

FY2022 1st Half Results (from April 1, 2022 to September 30, 2022)

October 31, 2022



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President
Shigeru Kobayashi



NGK INSULATORS, LTD.

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 FY2022
(1st Half results/Forecasts for FY2022)
- Forecasts and Outlook of Segment Information
- Capital Expenditures, Depreciation Costs & R&D
- Medium-term Plan・Business Portfolio
(Business Performance/ROIC)
- ESG Management/ Carbon Neutrality Initiative
Sustainable Finance
- Financial Condition
(Capital Policy・Treasury Stock Purchase
/Summary of Cash Flow/Total Assets・Dividend)

Summary of financial 1st Half results for FY2022

	(¥ Bil.)	FY2021 1st half	Announcement April	FY2022 1st half	Growth ratio
Net Sales		250.2	275.0	274.7	FX +19.1 +10%
Operating Income		45.9	41.0	38.8	+7.2 (15%)
Ordinary Income		43.9	39.0	34.5	(21%)
Profit Attributable to Owners of Parent		32.0	28.0	26.5	(17%)
Exchange Rate	USD	¥110	¥120	¥133	+¥23
	EUR	¥131	¥130	¥139	+¥8

YOY Sales increased; operating income decreased.

Sales and income decreased compared to the April announcement.

■ Environment

While sales increased due to the weak yen, operating income decreased due to that a decline in demand caused by China lockdown and that soaring raw material and energy prices.

■ Digital Society

Shipments of components for semiconductor production equipment increased supported by robust capital investments in semiconductor foundries, and sales and operating income increased due to higher demand mainly for crystal packages.

■ Energy & Industry

Despite sales increased due to the positive effect of the weak yen, operating income decreased due to soaring raw material and energy prices.

Forecasts for FY2022

	(¥ Bil.)	FY2021	Announcement April	FY2022	Growth ratio
Net Sales		510.4	580.0	580.0	FX +39.3 +14%
Operating Income		83.5	90.0	78.0	+16.7 (7%)
Ordinary Income		86.2	88.0	74.0	(14%)
Profit Attributable to Owners of Parent		70.9	65.0	61.0	Assumed exchange rates in 2 nd half ¥140/USD (14%) ¥135/EUR
Exchange Rate	USD	¥113	¥120	¥137	+¥24
	EUR	¥131	¥130	¥137	+¥6

YOY sales will increase; operating income will decrease.

Compared to the April announcement, operating income will decrease.

■ Environment

While the sales of trucks in China decreased, sales are expected to increase due to the tightening emission regulations and the positive effect of the weak yen. Operating income is forecasted to decline due to higher labor costs and soaring raw material and energy prices as a result of inflation.

■ Digital Society

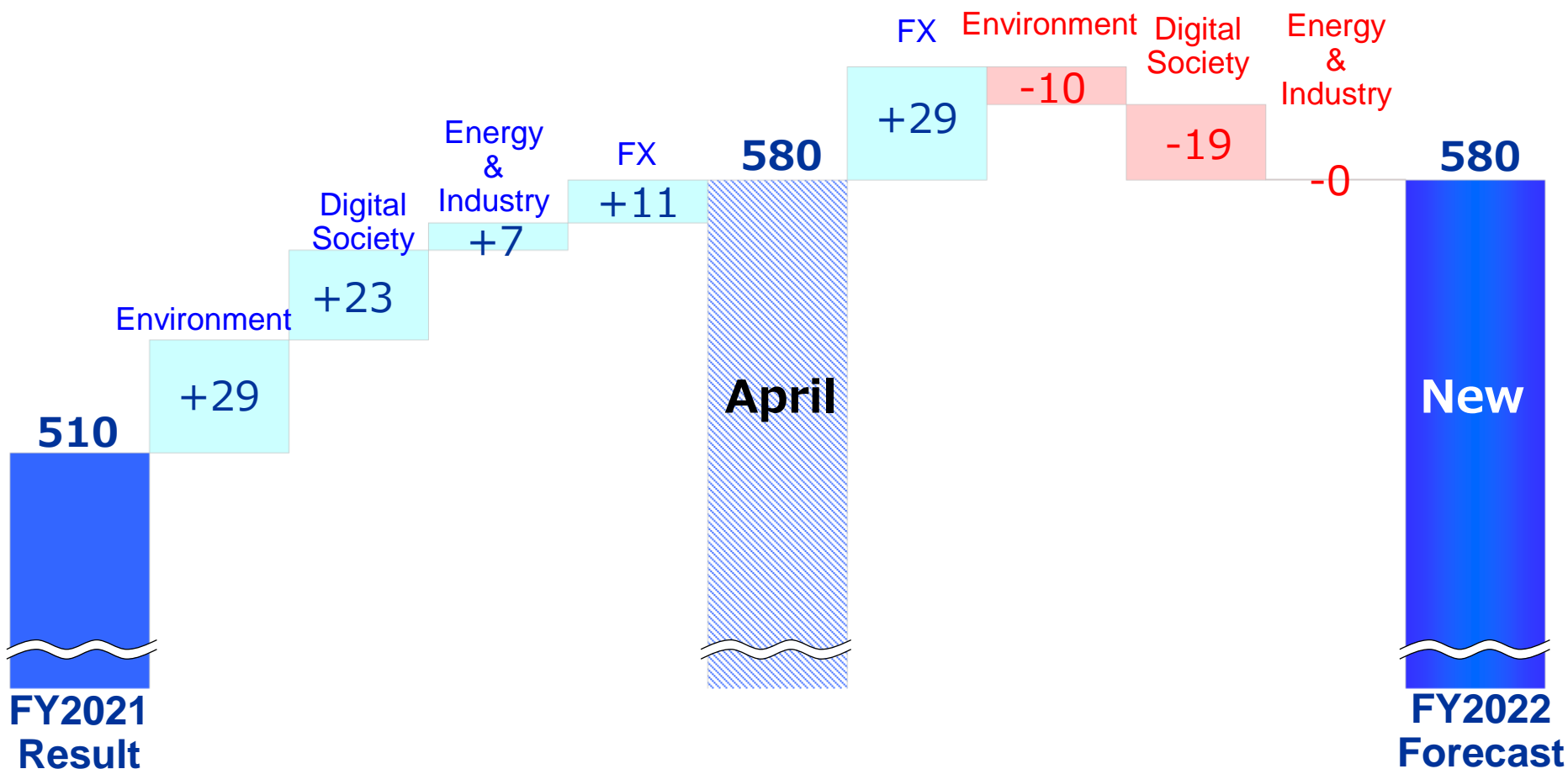
The latest demand are assumed to be weak due to that a downward tendency in semiconductor capital investments and that new China export regulations for advanced semiconductors by the U.S.. Compared to the previous fiscal year, sales and operating income are expected to increase due to the weak yen.

■ Energy & Industry

Sales are expected to increase due to a demand for industrial heating systems for Lithium-ion battery cathode materials and the positive effect of the weak yen.

Sales Change Analysis for FY2022

(¥ Bil.)

