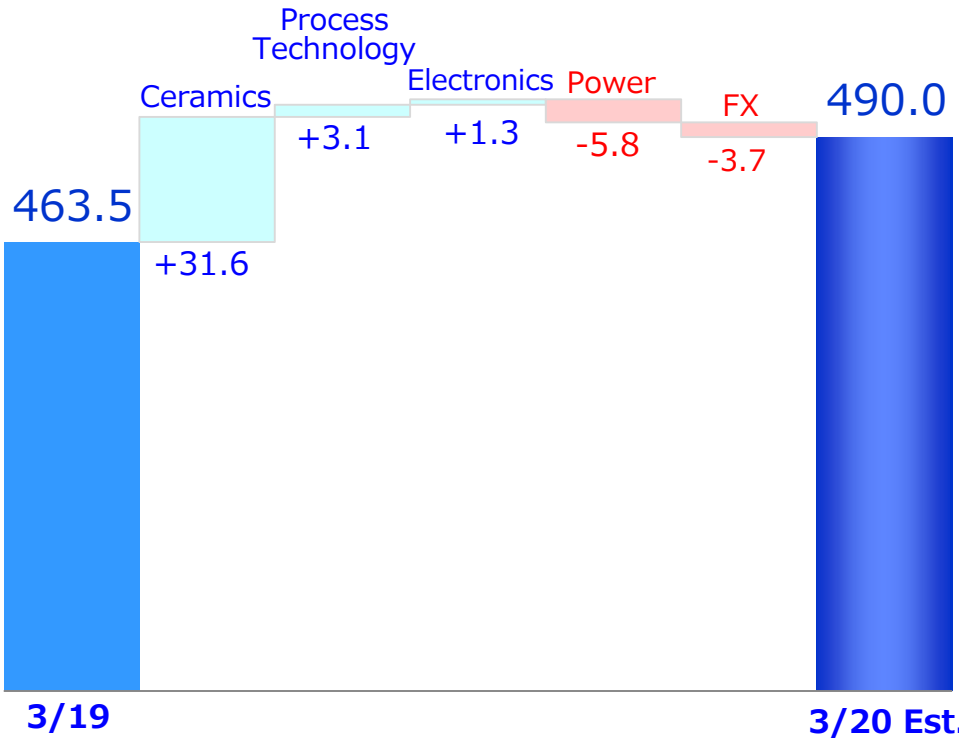
* Sales are expected to exceed the past record

- **Power** Demand for both insulators and NAS batteries is forecast to be weak, but aim to reduce the deficit through cost reductions and other measures.
- **Ceramics** Tighter emissions regulations will cause demand for GPF (gasoline particulate filters) to gain strength, and expand demand for other products. Regarding profits, an increase in depreciation costs and development expenses will be absorbed by higher sales, resulting in a profit increase.
- **Electronics** Sales are projected to increase and profits are forecast to go back into positive territory, with market conditions expected to recover in the second-half period.
- **Process Technology** Investments in semiconductor manufacturing equipment will remain in an adjustment phase and are expected to pick up from next year. Sales will remain at the same level as the previous period. Profits are forecast to decrease due to heavy depreciation costs associated with investments to increase production, including construction of a new plant, and start-up costs.

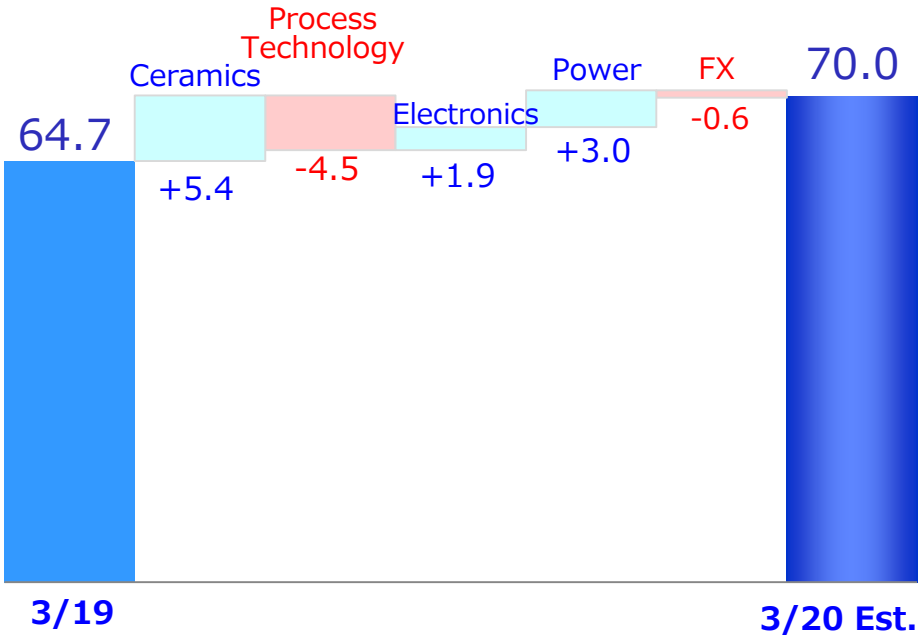
Change Analysis for FY2019

(¥ Bil.)

Sales



Op. Income



	3/19	3/20 Est.
FX Rate	¥111 /USD	¥110 /USD
	¥128/EUR	¥125 /EUR

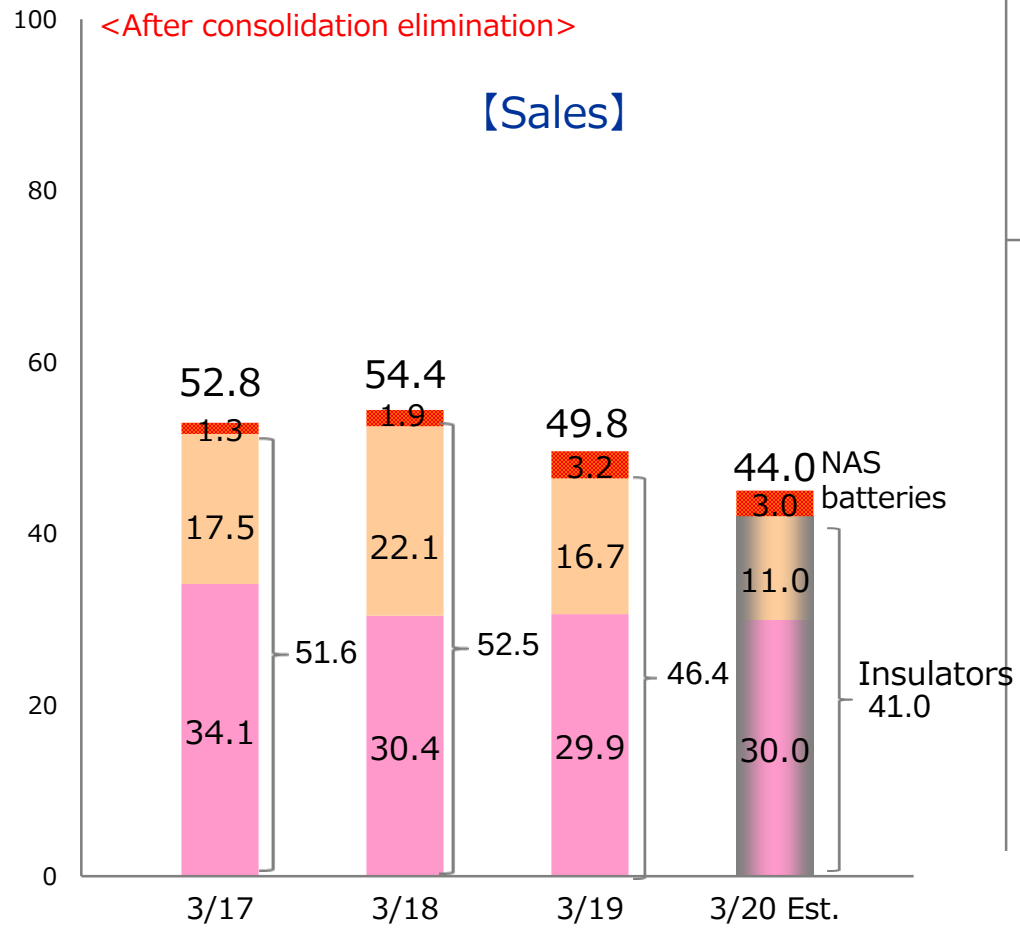
Power Business

- Insulators
  - Domestically, electric utility companies will continue to restrain capital investment, while overseas profitability is deteriorating due to increasing competition with competitors.
  - We resolved to dissolve a Chinese production subsidiary in March. Although sales are forecast to decline due to dissolution of the subsidiary, we expect a decrease in deficit through liquidation and streamlining of indirect departments.
- NAS
  - A deficit is forecast to continue due to sluggish demand of domestic users.

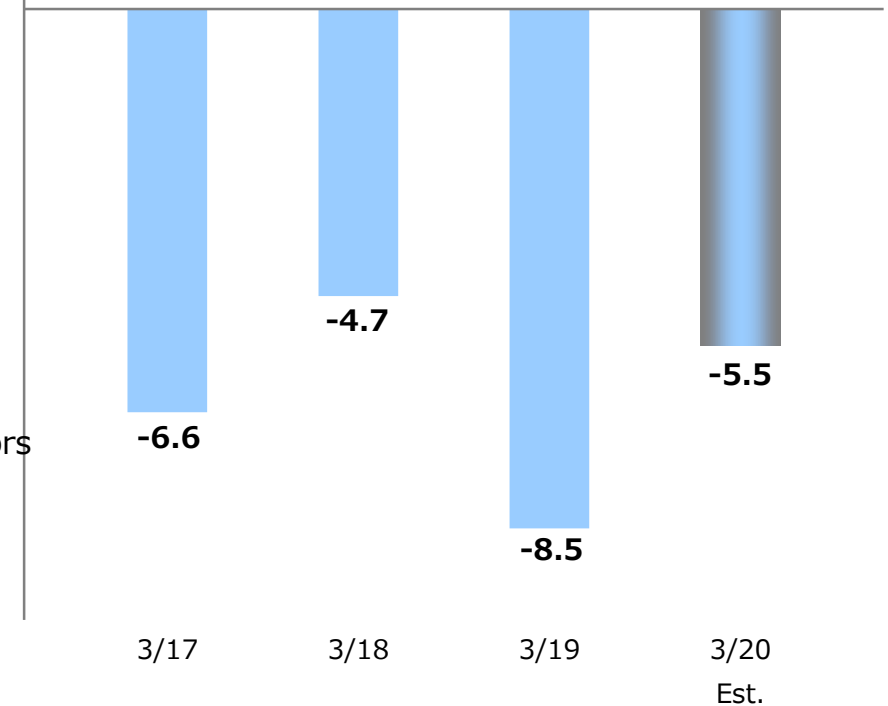
(¥ Bil.)

<After consolidation elimination>

【Sales】

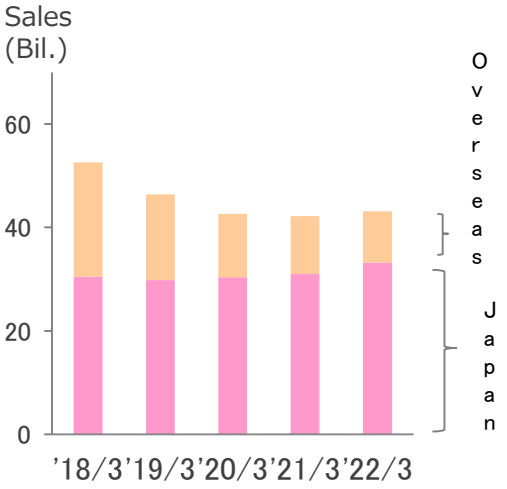


【Operating Income(Loss)】



Forecast for the Power business

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



Japan: Power companies will continue to curb their capital investments and postpone replacement

Overseas: Competition intensifies due to sluggish demand.

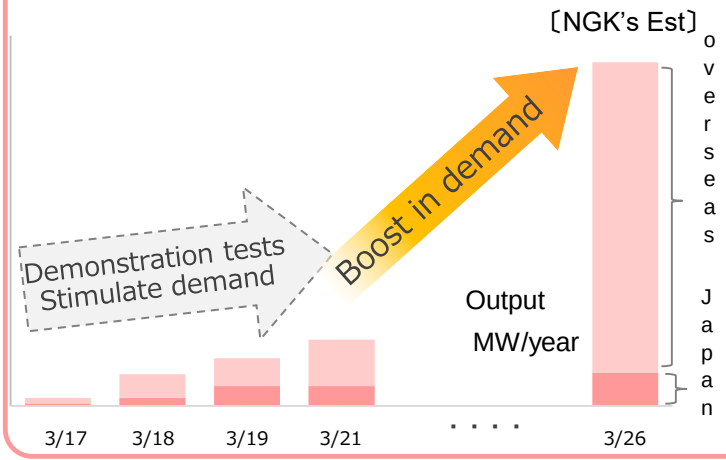
- North America: Replacement of power transmission insulators is weak as focus is placed on investments in power distribution facilities to accommodate renewable energy.
- Asia: Development of systems for power distribution in Southeast Asia has run its course.
- Middle East: Demand continues to be weak due to tight budget.

Liquidate a production subsidiary in China.
The insulators business has four production bases in Japan and two production bases overseas (in the U.S. and Australia).

In addition, promote the withdrawal from unprofitable products, drastic workforce cuts, and productivity improvement with a view toward bringing profits back into positive territory early.

■NAS®Batteries　It will take time for the development of full-scale demand

[Global market scale for long-life storage batteries]



<Market environment>

Japan: The Ministry of Economy, Trade and Industry and Ministry of the Environment appropriated a budget for implementation of measures for national resilience.

- Hokkaido: Needs are growing for installing storage batteries with offshore wind projects.
- Kyushu: There are needs for absorbing excess electricity following the launch of nuclear power plants and increase in solar power generation.

Overseas: Abu Dhabi　Large-scale solar power generation implementation plan
⇒It will take a few years until such large-scale projects take shape.

While working to streamline business operations to achieve the minimum costs, we will focus on winning orders for large-scale projects.

Electronics Business

● Electronics Components

・Revenue from wafers products is forecast to increase slightly with the expansion of the market for high-functionality SAW filters, despite the impact of a slowdown in the smartphone market in China.

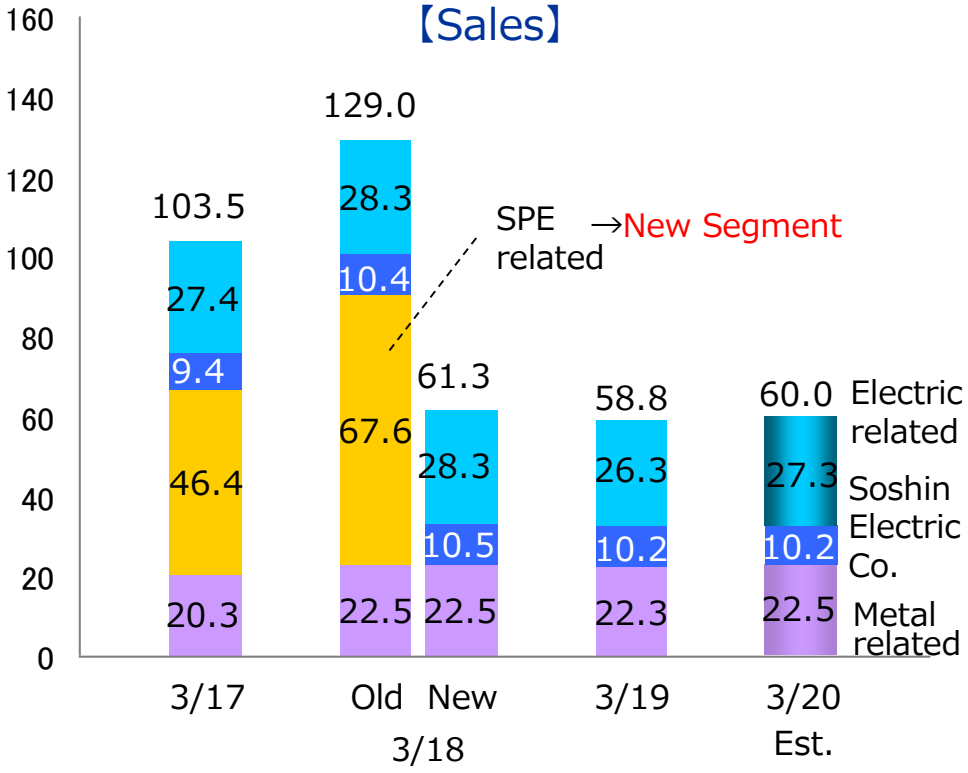
・Revenue from piezoceramic actuators for HDD is forecast to increase due to an expected recovery in demand for storage for data centers in the second-half period.

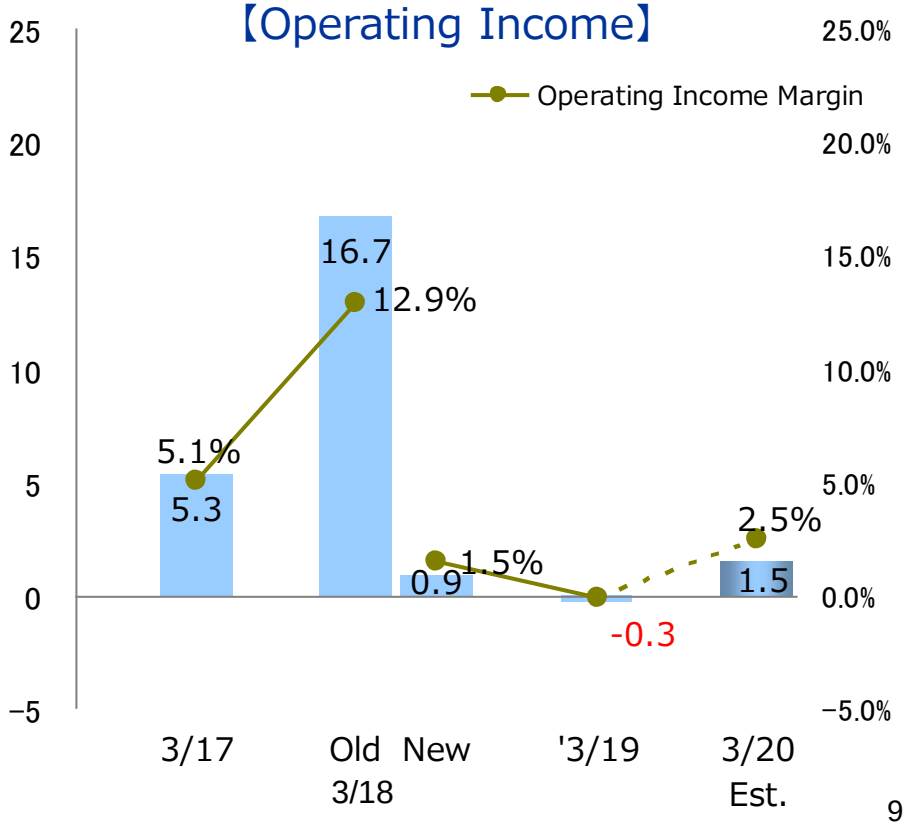
・Regarding package products, demand for DCB and AMB substrates for power modules is forecast to grow for in-vehicle and industrial equipment uses. On the other hand, demand for RF packages is forecast to remain sluggish. Meanwhile, depreciation costs will decrease as a result of the recognition of an impairment loss on fixed assets in FY2018. Profits are forecast to enter positive territory through a productivity improvement, etc.

● Metal Related Products

Demand for beryllium copper products is forecast to remain at the same level as the previous period, due to a slowdown in the Chinese market. Sales and profits are also forecast to remain at the same level as the previous period.

(¥ Bil.) <After consolidation elimination>



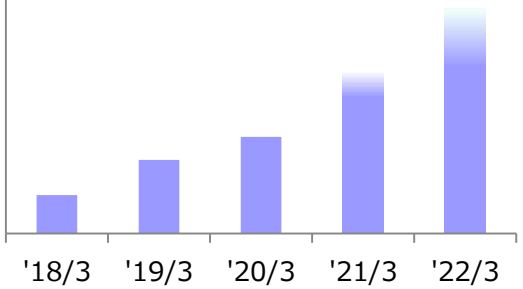


Forecast for the Electronics Business

■Bonded Wafer Products (Electronics Components)

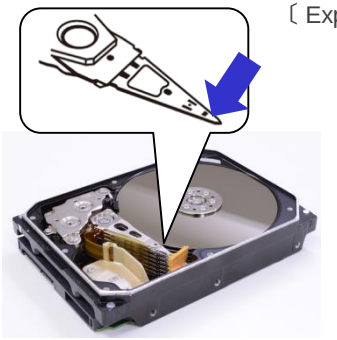
The market for composite wafer products for high-functionality SAW filters with an improved temperature profile, fabricated by bonding wafers of differing material through proprietary technology, is forecast to expand at an annualized rate of 20% or more with the spread of technologies to accelerate mobile communications.

〔Total demand forecast of high performance filters〕
(NGK's Est.)

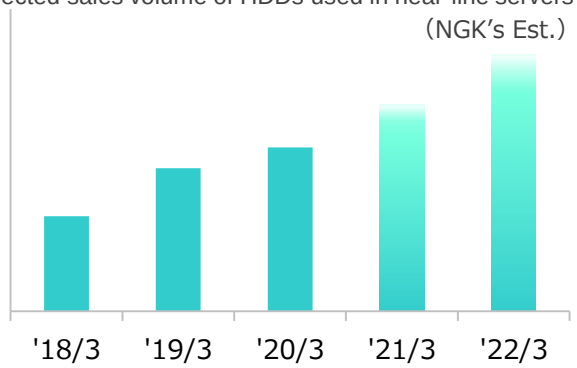


■Piezoceramic Actuators for HDD (Electronic Components)

It has become necessary to expand the storage capacity of data centers due to the growth of data storage for SNS, videos, and IoT. Demand for HDDs is forecast to grow, due to their cost advantage, for use in near-line servers for data centers.



〔Expected sales volume of HDDs used in near-line servers〕
(NGK's Est.)



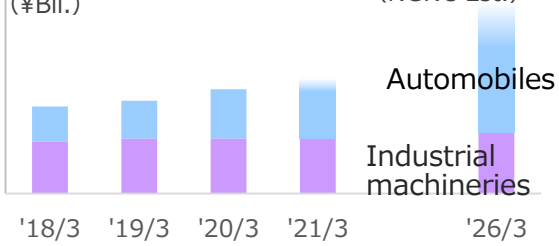
Invest to increase production in Yamanashi, Komaki and Malaysia

■Ceramic Package Business (Electronics Components)

DCB and AMB substrates for power modules

Demand for high reliability, high thermal conductivity ceramic substrates for power modules for in-vehicle and industrial equipment uses (ZDA) is forecast to expand in the medium and long term with the shift to vehicle electrification (EV/HV).