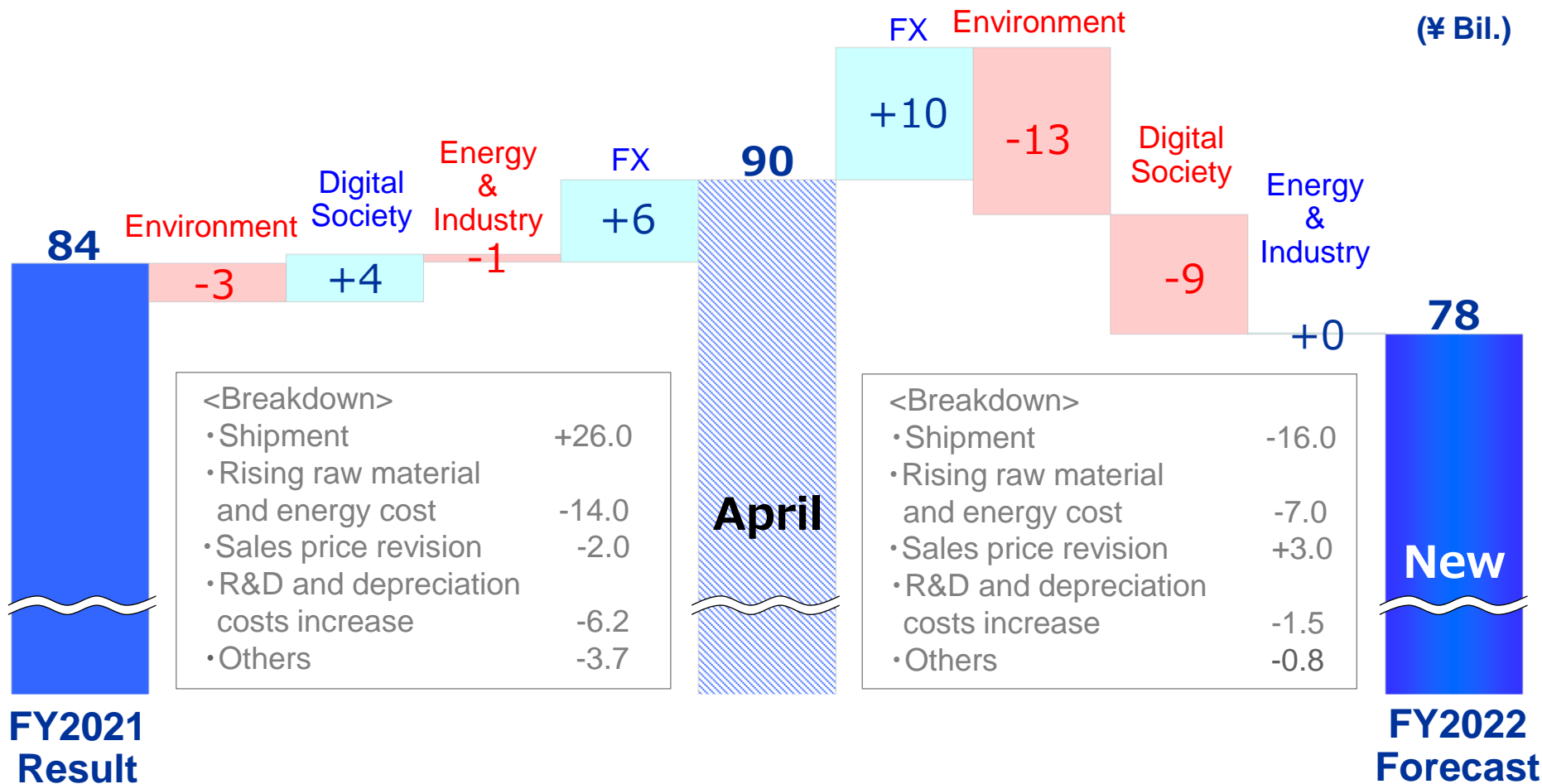


FX Rate
 FY2021
 ¥113/USD
 ¥131/EUR

April
 (FY2022 Forecast)
 ¥120/USD
 ¥130/EUR

New
 (FY2022 Forecast)
 ¥137/USD
 ¥137/EUR

Operating income Change Analysis for FY2022



FX Rate

FY2021
¥113/USD
¥131/EUR

April
(FY2022 Forecast)
¥120/USD
¥130/EUR

New
(FY2022 Forecast)
¥137/USD
¥137/EUR

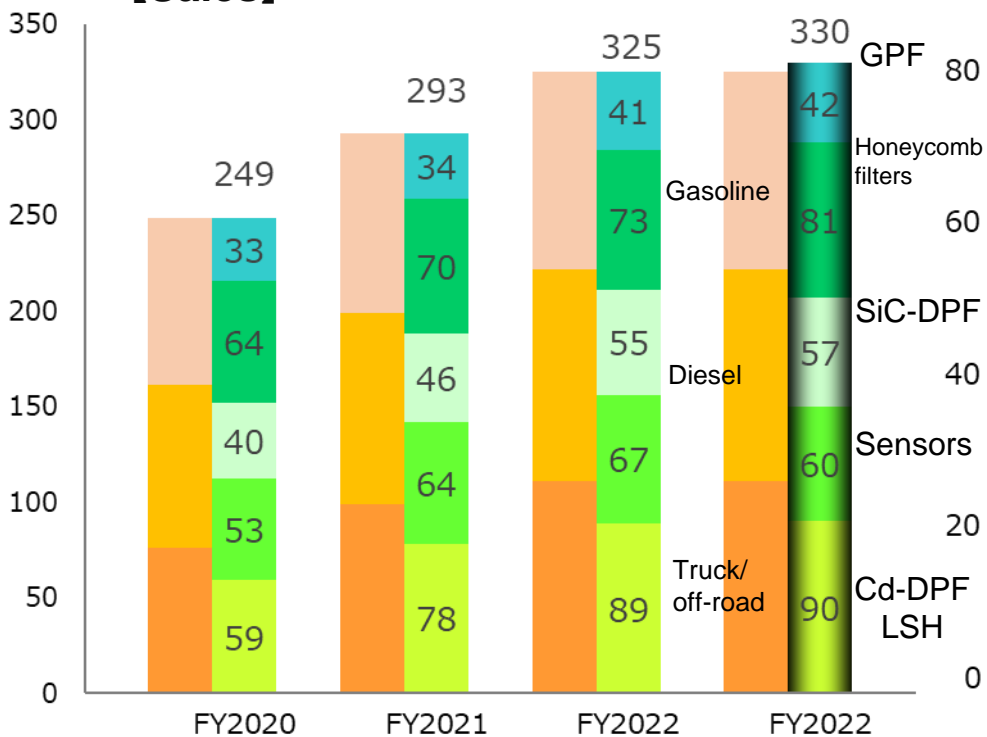
● Automotive Related

Although demand decreased due to the decline in sales of passenger vehicles caused by a further drop in the sales of trucks mainly in China and a concern toward global economic stagnation, sales are expected to exceed the April forecast due to the effect of the weak yen. Operating income is likely to slightly fall below the April forecast due to higher labor costs and raw material and energy prices as a result of further inflation although sales price revision is implemented to the maximum extent possible. While the impact of semiconductor shortages will be gradually resolved and the sales of passenger vehicles and trucks will increase toward the second half of the fiscal year, uncertainties still remain, so we will pay close attention to future developments.

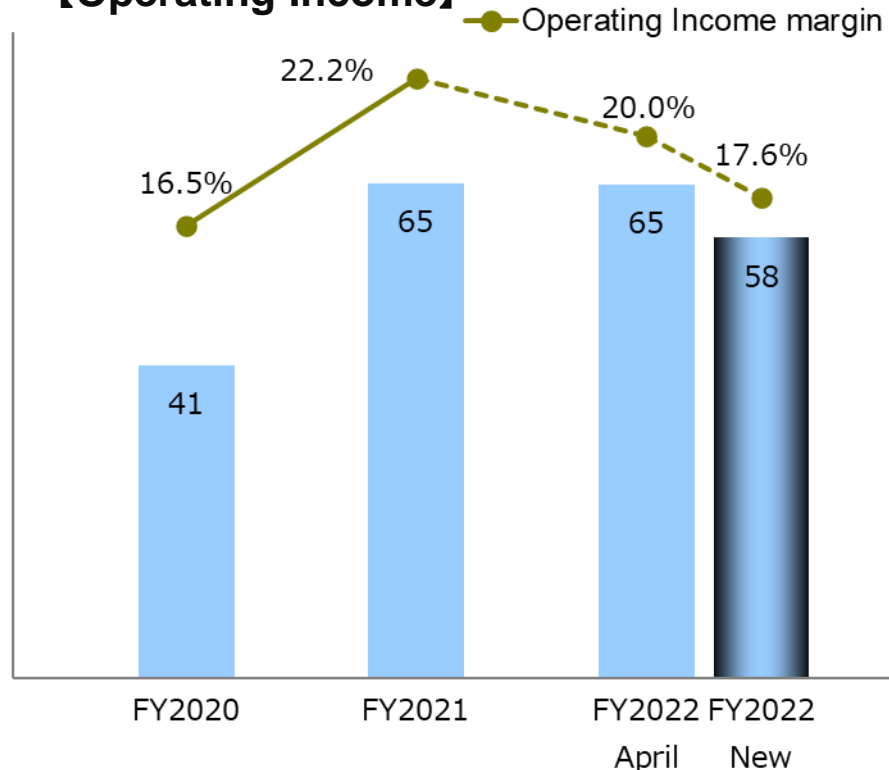
- GPF/Honeycomb filters (for gasoline-fueled vehicles) : Demand is likely to decrease slightly compared to the April announcement due to the decline in sales of passenger vehicles caused by a global economic stagnation.
- SiC-DPF (for diesel passenger vehicles/trucks) : Demand for our company's products is likely to remain strong even in deteriorated market.
- Sensors (for diesel passenger vehicles/trucks) and trucks in China. : Demand is likely to decrease compared to the April announcement due to the decline in sales of passenger cars (for diesel passenger vehicles/trucks) and trucks in China.
- Cd-DPF/LSH (for trucks) : Demand is likely to decrease compared to the April announcement due to the decline in sales of trucks in China

(¥Bil.)

【Sales】 <After inter-segment elimination>

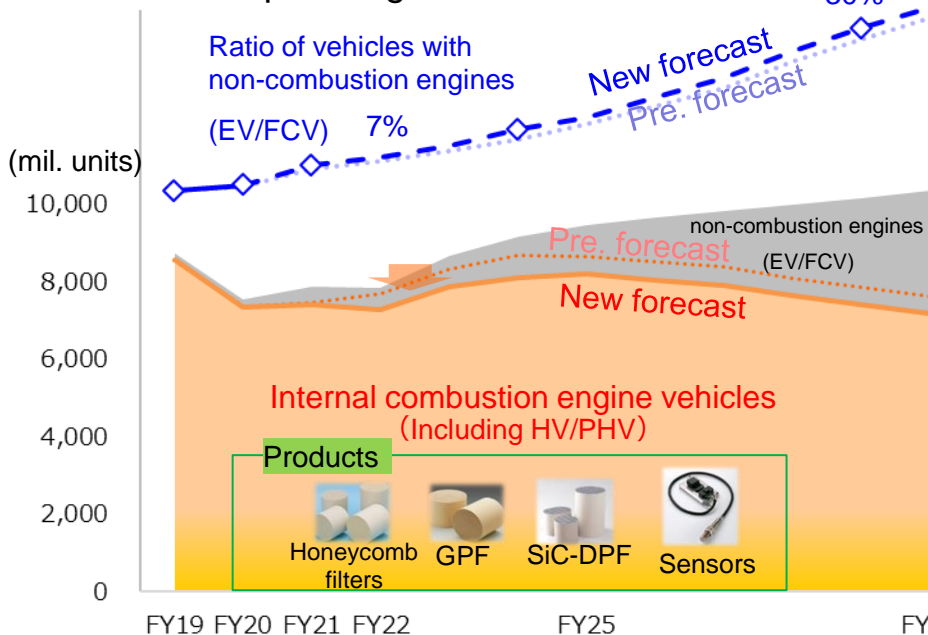


【Operating Income】



Forecasts for Products for Passenger Vehicles

〔Forecast for passenger car sales〕 (NGK's Est.)