〔Sales forecast for DCB infrastructure (ZDA)〕
(NGK's Est.)
(¥Bil.)



Make investments to increase production capacity centered at a plant in Malaysia

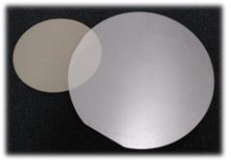
RF package

Although investments in mobile base stations are currently weak in China, demand for packages for high-frequency power devices for mobile base stations is forecast to grow on a full-scale basis due to investments in 5G starting in 2020.

<New Products>

⇒Details will be provided at the new product presentation meeting.

Chip-type Secondary Battery (EnerCera®)



Gallium nitride (GaN) wafer

Process Technology Business

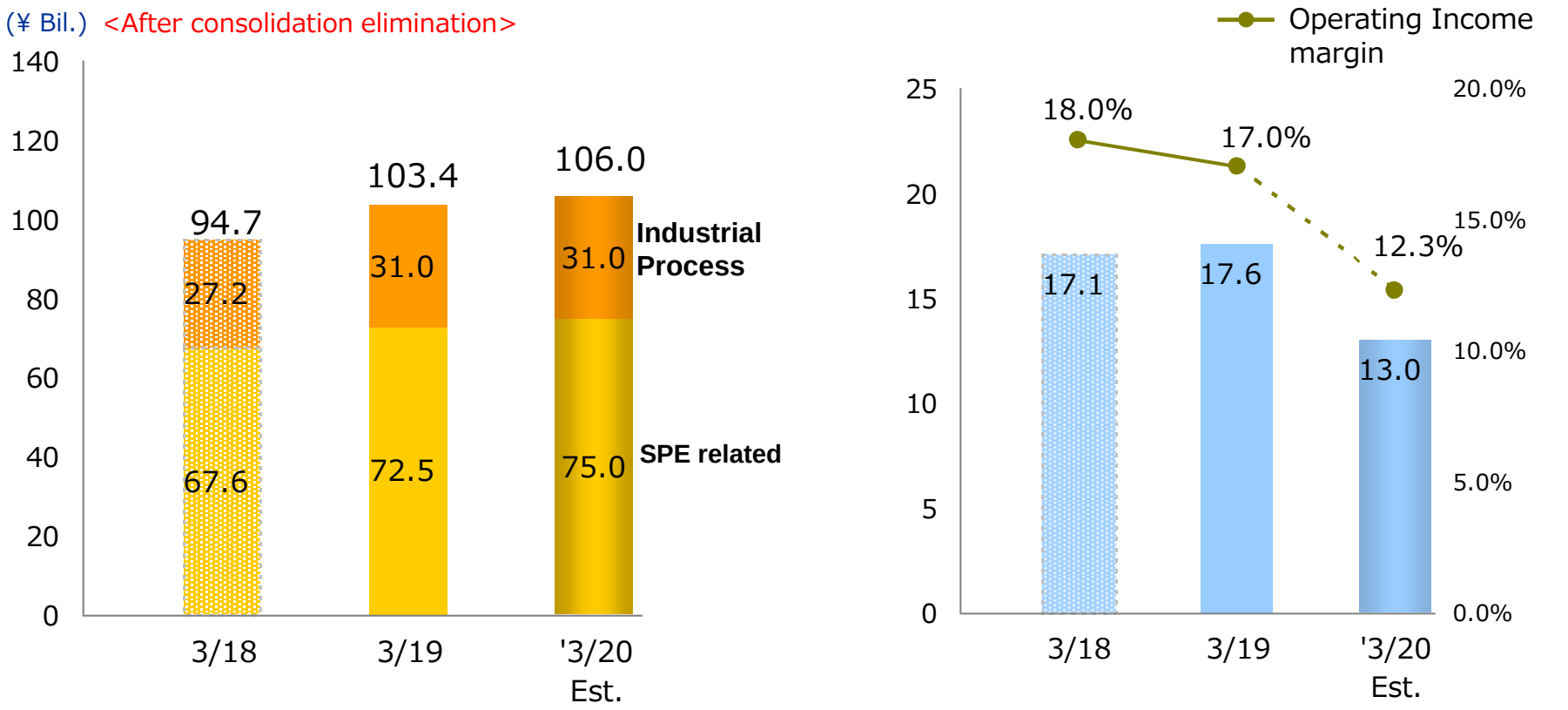
●Ceramic for Semiconductor Manufacturing Equipment (SPE-related products)

・Demand is forecast to remain in the adjustment phase until the end of 2019 and is expected to pick up in the next year. We need to boost the production capacity of the Tajimi Plant to respond to greater demand from FY2020, and we are making preparations according to our plan.
However, current demand is weak and there will be a heavy burden from depreciation costs and start-up costs of investments to increase production. As a result, revenue is forecast to increase but profits are expected to decline.

●Industrial processes

・Sales of heating equipment are solid as a result of the continued investments related to in-vehicle lithium ion batteries and electronic components, while sales are expected to increase for new projects of low-level radioactive waste disposal equipment.

(¥ Bil.) <After consolidation elimination>

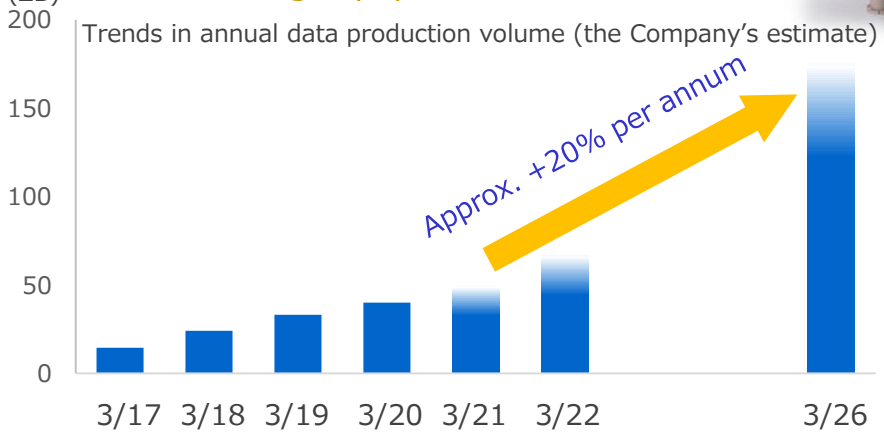


Forecast for the Process Technology Business

Ceramics Components for Semiconductor Manufacturing Equipment

(ZB)

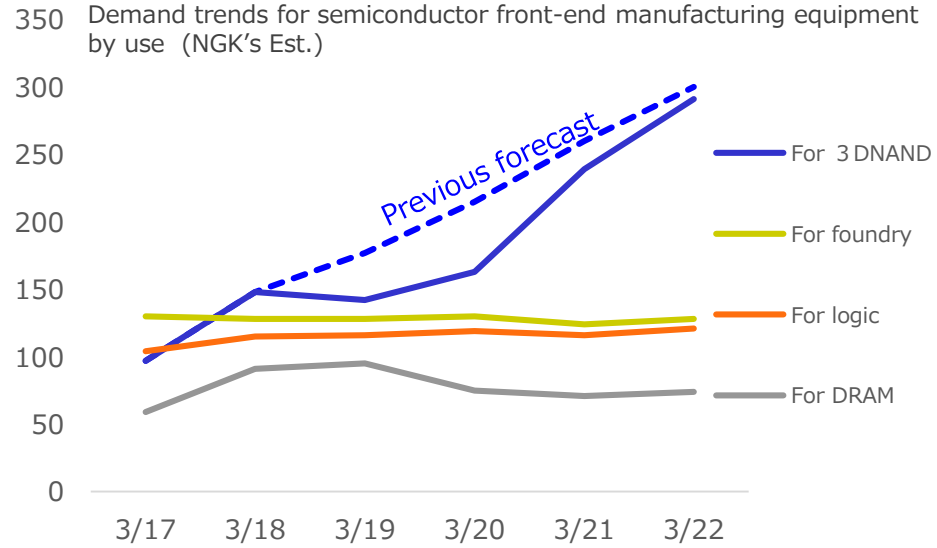
Trends in annual data production volume (the Company's estimate)



With the full-scale launch of 5G, data production volume is forecast to increase at an average annual rate of 20% or more from FY2020, and memory capacity per device will continue to expand in the medium and long term.

(Bil.)

Demand trends for semiconductor front-end manufacturing equipment by use (NGK's Est.)



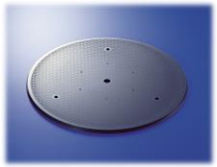
Demand is forecast to recover and greater demand is expected mainly for 3D-NAND from 2020.

NGK's Ceramics Components for Semiconductor Manufacturing Equipment

Susceptors

(Japan)

Heater (AlN)

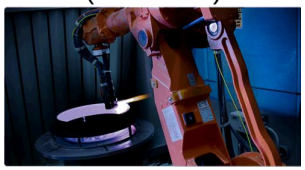


Electrostatic chuck
(Alumina, AlN)

Chamber components

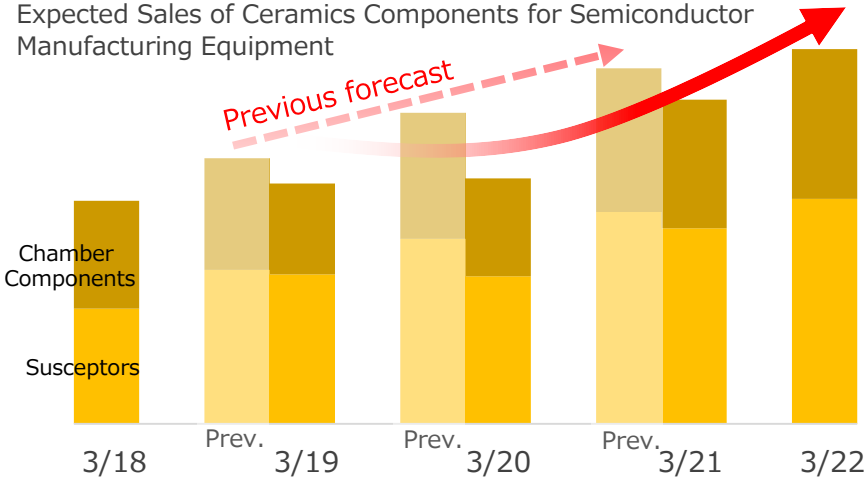
(U.S.)