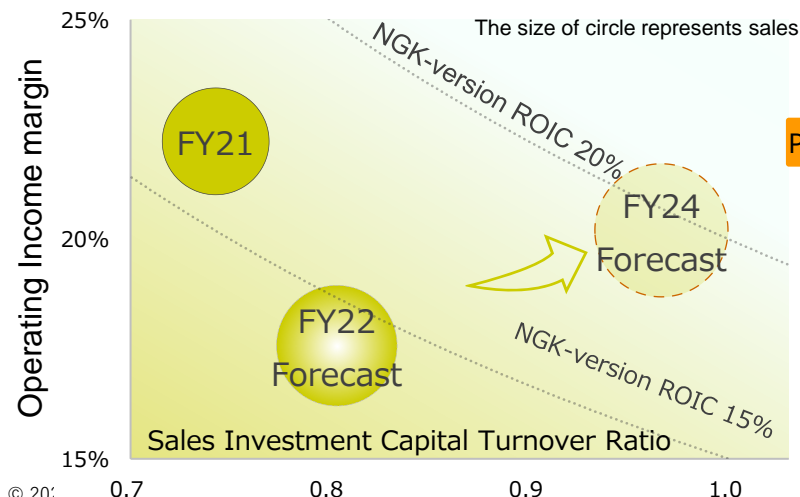
〔Forecast for emission regulations〕 (NGK's Est.)

Markets	FY20	FY21	FY22	FY23	FY24	FY25
Japan	PPNLT (WLTC)					GE/GDI RDE
Europe	EU6d-Full					EU7
U.S.	Tier3 LEV III					PM 1mg
China	China 6a (All)			China 6b (All)		
India	BS6 Stage I		BS6 Stage II			
Thailand	EU4				EU5	

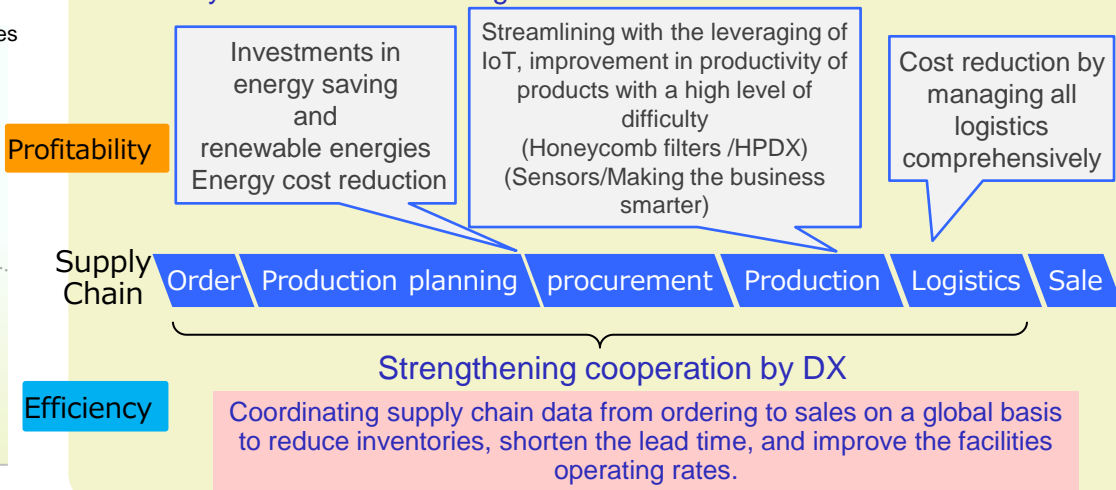
The forecast for the sales of passenger vehicles was revised downward given the situation in Ukraine and concerns over an economic downturn. Demand for internal combustion engine vehicles will remain at a certain level supported by stricter regulations in China, Europe, and others, although it will gradually decrease in the long run.

〔* NGK-version ROIC medium-term Forecast 〕

$$\text{* NGK-version ROIC} = \frac{\text{Operating Income}}{\text{Accounts receivable} + \text{Inventories} + \text{Fixed assets}}$$

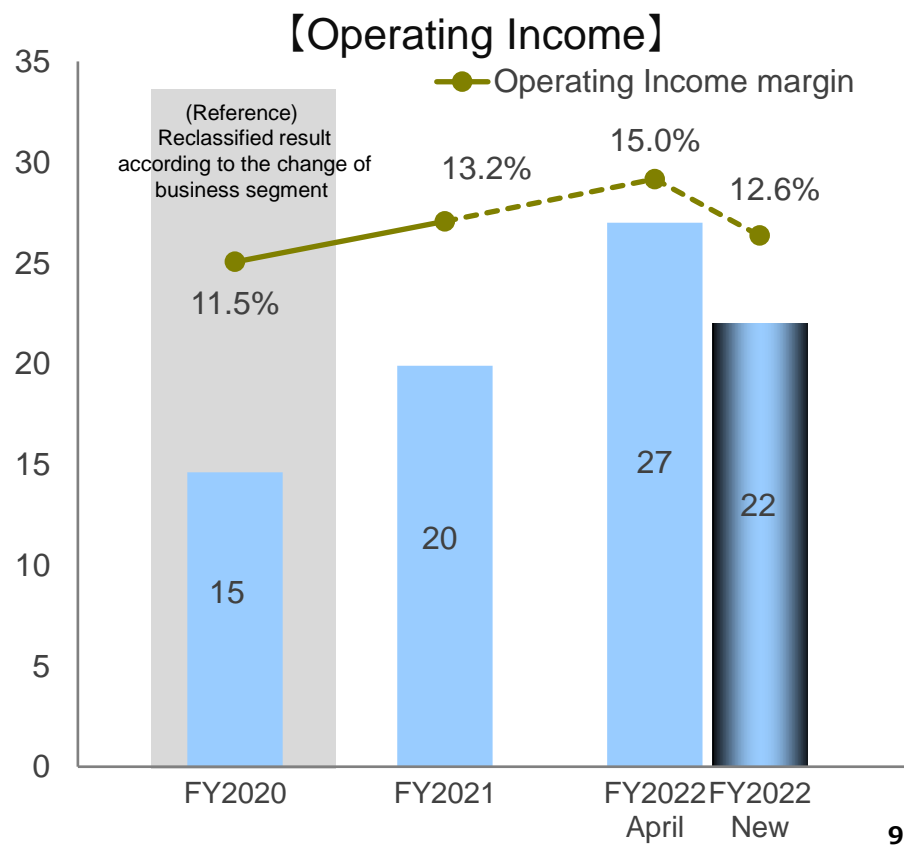
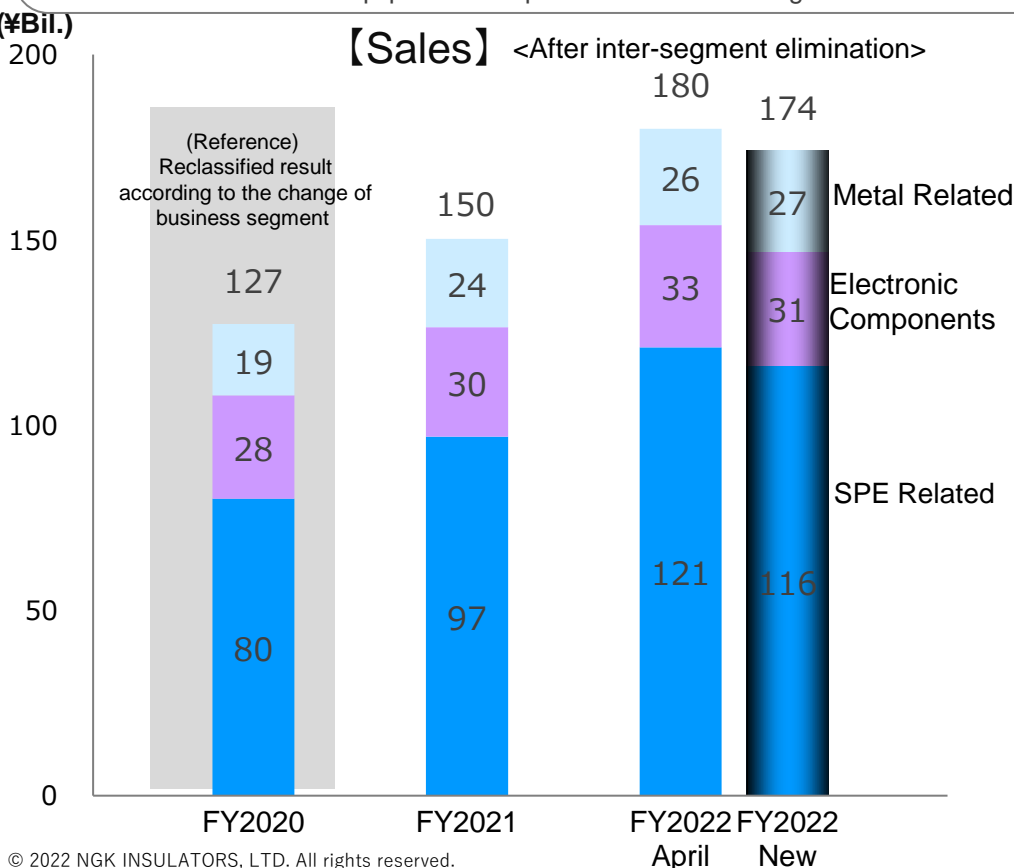


Aiming to maintain and improve profitability by promoting automation and efficiency with IoT while sales growth is limited.



Digital Society Business

- **SPE Related** (Components for semiconductor production equipment)
 - Device manufacturers have cut down production or postponed their investment plans because of sluggish sales of smartphones/PCs. In addition, sales of components for semiconductor manufacturing equipment are forecasted to decline due to stricter regulations on advanced semiconductors by the U.S., which restrict SPE manufacturers to export to China. Sales and operating income are likely to decline compared to the April announcement despite the positive effect of the weak yen.
- **Electronic Components**
 - Sales and operating income of piezoceramic actuators for HDDs are likely to decrease compared to the April announcement due to a sharp decline in investments in data centers affected by recession.
 - Ceramic packages are expected to achieve the April announcement both in sales and operating income as demand for packages for base stations will increase due to the China's continued investments in macro base stations, although demand for crystal packages will decline due to the sluggish sales of smartphones.
- **Metal Related**
 - Demand for industrial equipment is expected to remain strong.