Chamber Components
(Aluminum)



Chamber Components
(Aluminum, thermal spraying)

Expected Sales of Ceramics Components for Semiconductor Manufacturing Equipment



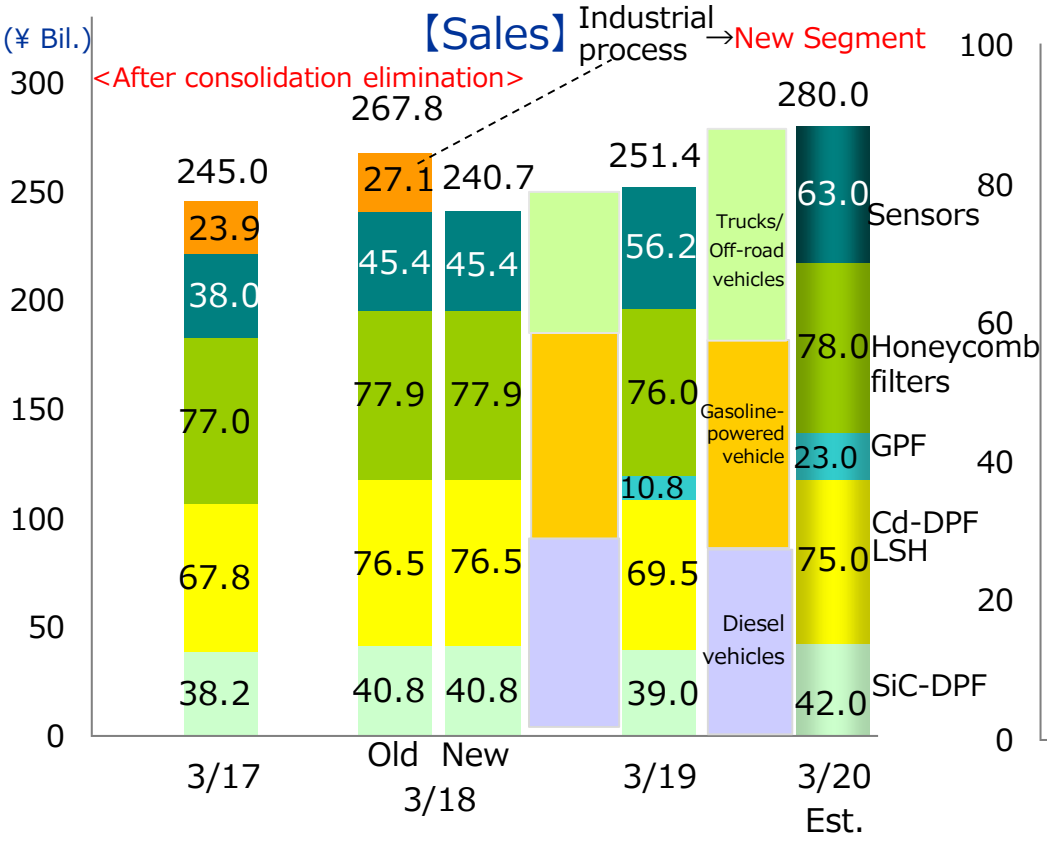
Developed a production system at the Tajimi Plant to gear up for investments in memory devices and a rapid demand recovery for semiconductor manufacturing equipment. Review the schedule for the medium-term investment plan for production increase to reflect weak demand in the adjustment phase.

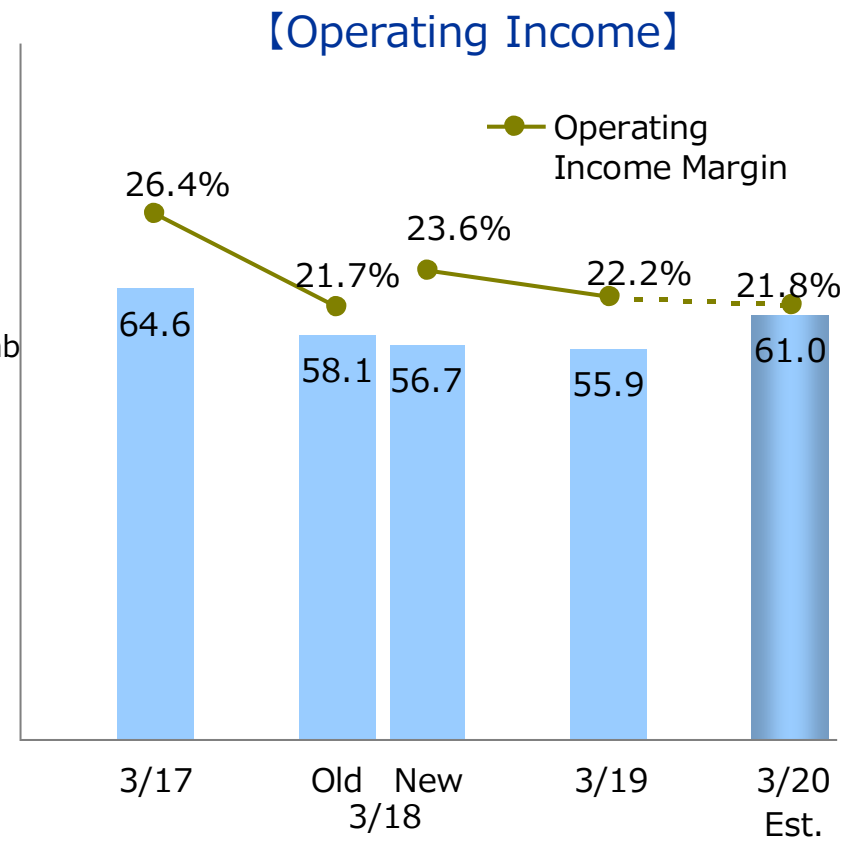
Ceramics Business

● Automotive-related

・Demand for automotive-related products will increase as a result of tighter emissions regulations in addition to the increase in sales of passenger cars and trucks in Europe and emerging markets in Asia. Profits are forecast to increase by absorbing the increase in depreciation costs, development expenses, etc., with the increase in volume.

・Honeycomb(For passenger vehicles): Demand has increased against the backdrop of increased sales of passenger cars in China and emerging markets in Asia.
・GPF(For gasoline-powered vehicles): Demand has increased due to a greater scope of application of RDE regulations in Europe and stronger demand in China.
・Cd-DPF/LSH(For trucks): The number of trucks sold globally levelled off, but demand for Cd-DPF increased as a result of tighter control on exhaust emissions in China and India.
・SiC-DPF: (For diesel passenger vehicles/trucks) Sales are forecast to increase with an effort to increase the market share, despite the lower ratio of diesel for European passenger cars.
・Sensors: (For diesel passenger vehicles/trucks) The number of sensors used for each diesel vehicle is forecast to increase as a result of tighter emissions regulations in Europe.

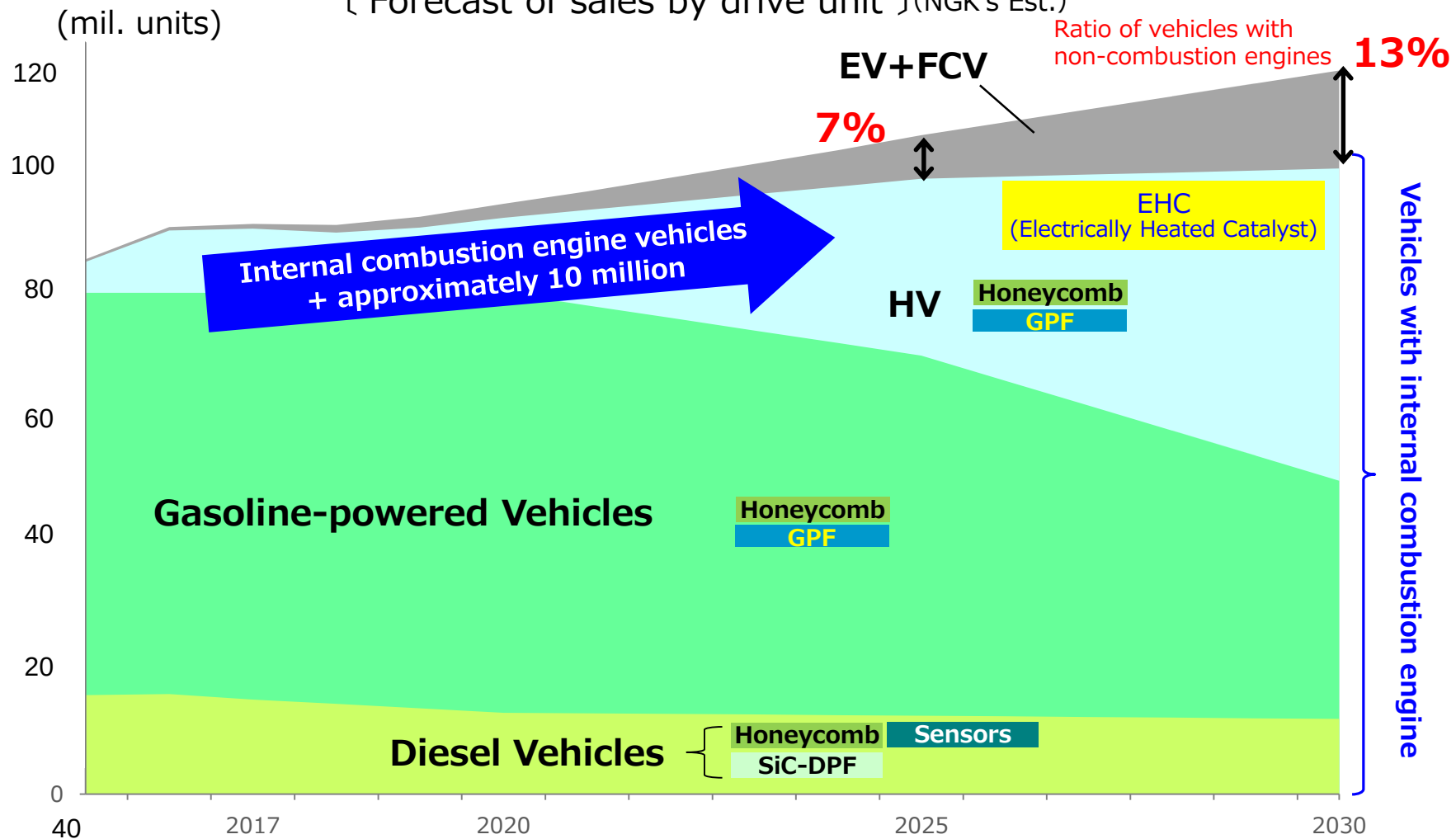




Long-term Forecast of Passenger Car Power Train

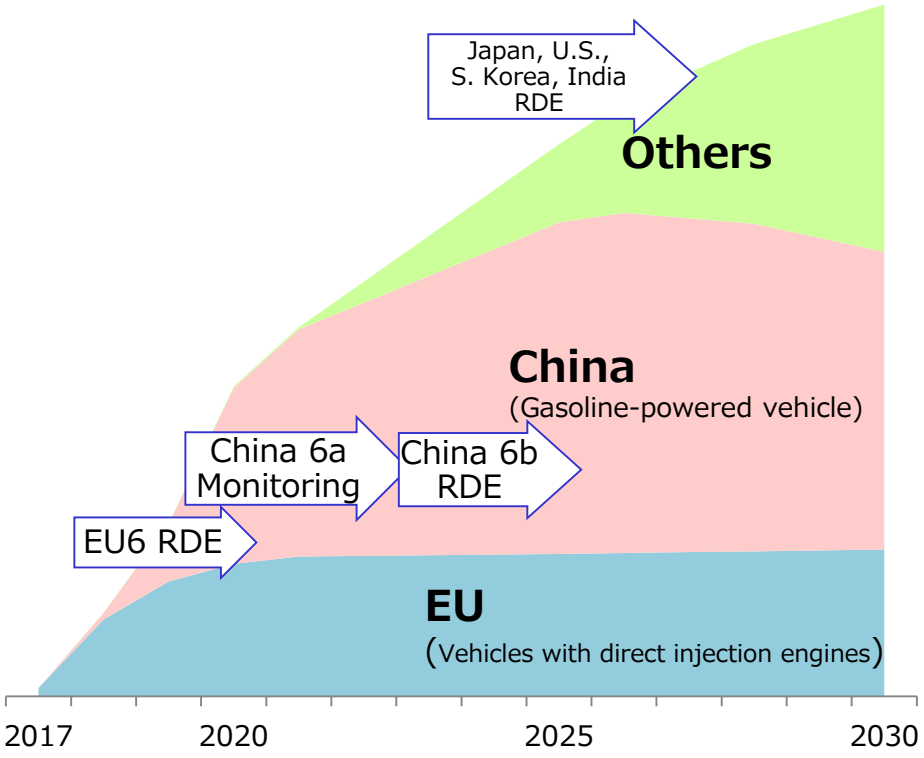
・The number of passenger cars sold in the world will surpass the 100 million-level in 2022 or so and is expected to be at the 110 million-level in 2025 to 2030.
・Non-internal combustion engine vehicles (EVs, fuel battery vehicles) will likely account for 7 to 13% even some time between 2025 and 2030. The market for vehicles with an internal combustion engine is expected to be at the annual 100 million-level, above the present state.