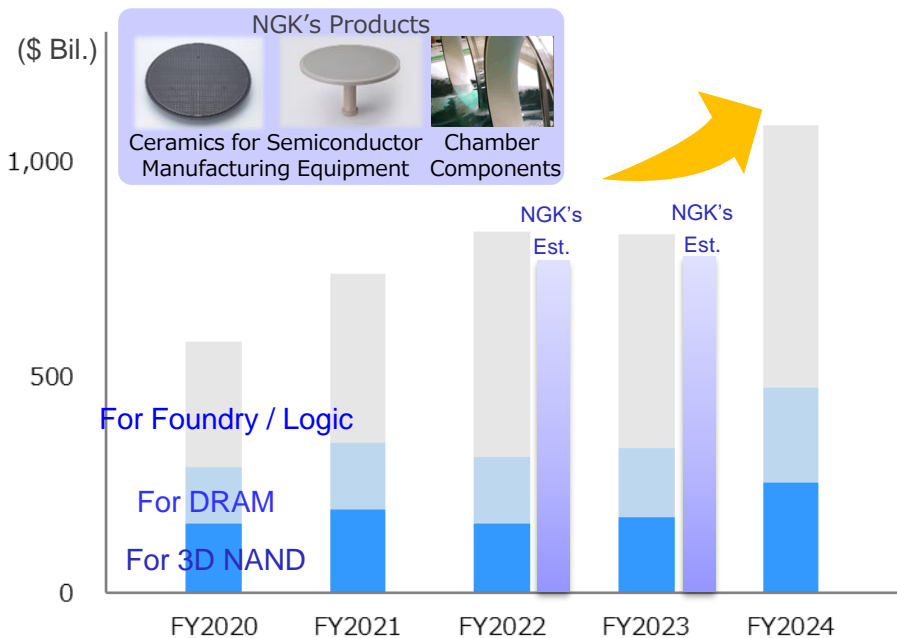


Forecasts for the Digital Society Business

■ SPE related

(Components for semiconductor manufacturing equipment)

Investment trends for semiconductor front-end manufacturing equipment by use (NGK's est. based on SEMI forecasts in September)



[Forecast for the demand of SPE related products]

Latest (FY2022) Semiconductor investments restriction due to the sluggish sales of smartphones/PCs → We assume further decline of WFE against the SEMI forecast.

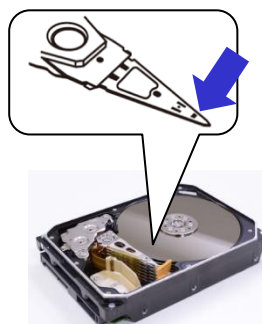
FY2023 Inventory adjustment phase and a temporary respite in demand will be observed

Metaverse and data centers will drive Medium to Long-term investments, and the SPE market, especially foundries, will grow again

Investments at each base will be increased to ensure the demand for our products is captured.

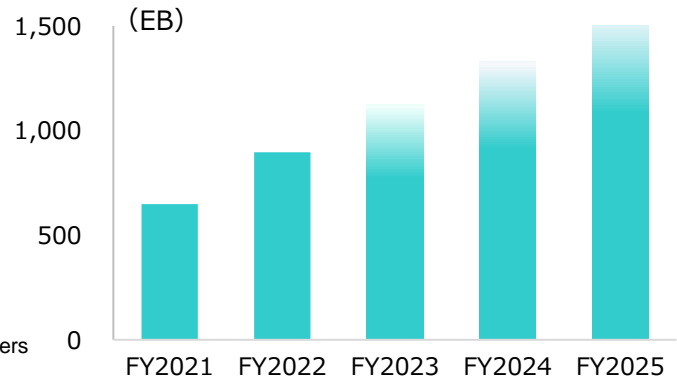
■ Piezoceramic Actuators for HDD (Electronic Components)

Huge investments in data centers continue as the volume of data generation keeps increasing due to the widespread use of image data and teleconferencing. Demand for high capacity HDD storage is on the rise despite its latest demand adjustment phase.

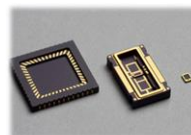


Piezoceramic Actuators for HDDs used in near-line servers

[Expected sales volume of HDDs used in near-line servers]

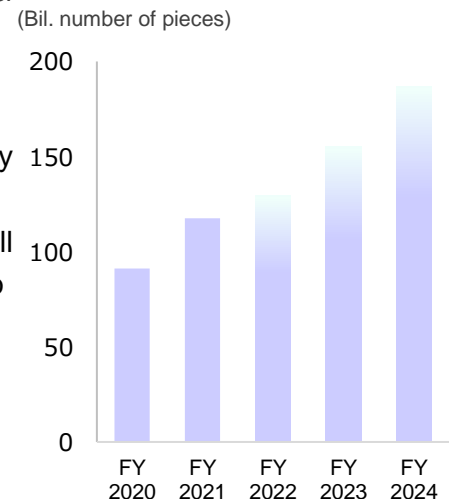


■ Ceramic Packages (Electronic Components)



Ceramic packages are used in crystal devices, CMOS, RF, etc.

[Forecast for the quantity of small crystal devices]



The latest demand for crystal devices has been weak affected by the inventory adjustment as a result of the sluggish sales of smartphones. Demand for small crystal packages is likely to grow due to the use of high frequency in short-distance wireless communications and the expansion of 5G smartphones and wearable devices.

● Insulators

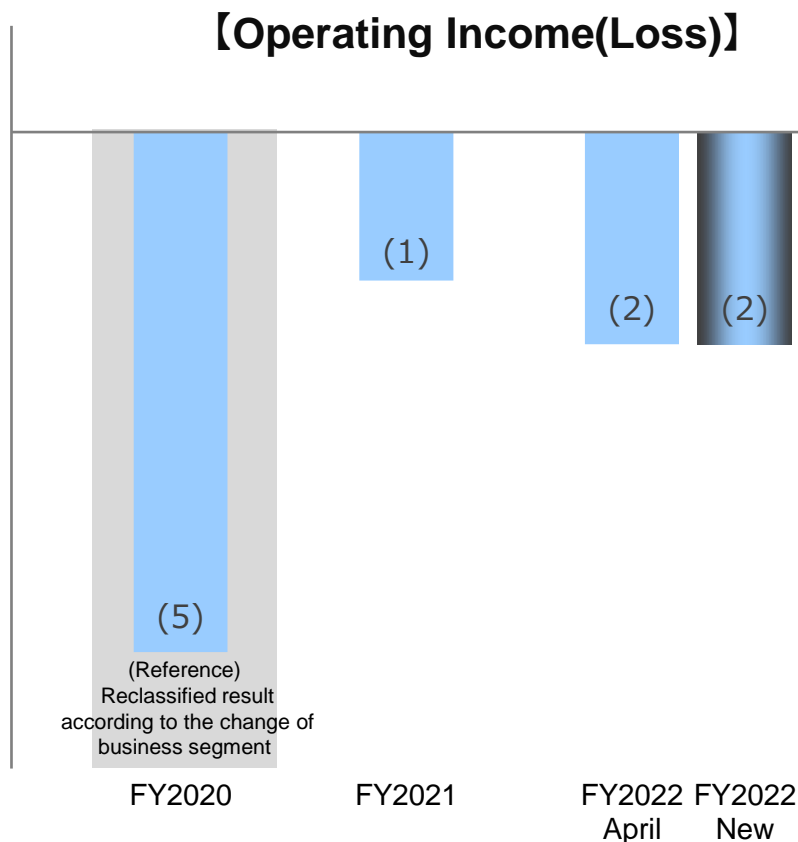
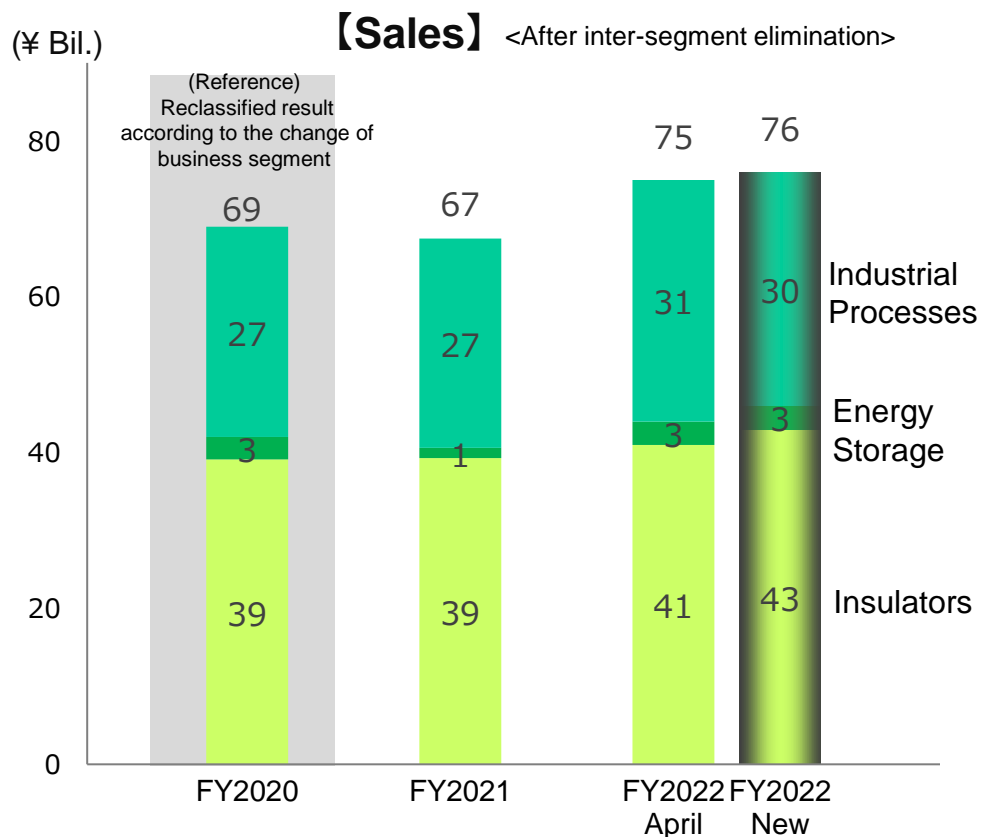
• Sales are expected to slightly exceed the April announcement due to the effect of the weak yen despite decreased amounts as a result of delays in projects in Japan and abroad.

● Energy Storage

• Though operating loss will continue as it takes time to realize and expand a business model that utilizes NAS® batteries, inquiries remain active as actions toward the realization of carbon neutral society steadily progress.

● Industrial Processes

• Sales will decrease compared to the April announcement due to a delay in some demand for industrial heating systems for Lithium-ion battery cathode materials in China.



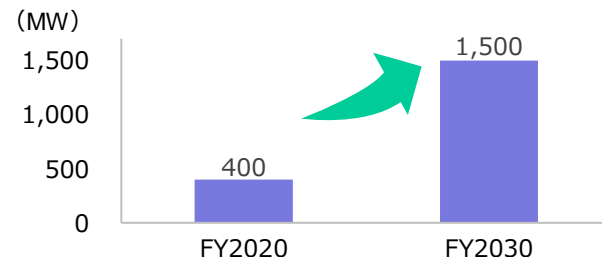
■ NAS® Batteries

Formulation of systems and budgeting of subsidized projects related to system storage batteries by the Ministry of Economy, Trade and Industry are underway to effectively use excess renewable energies and supply an adjustment capability by system storage batteries toward further utilization, installation and expansion of renewable energies in Japan.

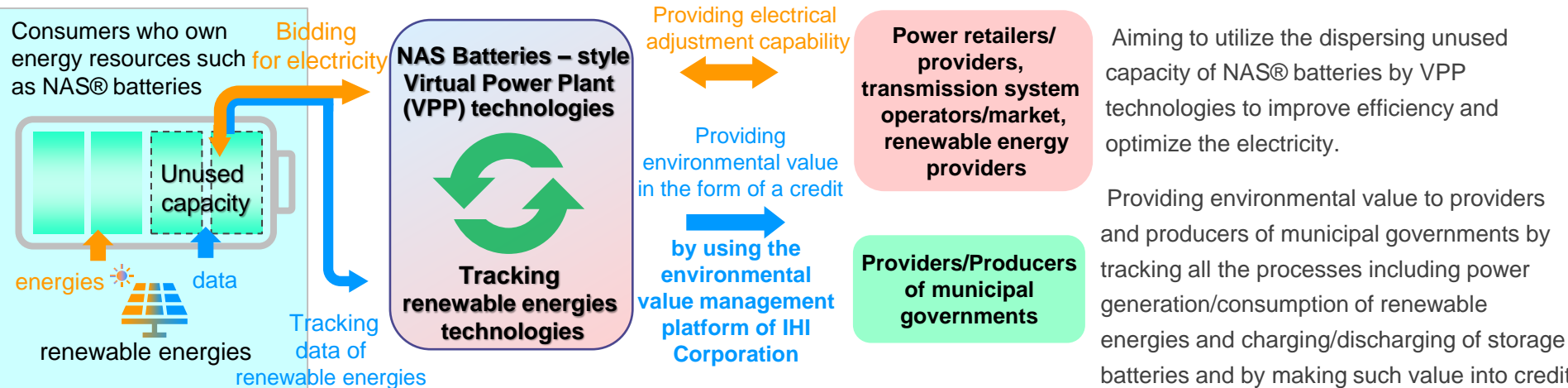
The selection of target areas for decarbonization has been approved by the Ministry of the Environment, and initiatives of municipal governments on carbon neutrality has begun in earnest.

Domestic amount of adoption of power storage technologies, the market is expected to grow by 100MW/year toward 2030

The information on the market is based on publicly available information, consulting firms, and our estimates



Develop a “NAS x Digital” business model and expand “selling value and services” that provides asset value and environmental value



Aiming to utilize the dispersing unused capacity of NAS® batteries by VPP technologies to improve efficiency and optimize the electricity.

Providing environmental value to providers and producers of municipal governments by tracking all the processes including power generation/consumption of renewable energies and charging/discharging of storage batteries and by making such value into credit through the J-Credit System.

- Regional power provider
- Municipal Government
- Providers
- Consumers of high voltage
- Renewable energy power stations
- Power storage providers

Aiming to commercialize a VPP/power digital service early by establishing a joint venture with RICOH COMPANY, LTD.

(Reference) Sales expansion of NAS® batteries to subsidized energy storage stations

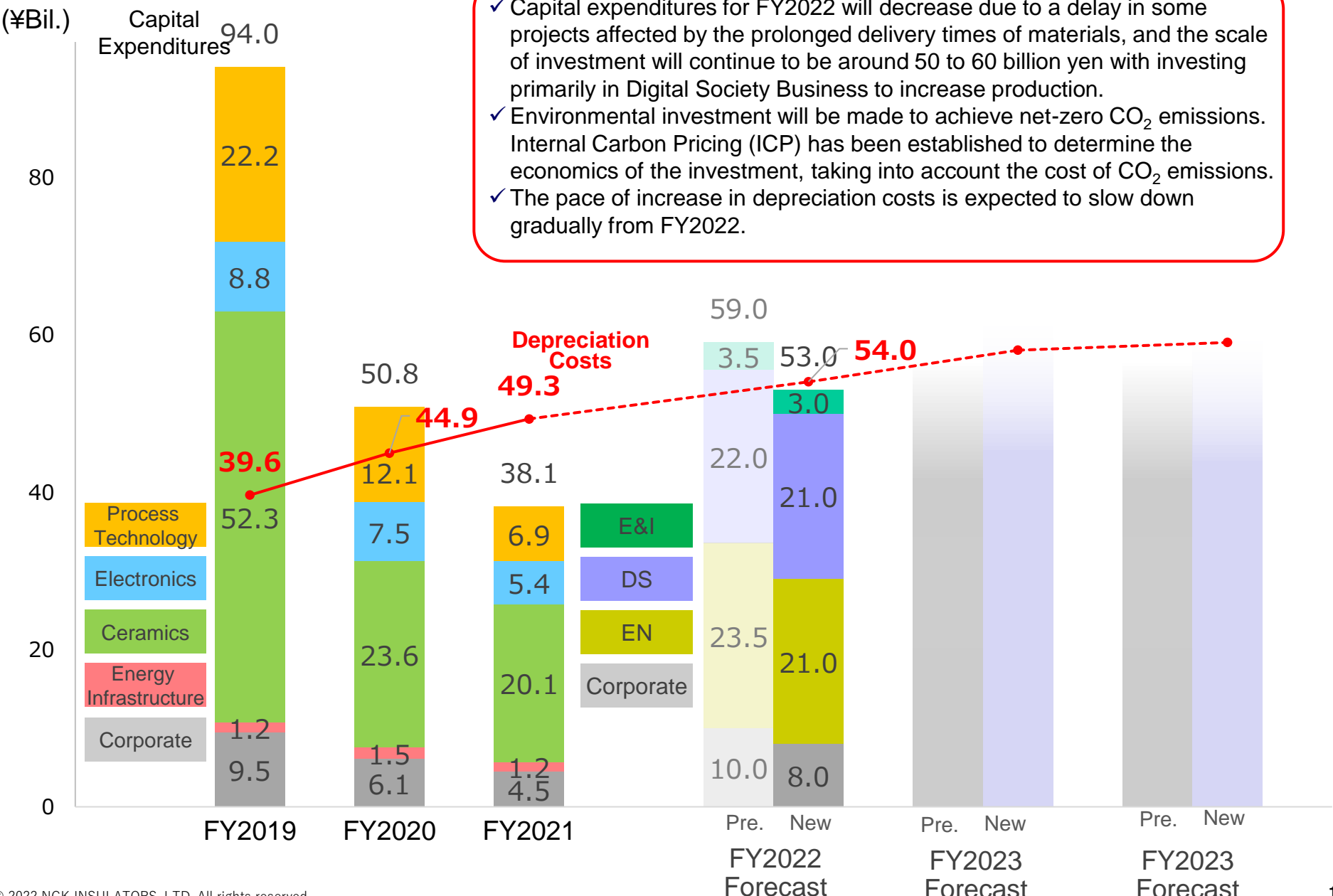
Received an order for NAS® batteries for system storage batteries of TOHO GAS., Ltd
 Location: Former Tsu LNG Station of TOHO GAS
 Battery capacity: 11.4MW
 (48 container-type NAS® batteries)

Leading to the expansion of the revenue base as inquiries for power storage batteries are increasing.