〔 Forecast of sales by drive unit 〕(NGK's Est.)



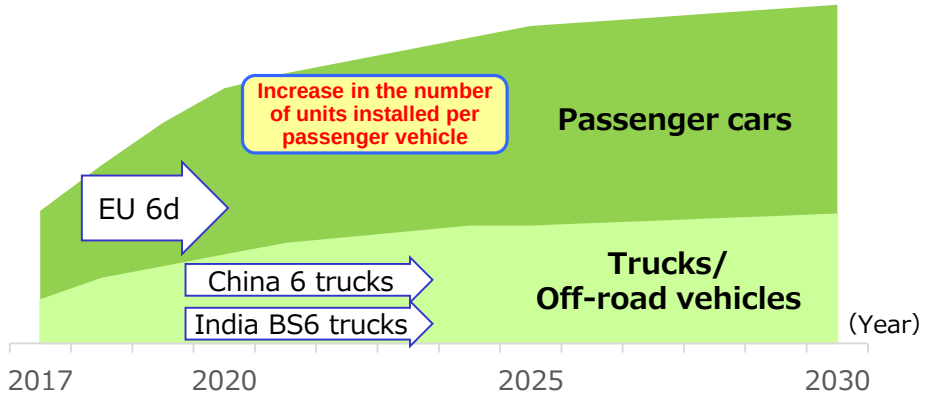
Products with Growth Potential in the Medium- and Long-Term

Total Demand Forecast of GPF



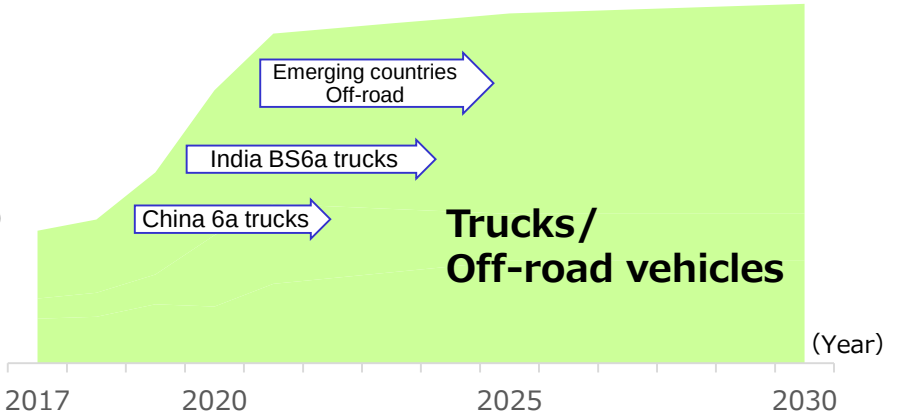
Demand will increase rapidly in conjunction with the start of RDE in the EU and the tightening emission regulations (country 6a, b) in China.
From 2025, demand for GPF in China will gradually decrease due to the promotion of EVs, while demand for other regions is expected to increase primarily in North America.

Total demand forecast of Sensors



Mid-to-long-term demand is expected to grow since there is no change in the trend for an increasing number of sensors installed per diesel vehicle because of the strengthened Euro regulations, although the forecast falls short of the previous forecast due to a lower ratio of diesel passenger cars in Europe.

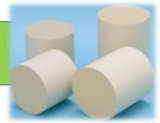
Total demand forecast of Cd-DPF

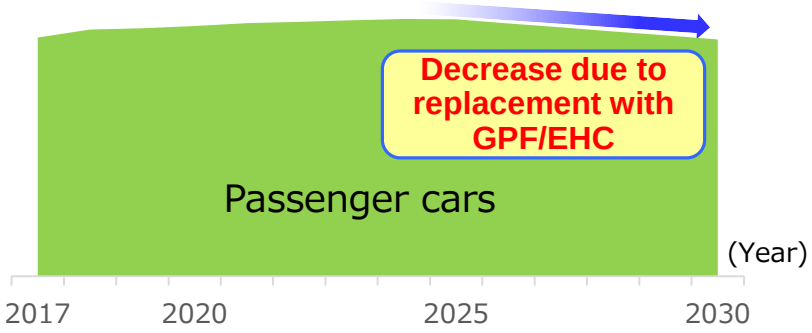


Demand for DPF will increase in FY2019 and thereon, due to the tightening of emission regulations in China, India and other emerging countries.

Demand forecast of Honeycomb, LSH and SiC-DPF

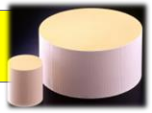
Total Demand Forecast of Honeycomb

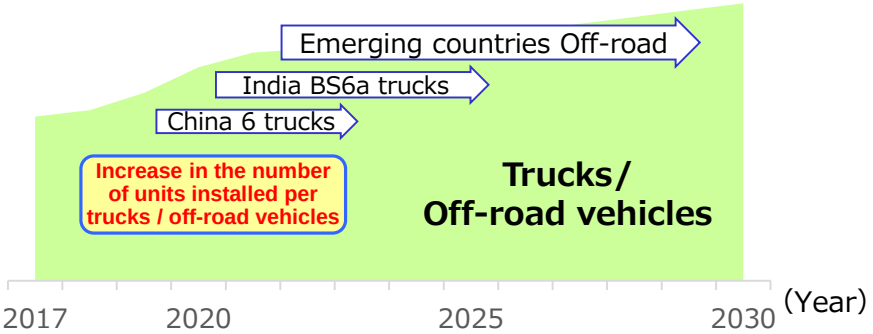




Linked with the number of new vehicle sales worldwide. Demand (number of pieces) is forecast to decrease after 2025 due to replacement with GPF and EHC, but the ratio of thin-walled, high-porosity and high-value-added products is forecast to increase as a result of CO2 emissions regulations and an increase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

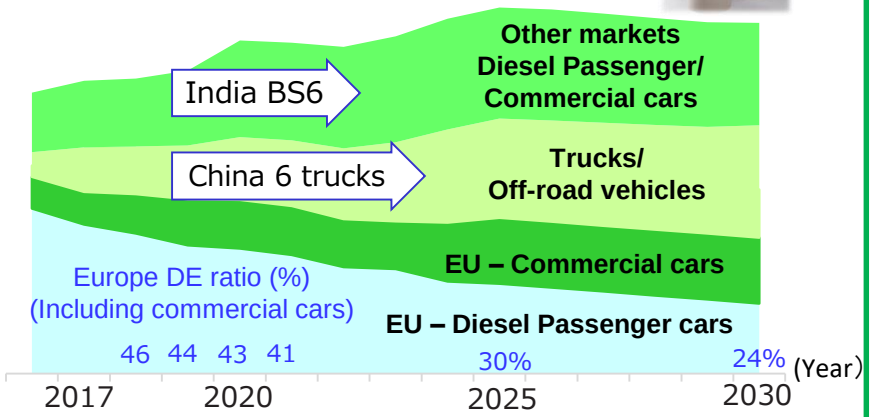
Total demand forecast of LSH





Demand for LSH will moderately increase as a result of tighter emissions regulations in China, India and other emerging countries in addition to the increase in sales of trucks.

Total demand forecast of SiC-DPF



In Europe, demand for products for diesel passenger cars will decrease while that for commercial cars and 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.

■ Impact of adoption of WLTP in Europe (SiC-DPF, Sensors)

・WLTP, the new emissions test, was adopted in Europe in September 2018. Some automakers lagged behind in obtaining certification, causing the number of new vehicles sold to decline.

・Due to the impact of the “dieselgate” scandal and automakers prioritizing acquisition of certification for top-selling gasoline-fueled vehicles, the sales volume of diesel vehicles which are equipped with NGK’s products decreased significantly. In addition, sales of NGK’s diesel vehicle-related products dropped sharply.

・With the progress of the certification process of automobile makers, demand is forecast to pick up in FY2019.

Construct a global production system

(Major Bases)

Increase of capacity of Sensors (approx. ¥14.0 Bil.)

1st plant in Poland
Facilities for assembling Sensors :
Production starts in September 2020.

Plant in Ishikawa
Facilities for elements of Sensors :
Production started in January 2019.

Plant in Ishikawa

Increase of capacity of
raw material mixing equipment
Production starts in June 2020.
(approx. ¥7.0 Bil.)
(Press release on September 19, 2018)

- Ceramics business base
- Process technology business base

Belgium
Poland

2nd plant in China

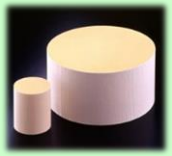
Mass Production of GPF
(approx. ¥33.0 Bil.)
Production starts in December 2019.

2nd plant in Poland

Increase capacity of **SiC-DPF**.
(No. 2 Building)(approx. ¥22.0 Bil)
Production starts in May 2019.

Ishikawa
Gifu (Tajimi)
Aichi
(Komaki,Chita)
China
Thailand
Indonesia
U.S. (California)
U.S. (Arizona)
Mexico
U.S.
South Africa

Plant in Thailand



Investment amount by 2020: approx ¥16.0 Bil.
LSH production started in Aprill 2019.