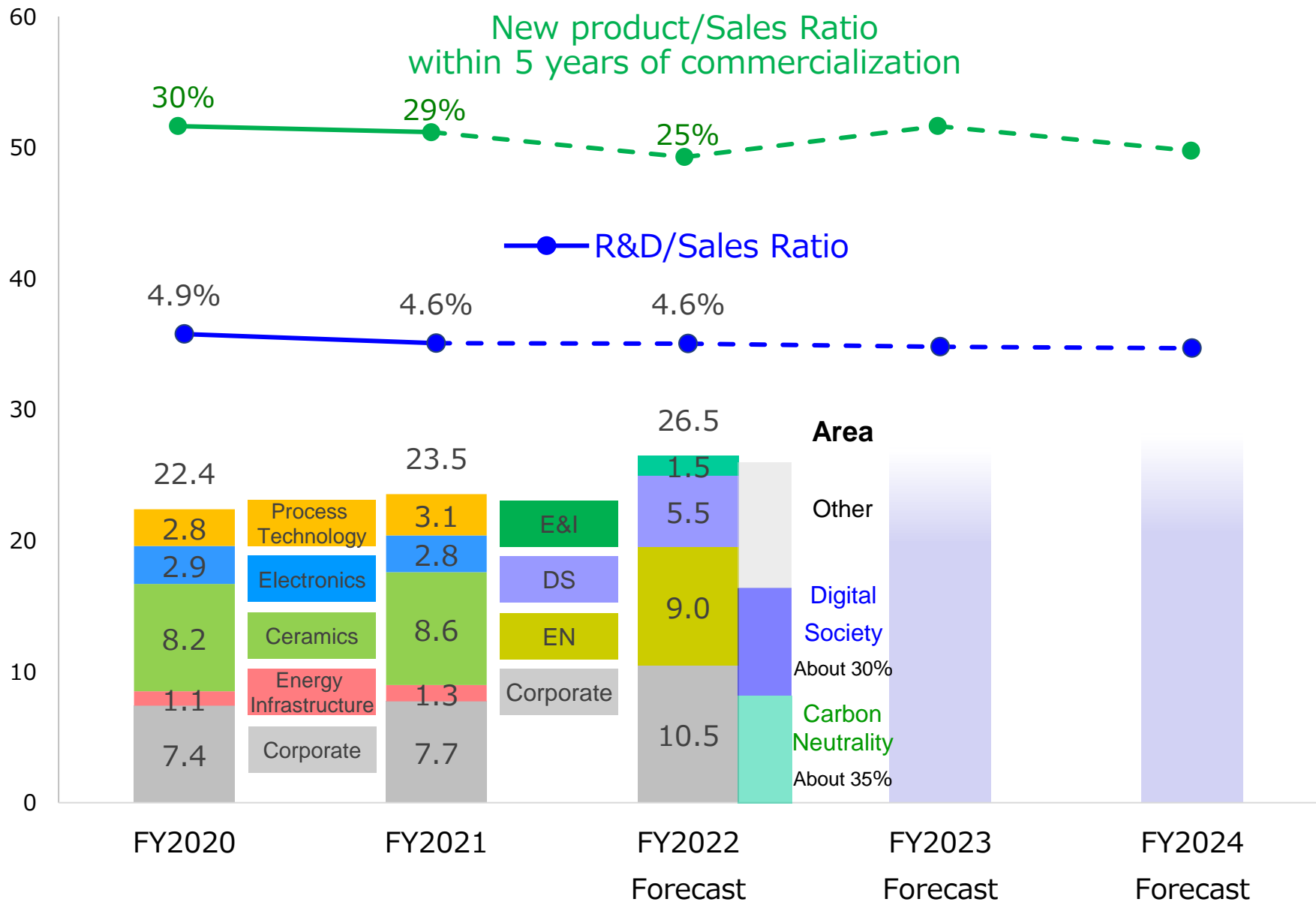
Capital Expenditures & Depreciation Costs

- ✓ Capital expenditures for FY2022 will decrease due to a delay in some projects affected by the prolonged delivery times of materials, and the scale of investment will continue to be around 50 to 60 billion yen with investing primarily in Digital Society Business to increase production.
- ✓ Environmental investment will be made to achieve net-zero CO₂ emissions. Internal Carbon Pricing (ICP) has been established to determine the economics of the investment, taking into account the cost of CO₂ emissions.
- ✓ The pace of increase in depreciation costs is expected to slow down gradually from FY2022.



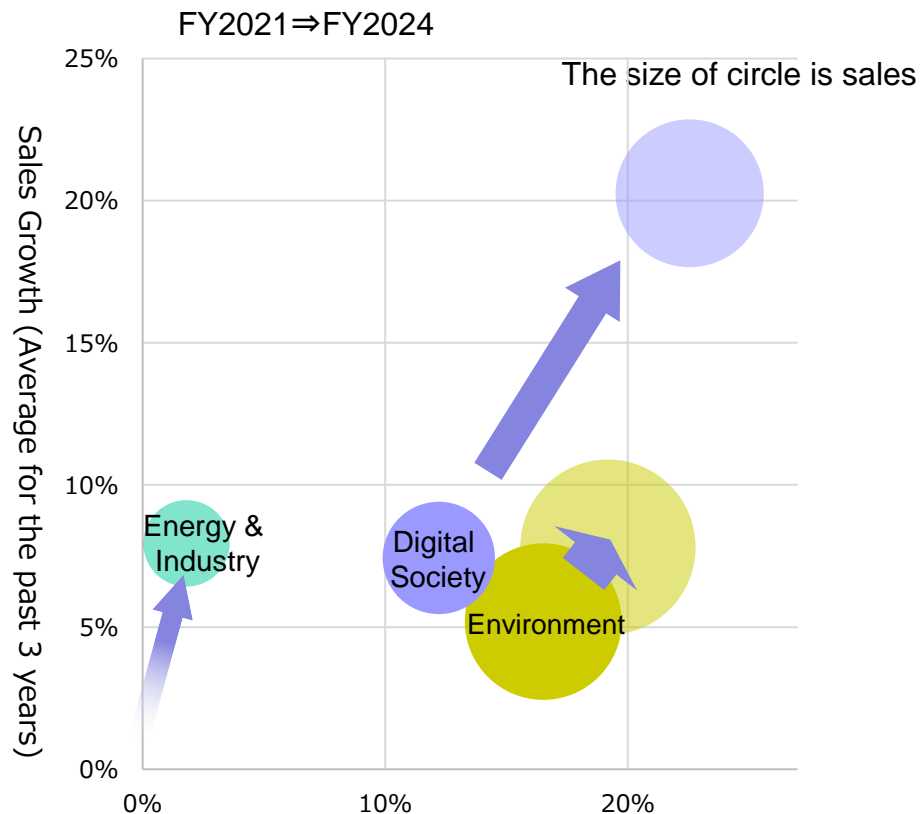
R&D Input

(¥Bil.)



Medium-term Plan · Business Portfolio

Medium-term portfolio image



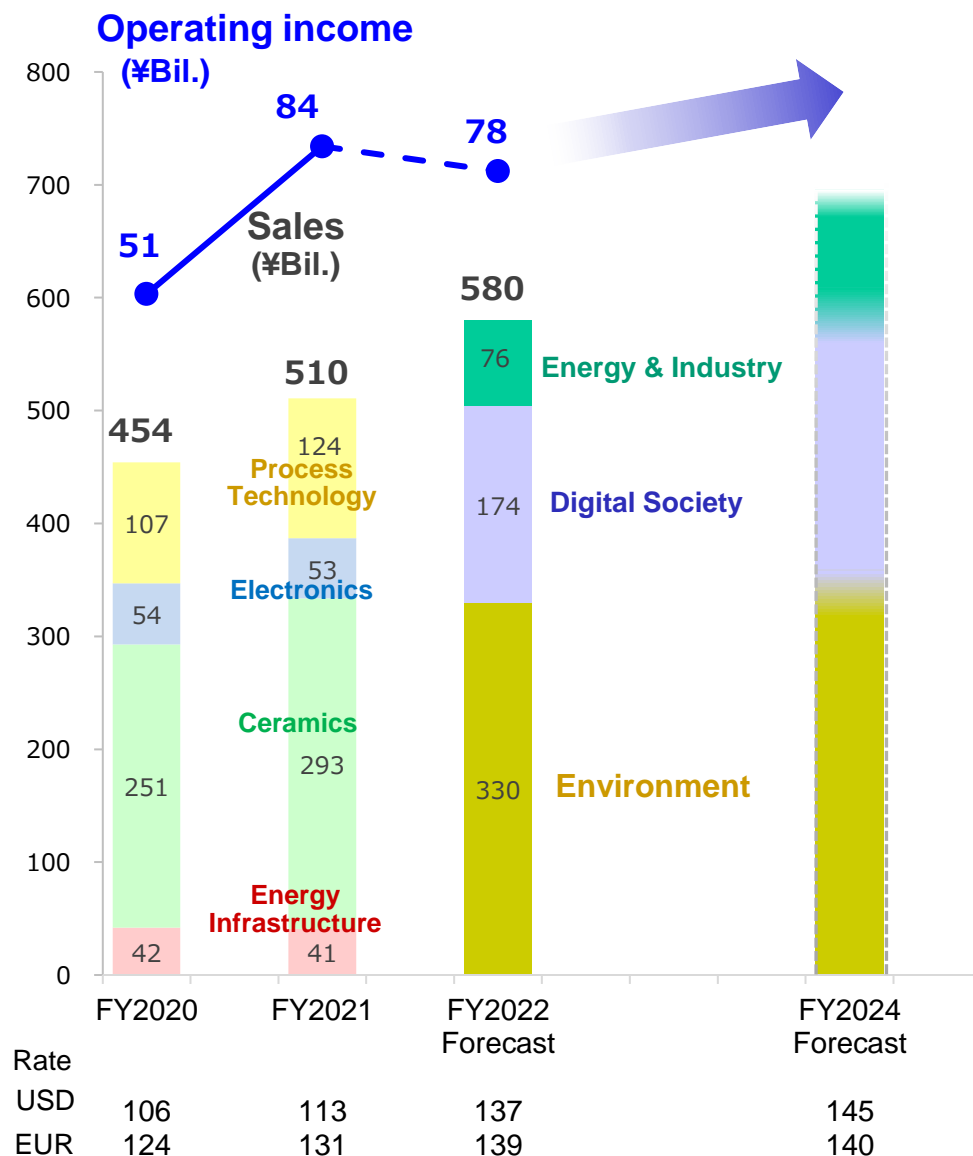
NGK-version ROIC* → High (high rate of return)

$$\text{NGK-version ROIC}^* = \frac{\text{Operating Income}}{\text{Accounts receivable} + \text{Inventories} + \text{Fixed assets}}$$

Calculated based on business assets (accounts receivable + inventories + fixed assets) that can be managed by business departments rather than "capital" and "liabilities".

Shifting the Environment Business to a high-revenue, high-efficiency business structure. Aiming to increase sales and operating income as a whole while growing the Digital Society Business with growth potential and transforming the business portfolio.

Consolidated performance trends



ESG Management / Carbon Neutrality Initiative

Enhancing non-financial value that doesn't appear in financial indicators such as the reduction of environmental burden, initiatives on respect for human rights, and human capital and intellectual capital that serve as resources for future competitiveness to increase corporate value





■ Environmental Action Targets

We have released the NGK Group Environmental Vision in April 2021 and formulated “the Fifth Five-Year Environmental Action Plan” as environmental action targets, aiming for the realization of society’s direction toward “carbon neutrality,” “a recycling-oriented society,” and “harmony with nature” through its business activities.

• We achieved the targets in all items in FY2021, the initial year of the Plan. We have set FY2022 targets for each item based on this performance.

Excerpt from “NGK Report 2022(Japanese), published on September 21, 2022”
[P49 “the Fifth Five-Year Environmental Action Plan (Fiscal 2021–2025)”

NGK Report 2022(Japanese), PDF download page
<https://www.ngk.co.jp/sustainability/booklet.html>

Category	Item	KPI	FY2025 Target	FY2022 Target	Related SDGs
Initiatives toward carbon neutrality	Reduce CO ₂ emitted by manufacturing activities	CO ₂ emissions (consolidated)	550,000 tons (Reduce by 25% from FY2013)	600,000 tons (Reduce by 18% from FY2013)	   
		Renewable energy use rate(consolidated)	50%	25%	

■ Reduction of CO₂ emissions/Expanding use of renewable energy

Work on the reduction of CO₂ emissions as a Group by expanding the use of renewable energies at the manufacturing sites in Ishikawa as well as overseas sites such as China, Poland, and Thailand in addition to domestic sites where renewable energy related facilities have already been installed.

(Install NAS Battery and Photovoltaic Equipment Systems at Manufacturing Sites in Ishikawa Prefecture)



Manufacturing Sites in Ishikawa NAS@ Batteries

■ Participate in “RE100”, a global environmental initiative

Taking participation as an opportunity, we will accelerate our actions and aim to cover 100% of the electricity used for its own businesses with renewable energies by 2040.

Promote the procurement of renewable energies based on various schemes in Japan and abroad

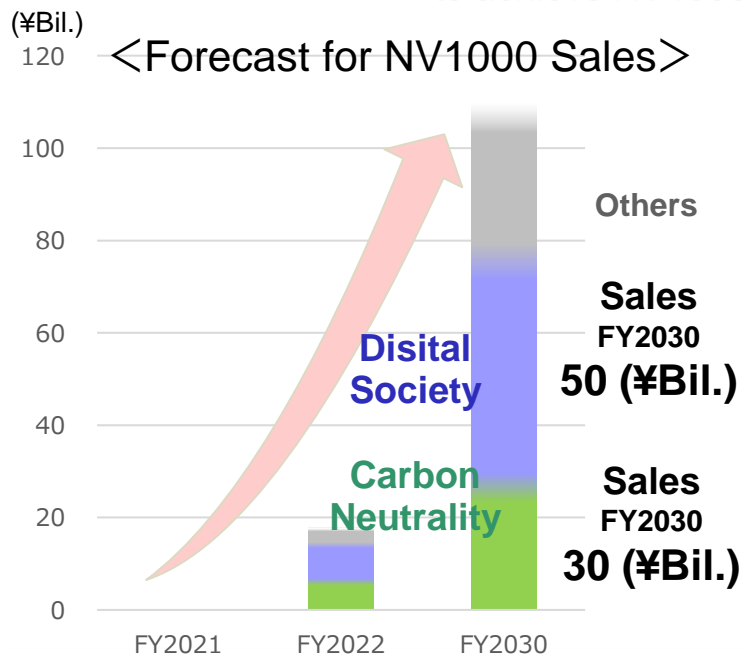
■ ESG evaluation by external organizations

Selected as representative index of ESG investing,

“FTSE4Good Index Series” and “FTSE Blossom Japan Index” in June, 2022

ESG Management / Sustainable Finance

Financing investments in projects contributing to decarbonization and in development related to carbon neutrality to achieve NV1000 by Green Bonds (interest-bearing liabilities)



■ Allocation of the first green bond*, 10 billion yen(7 years) in 2021

*Seventh series of NGK INSULATORS, LTD. unsecured straight bonds

The green bond has obtained “Green 1(F),” the highest rating, provided by an external reviewer (Japan Credit Rating Agency, Ltd.).

Eligible project categories	Project cases	(¥ Bil.)	
		Allocated amount (January to March 2022)	Allocating amount (April to March 2023)
Batteries	<ul style="list-style-type: none"> NAS® Batteries Zinc Rechargeable Batteries ® 	1.5	6.6
Next-generation power semiconductors	<ul style="list-style-type: none"> Gallium Nitride (GaN) Wafer DCB Circuit Substrate 	0.8	
CCU/CCS and hydrogen/ammonia	<ul style="list-style-type: none"> CO₂ Separation Membrane 	0.6	
Clean energy utilization	<ul style="list-style-type: none"> Install Photovoltaic Equipment Systems using NAS® Batteries 	0.2	
Energy-efficient manufacturing	<ul style="list-style-type: none"> Invest in the high-efficiency facilities meeting Energy-efficient standard sufficiently 	0.1	
Total(except expenses with issue)		3.3	

■ Second Series of Green Bonds in 2022(Plan)

Eighth Series of NGK INSULATORS, LTD. Unsecured Straight Bonds

Issuance amount	5 billion yen
Issuance date	November, 2022 onwards
Maturity	5 years

Batteries



Zinc Rechargeable Batteries ®
(inside buildings, communication, emergency)

Next-generation power semiconductors



DCB Circuit Substrate
(electric vehicle, industrial equipment)

CCU/CCS and hydrogen/ammonia

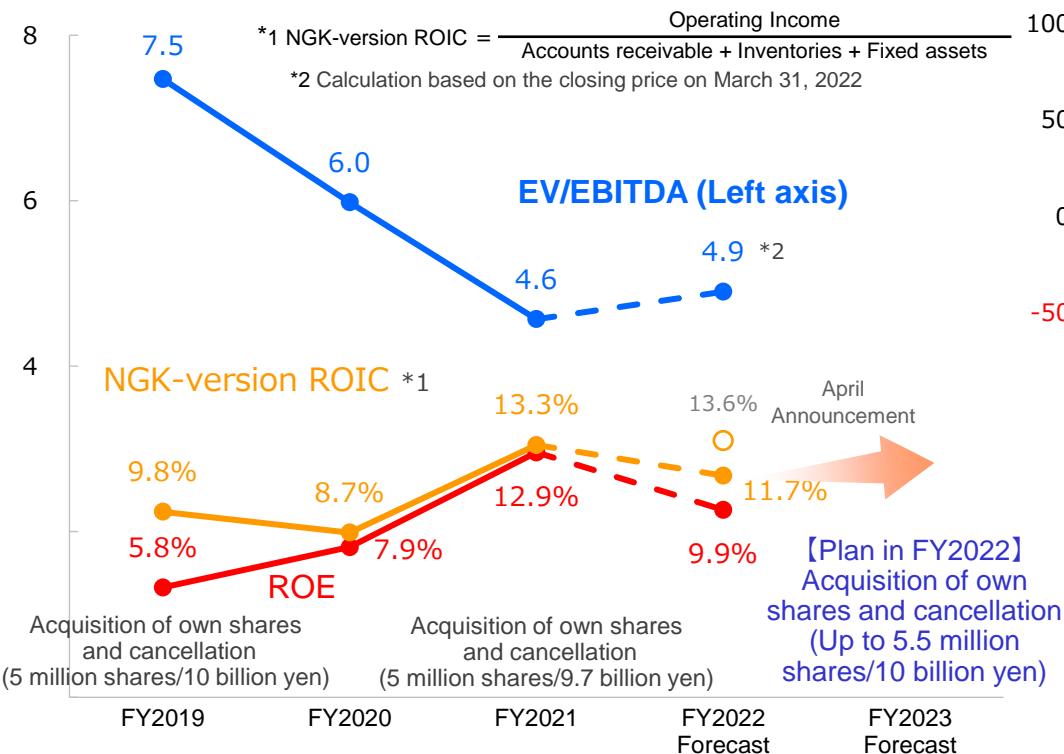
Sub-nano ceramic membranes
(CO₂, H₂, etc)



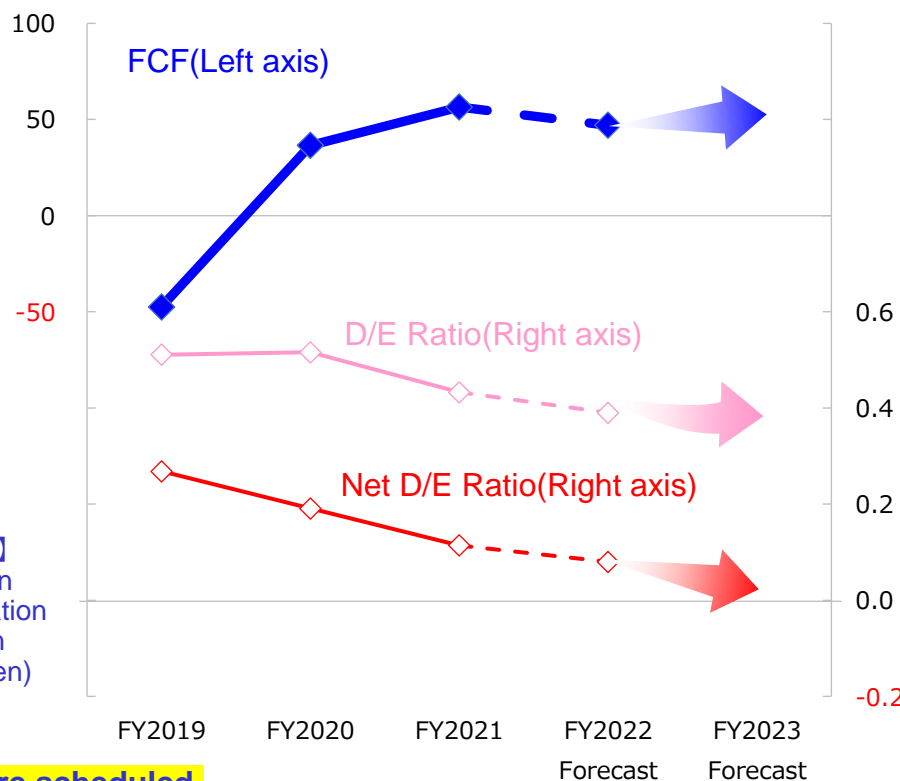
Capital Policy & Treasury Stock Purchase

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

Key management indicators transition



FCF & DE Ratio transition



Acquisition of own shares and cancellation of treasury shares are scheduled.