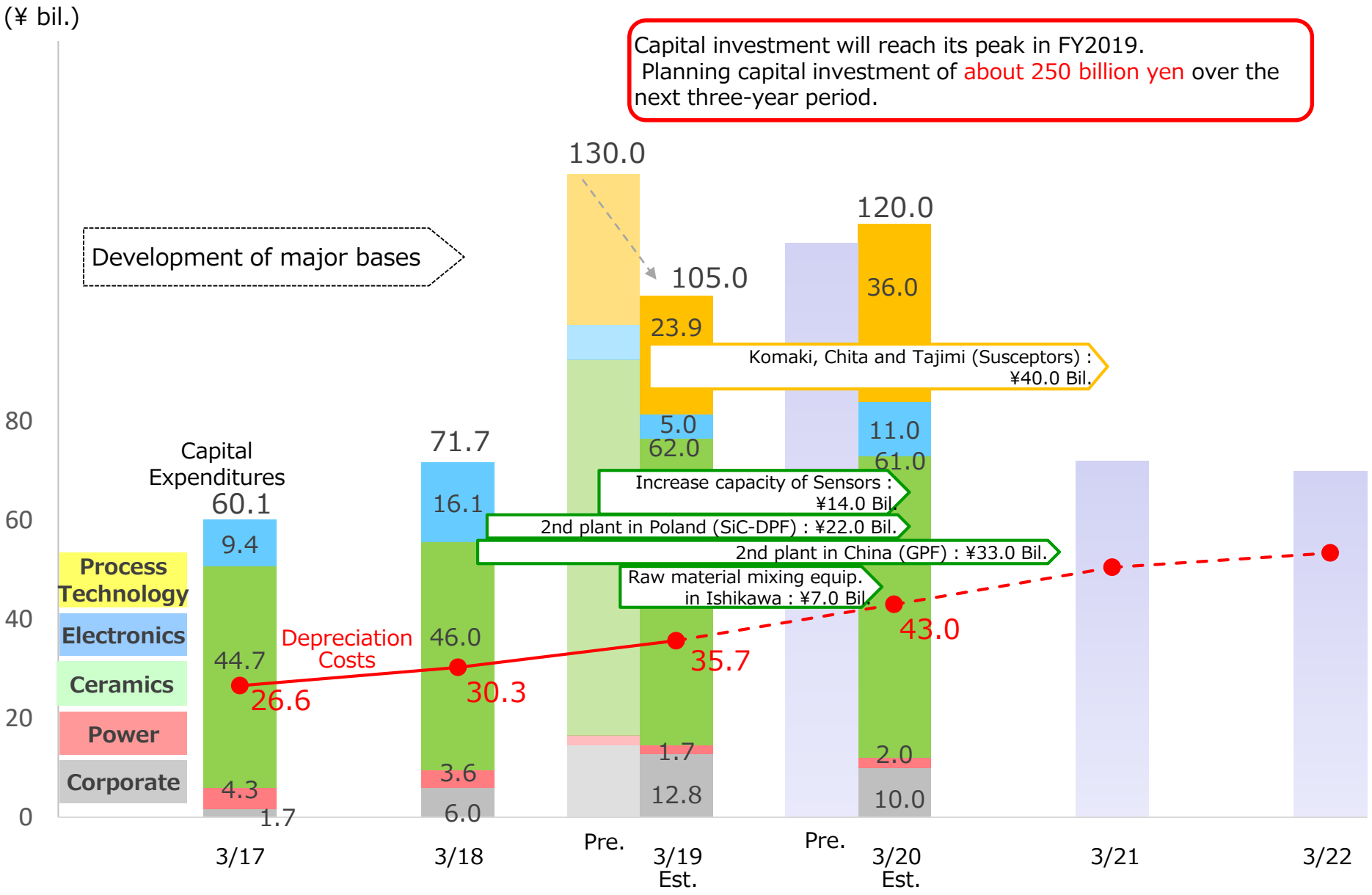
Reinforce ceramic products for semiconductor manufacturing equipment

Susceptor

Construct a new plant in Tajimi City, Gifu Prefecture with an investment of about ¥20 billion.

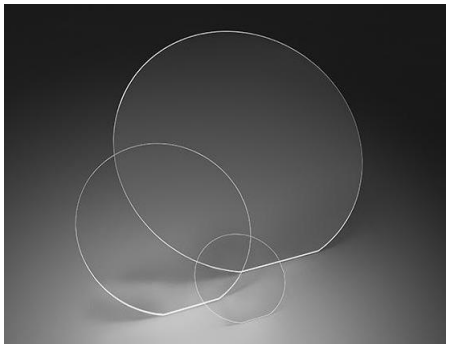
Plan to double production capacity with a further investment of ¥20 billion at 3 bases (Tajimi, Komaki, and Chita). Bring forward the start of production at the new Tajimi Plant to October 2019.
(Press release on March 20, 2018)

Capital Expenditures & Depreciation Costs

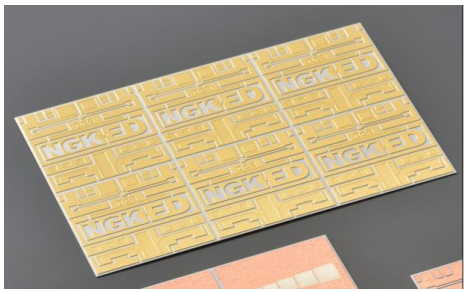


Response to the Expansion of PHVs/EVs

For Inverter



FGAN ®
Gallium nitride (GaN) wafer

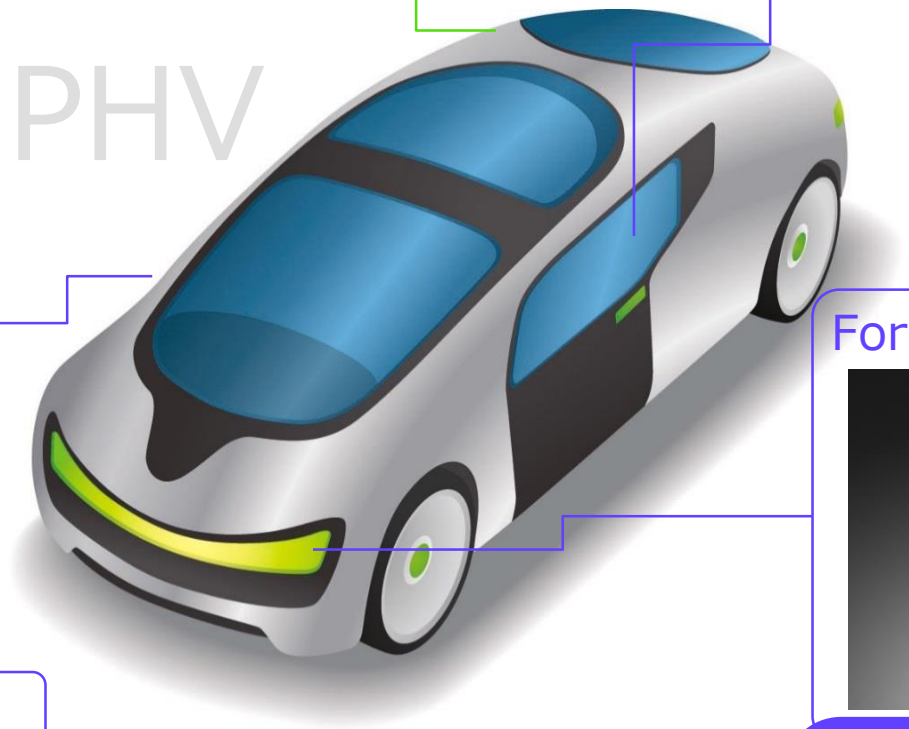


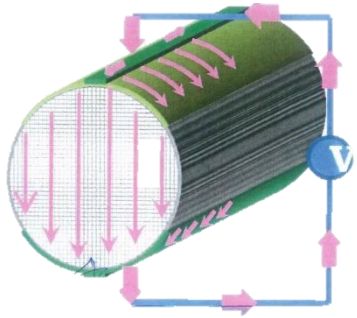
DCB infrastructure

Honeycomb

Switch, Relay
Beryllium copper products

Sensor

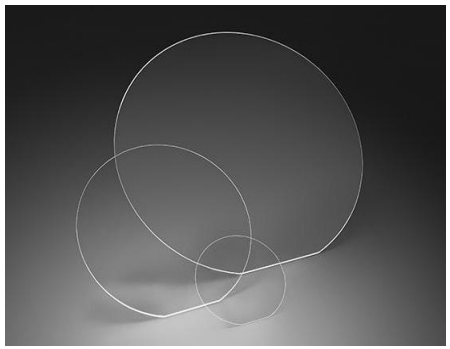




EHC

GPF

For Laser Headlight



FGAN ®
Gallium nitride (GaN) wafer

Safe and high-functionality all-solid state batteries are under development.

All Ceramics Batteries(ACB)

Steadily launch and develop various products in response to the progress in electrification of automobiles (shift to PHVs/EVs).

EnerCera® (Chip-type Secondary Battery)

・Using NGK's original Crystal Oriented Ceramic Plate as electrodes

・High energy density, small and thin body, high heat resistance

・Designed for high-temperature operation (260℃) necessary for mass production of devices.

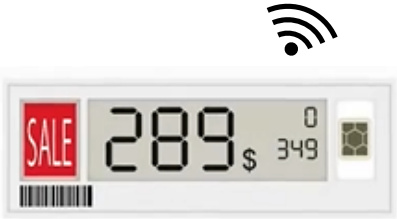
・The mass production of the EnerCera® series is scheduled to start in April 2019 sequentially

Intended use of EnerCera®

Smart Cards

Smart Key

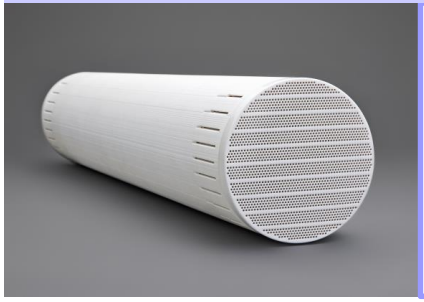
Electronic Shelf Labels (ESLs)



Smartwatch
(Multifunction solar/ hybrid smartwatch)

RFID Tags
(with temperature sensor)

DDR-type zeolite membranes for CO_2 separation



・The largest zeolite membrane element in the world, capable of separating small molecules

・Efficiently separating carbon dioxide (CO2) from methane (CH4) even at high CO_2 concentrations, at high pressures and at high temperatures

・Large membrane area per element means a smaller overall facility

・Developed with an eye on application to natural gas fields with a high concentration of CO2

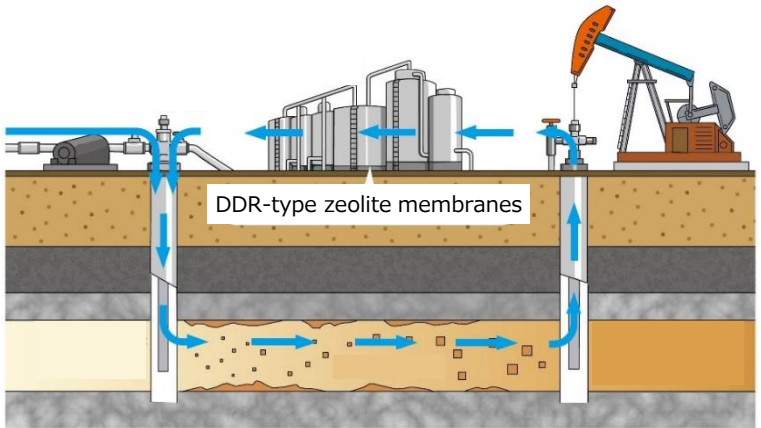
＜NGK's DDR-type zeolite membrane to Be Used in Demonstration Test ＞

(Press release on February 25, 2019)

NGK's DDR-type zeolite membrane has been adopted for use in "the demonstration test of the CO2 recovery process using DDR-type zeolite membranes," which conducted at an oil field in the United States by Japan Oil, Gas and Metals National Corporation (JOGMEC) and JGC Corporation (JGC).

Design and construction of the test facility began in February 2019, and demonstration tests will be carried out over approximately one year after its completion.

Schematic view of separation and collection of CO2 from crude-oil-associated gas

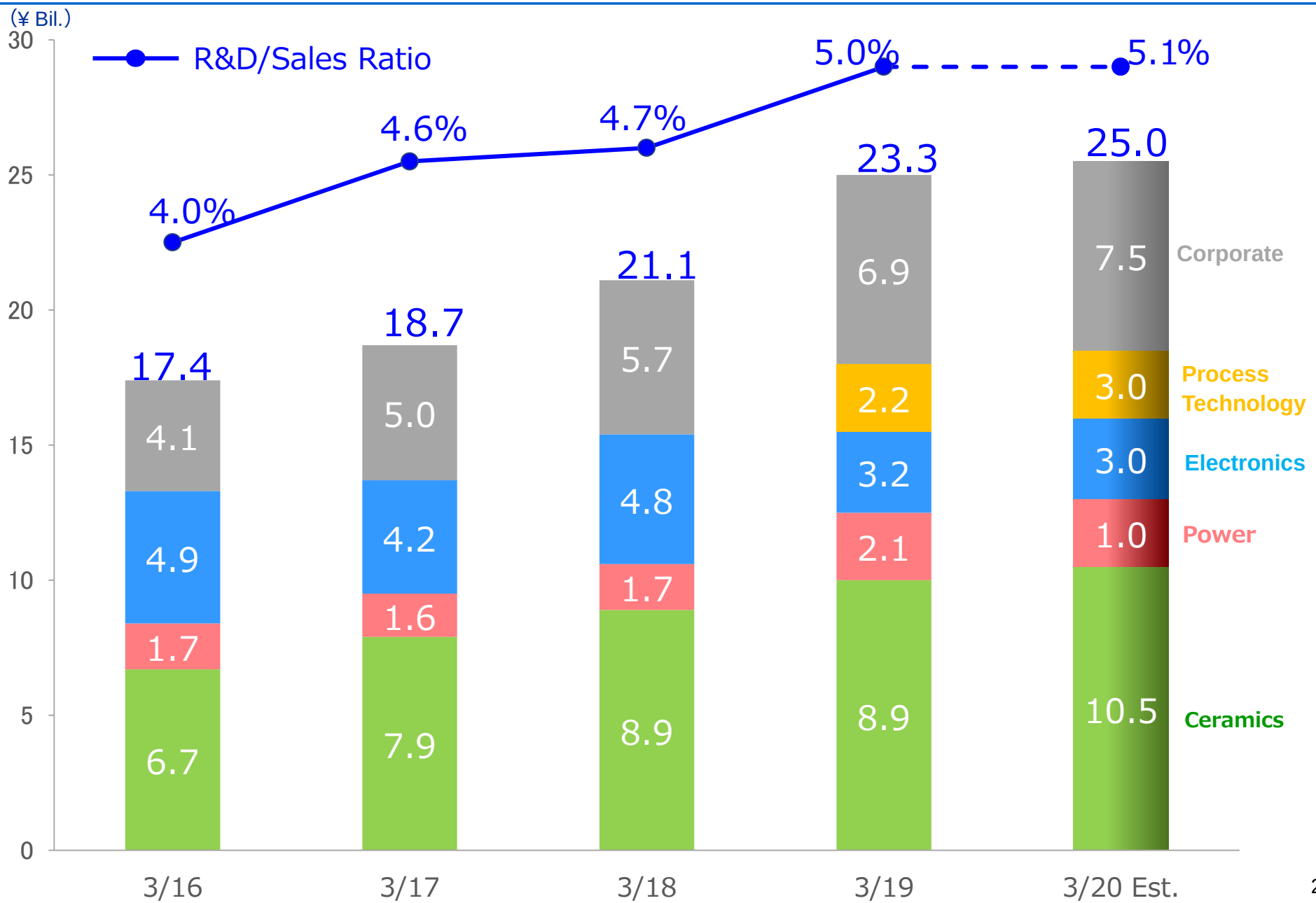


・The first-ever use of large ceramic membranes in CO_2 recovery from associated gas during oil production.

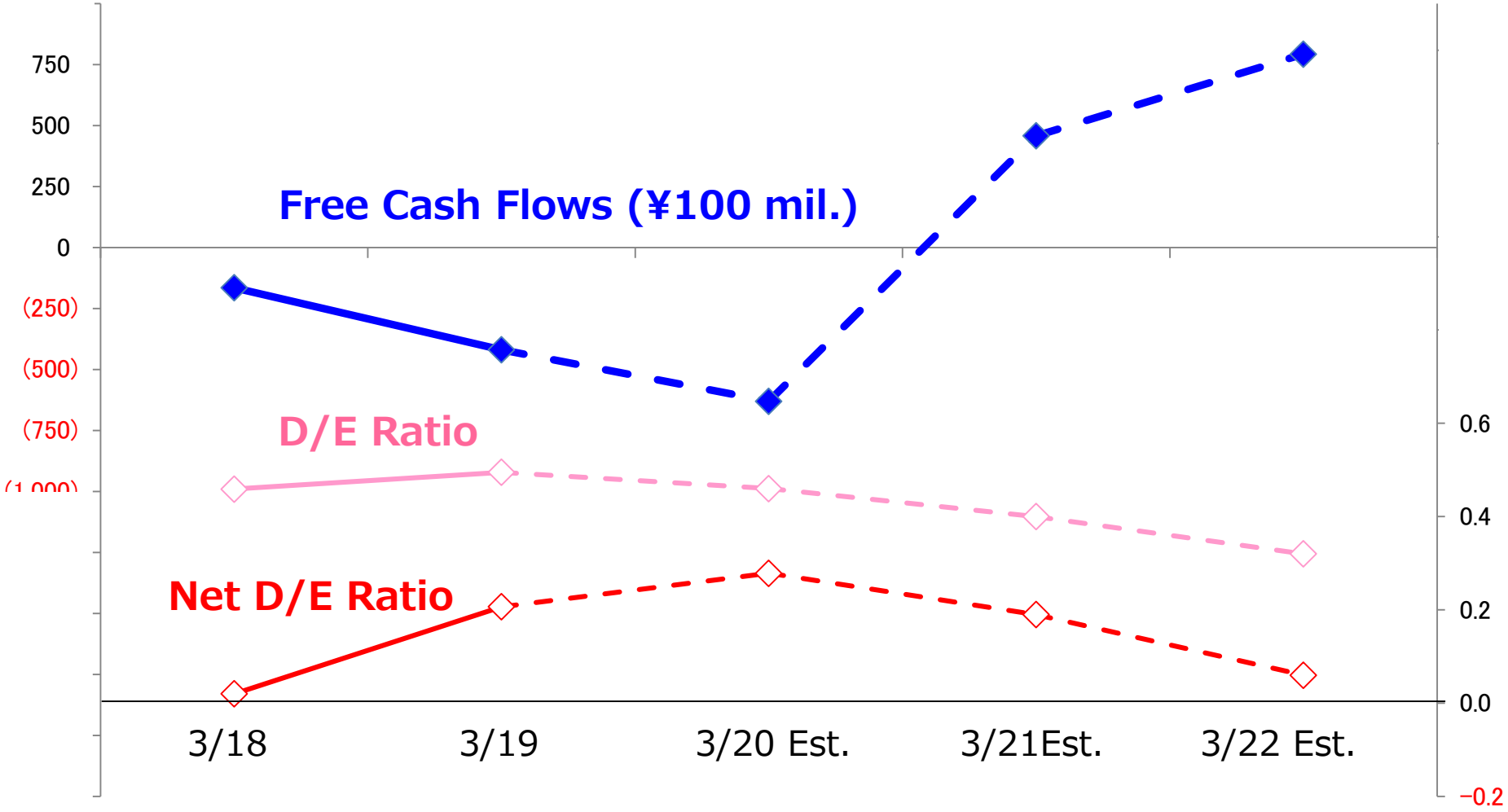
・Injecting CO_2 into the oil reservoir improves the fluidity of the crude oil and boost the oil production

・A part of the injected CO_2 is stored underground, which contributes to measure against global warming

R&D Input


(¥ Bil.)
R&D/Sales Ratio
4.0%
4.6%
4.7%
5.0%
5.1%
17.4
18.7
21.1
23.3
25.0
4.1
4.9
1.7
6.7
5.0
4.2
1.6
7.9
5.7
4.8
1.7
8.9
6.9
2.2
3.2
2.1
8.9
7.5
3.0
3.0
1.0
10.5
Corporate
Process Technology
Electronics
Power
Ceramics
30
25
20
15
10
5
0
3/16
3/17
3/18
3/19
3/20 Est.

Future FCF and Financial Composition



- 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.

Return on Invested Capital (ROIC)

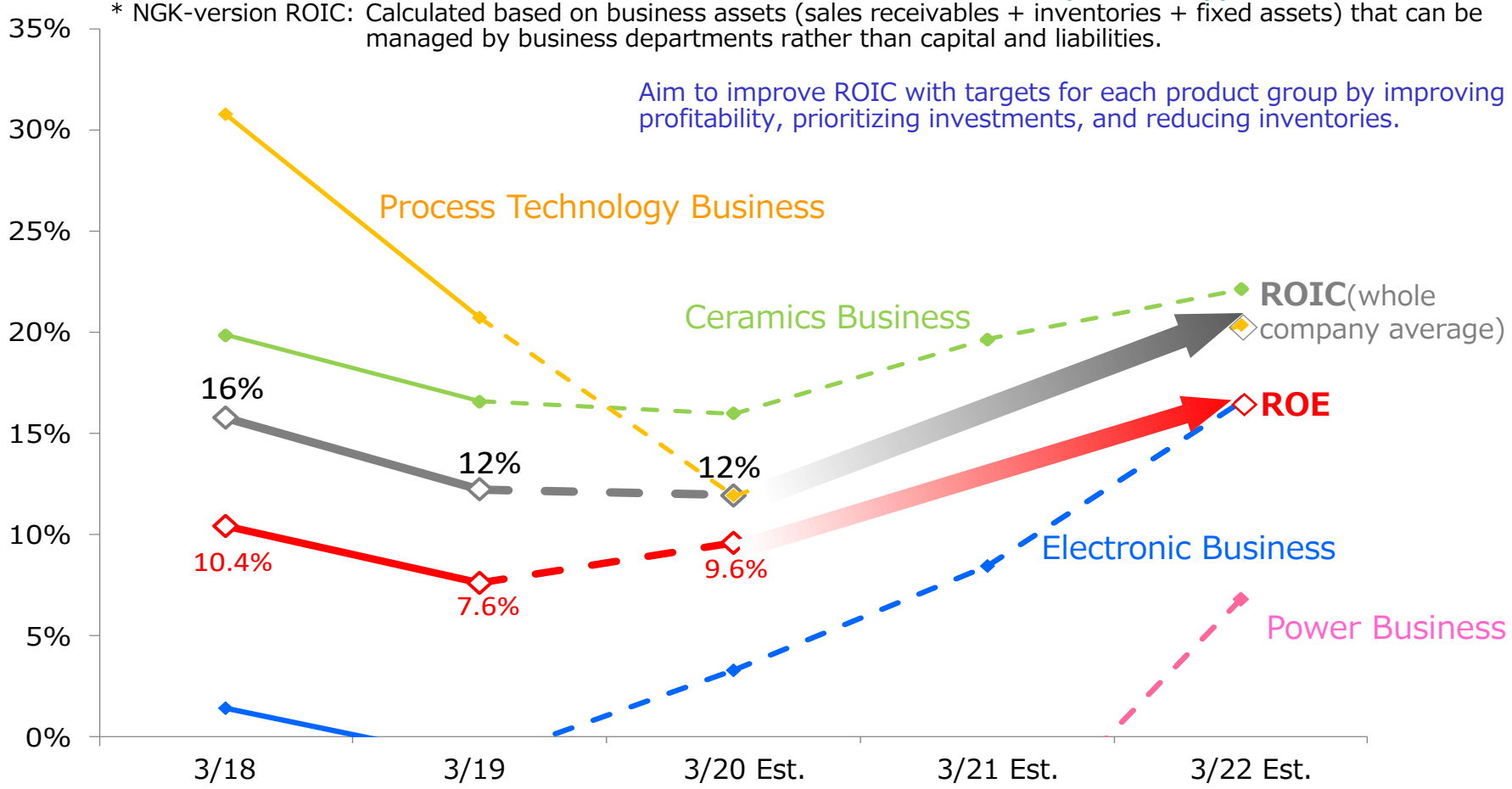
- Return on invested capital (NGK-version ROIC*) = $\frac{\text{Operating income}}{\text{Net sales}}$ X $\frac{\text{Net sales}}{\text{Business assets (sales receivables + inventories + fixed assets)*}}$

Return on turnover rate (Profitability)

Business assets turnover rate (Efficiency)

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

Aim to improve ROIC with targets for each product group by improving profitability, prioritizing investments, and reducing inventories.



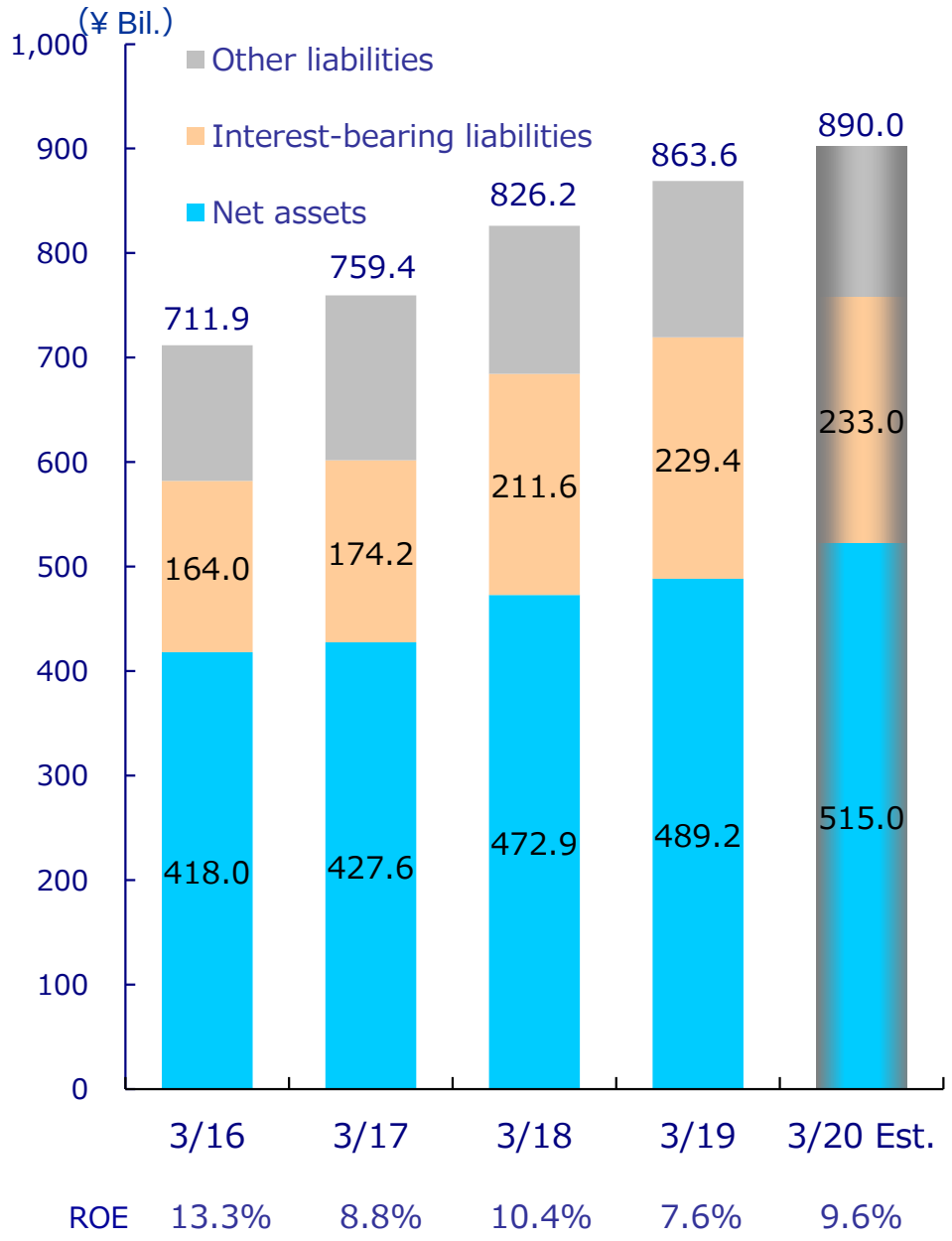
	3/18	3/19	3/20 Est.	3/21 Est.	3/22 Est.
Return on turnover rate	15.5%	14.0%	14.3%		15%以上
Business assets turnover rate	1.02	0.90	0.85		

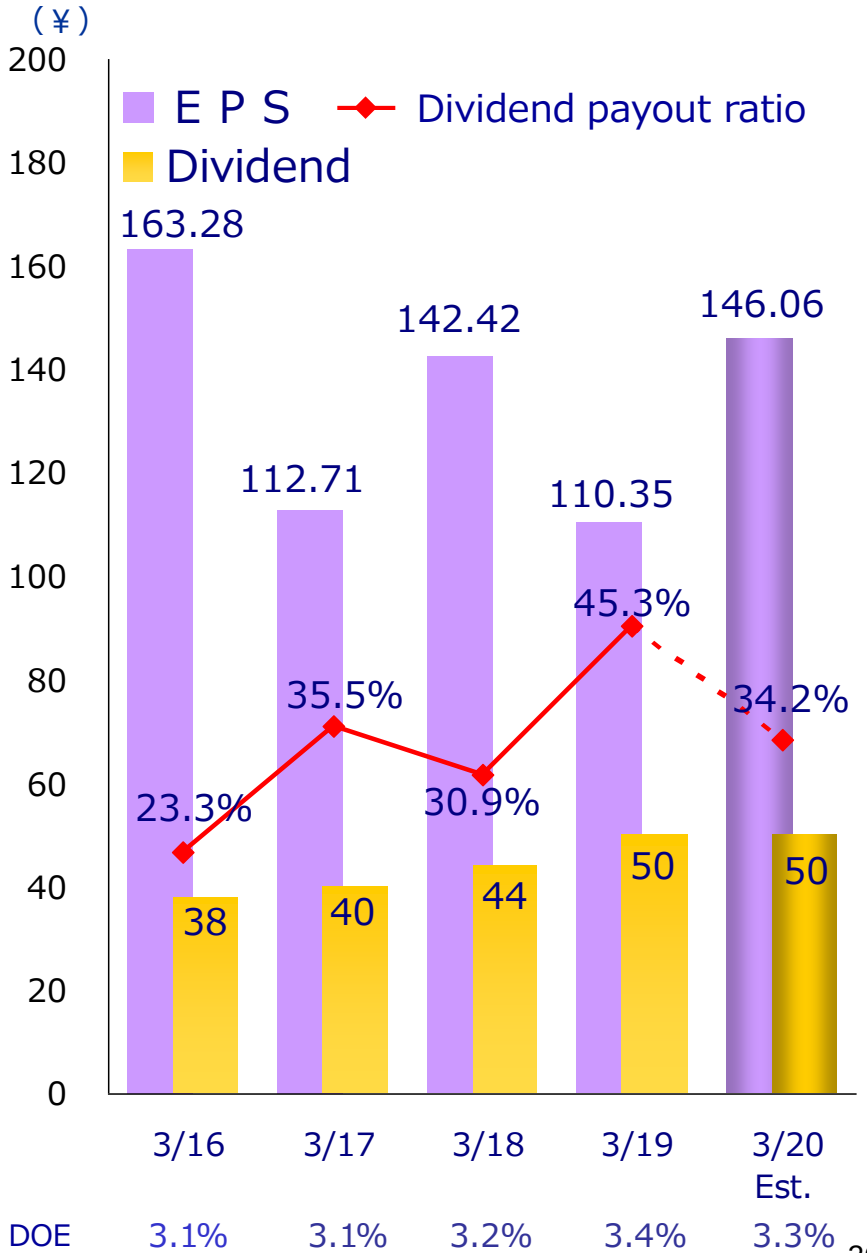
Summary of Cash Flow

(¥ Bil.)

	3/18	3/19	3/20 Est.
Operating Activities	50.6	61.2	61.0
Investing Activities	-49.4 Investment -68.8	-109.7 Investment-104.1	-98.0 Investment -120.0
Financing Activities	22.5 New loans +42.4 Repayment -6.8	3.6 New loans +31.9 Repayment -10.8	-12.0 New loans +33.0 Repayment -29.0
Effect of exchange rate change	1.5	-1.0	-
Net Change in Cash &Eq-	25.2	-45.9	-49.0
Cash & Eq- at the End of Year	169.9	124.0	75.0

Total Assets & ROE / EPS & Dividends





Sales by Product (Annual)

(¥ Bil.)

<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
N A S	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	78.0
G P F		76.5	76.5	10.8	22.0
Cd-DPF / LSH	67.8			69.5	75.0
SiC-DPF	38.2	40.8	40.8	39.0	42.0
Sensors	38.0	45.4	45.4	56.2	63.0
Industrial Process	23.9	27.1			
Ceramics Business	245.0	267.8	240.7	2,51.4	280.0
Metal related	20.3	22.5	22.5	22.3	22.5
SPE related	46.4	67.6			
Electric related	27.4	28.3	28.3	26.3	27.3
Soshin Electric CO.	9.4	10.5	10.5	10.2	10.2
Electronics Business	103.5	129.0	61.3	58.8	60.0
Industrial Process			27.1	31.0	31.0
SPE related			67.6	72.5	75.0
Process Technology Business			94.7	103.4	106.0
Total	401.3	451.1	451.1	463.5	490.0

Sales by Product (Semi Annual)

<After Consolidation Elimination>

(¥ Bil.)

	3/19		3/20 Est.	
	1st. Half	2nd. Half	1st. Half	2nd. Half
Insulators	23.1	23.6	19.0	22.0
N A S	1.1	2.1	1.0	2.0
Power Business	24.2	25.7	20.0	24.0
Honeycomb filters	38.4	37.6	39.0	39.0
G P F			9.0	13.0
Cd-DPF / LSH	38.1	42.1	36.0	39.0
SiC-DPF	18.8	20.2	21.0	21.0
Sensors	27.3	28.9	31.0	32.0
Ceramics Business	122.6	128.8	136.0	144.0
Metal related	10.8	11.5	10.5	12.0
Electric related	14.2	12.1	12.7	14.6
Soshin Electric CO.	5.2	5.0	4.8	5.4
Electronics Business	30.2	28.6	28.0	32.0
Industrial Process	13.4	17.5	15.0	16.0
SPE related	37.6	34.9	31.0	44.0
Process Technology Business	51.0	52.4	46.0	60.0
Total	228.0	235.5	230.0	260.0

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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