(Up to 5.5 million shares/10 billion yen, Acquisition method: Market purchases,

Acquisition period: From October 31, 2022 to February 28, 2023, Schedule date of cancellation: March 31, 2023)

- We will continuously maintain ROE of approximately 10% in FY2022 and promote efficiency-focused management by improving NGK-version ROIC in each business segments.
- FCF is expected to remain positive for the time being while investing mainly in Digital Society Business. By the leveraging of interest-bearing liabilities, we will secure investment funds for the launch of new businesses, including investments in start-ups and M&As, and aim to improve capital efficiency.

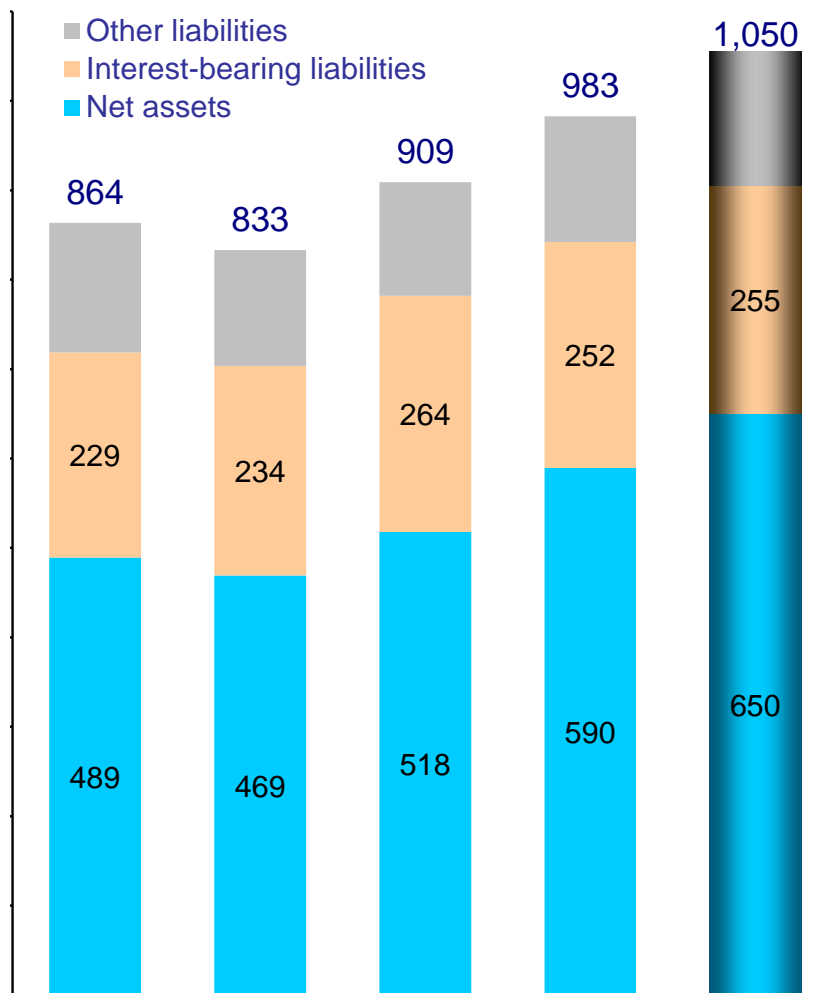
Summary of Cash Flow

(¥ Bil.)

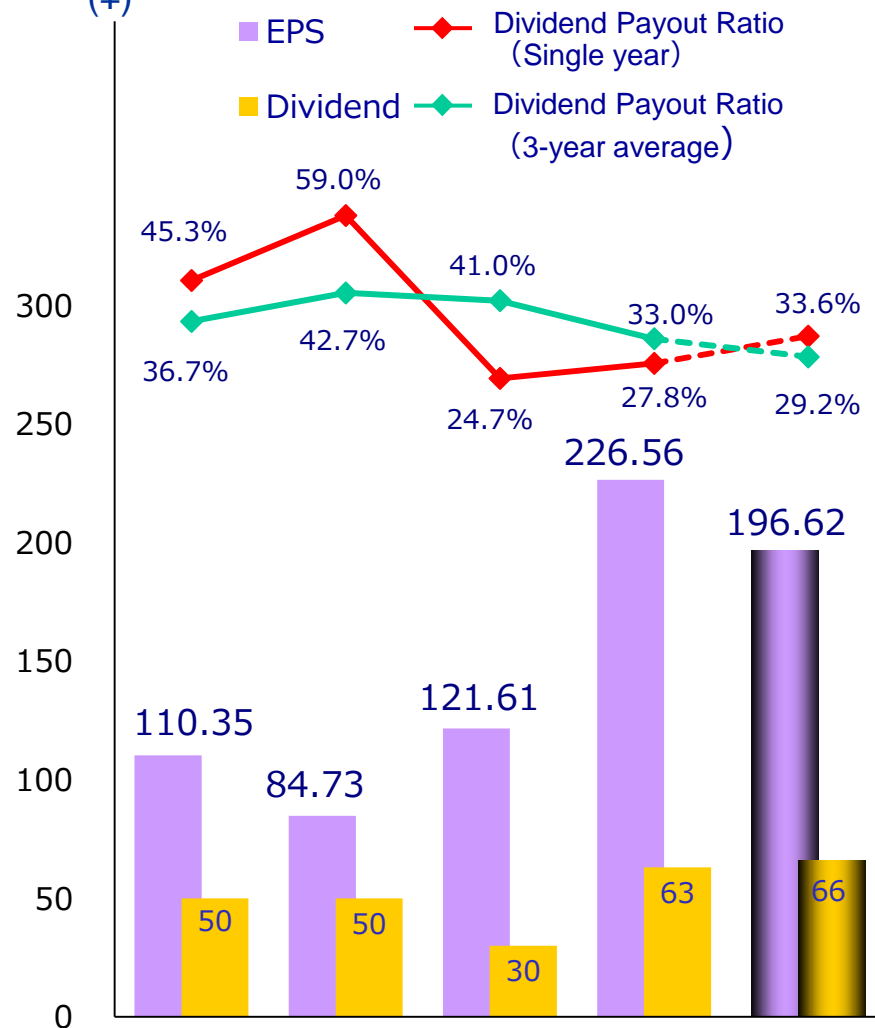
	FY2020	FY2021	FY2022 Forecast	
Operating Activities	85.6	94.8	April Announcement 115.0	100.0
Investing Activities	(51.7) Capital Expenditures (53.3)	(46.3) Capital Expenditures (37.4)	(64.0)	(57.0) Capital Expenditures (53.0)
Financing Activities	12.3 New loans +32.5 Repayments (9.4)	(45.3) New loans +15.0 Repayments (34.0) Treasury stock purchase (9.7)	(19.0)	(33.0) New loans +33.5 Repayments (36.0) Treasury stock purchase (10.0)
Foreign Currency Translation Adjustments on Cash & Cash Equivalents	5.2	5.5	(4.0)	4.0
Net Increase in Cash & Cash Equivalents	51.3	8.8	28.0	14.0
Cash & Cash Equivalents, End of Year	146.0	154.9	182.9	168.9

Total Assets & Dividend

(¥ Bil.)



(¥)



DOE

Single year
3-year average

	FY2018	FY2019	FY2020	FY2021	FY2022 Forecast
Single year	3.4%	3.4%	2.0%	3.6%	3.3%
3-year average	3.3%	3.4%	2.9%	3.0%	3.0%

ROE 7.6% 5.8% 7.9% 12.9% 9.9%
D/E Ratio 0.48 0.51 0.52 0.43 0.39

Equity ratio of 50% or higher will be maintained.

Sales by Product (Annual)

(¥ Bil.)



<After inter-segment elimination>	FY2019	FY2020	FY2021	FY2022 Forecast
Honeycomb filters	69.8	63.7	70.4	81.0
GPF	20.7	33.2	33.9	42.0
Cd-DPF・LSH	63.8	59.2	78.3	90.0
SiC-DPF	39.9	39.6	46.3	57.0
Sensors	57.6	53.3	63.7	60.0
Environment Business ^{※1}	251.8	248.9	292.7	330.0
SPE related	65.3	80.1	96.9	116.0
Electronics components	27.1	27.9	29.5	31.0
Metal related	19.4	19.3	23.9	27.0
Soshin Electric CO. ^{※3}	9.0	6.9		
Digital Society Business ^{※2}	120.8	134.2	150.3	174.0
Energy Storage	2.5	2.8	1.3	3.0
Insulators	40.8	39.1	39.3	43.0
Industrial Processes	26.1	27.0	26.9	30.0
Energy & Industry Business ^{※4}	69.4	69.0	67.5	76.0
Total	442.0	452.0	510.4	580.0

※1 The Ceramics Business has been renamed the Environment Business since the beginning of FY2022

※2 The Electronics Business has been dissolved and reorganized into the Digital Society Business composed of SPE related, Electronics components, and Metal-related since the beginning of FY2022.

※3 Excluded from consolidation in the fourth quarter of FY2020.

※4 The Energy Infrastructure Business has been dissolved and reorganized into the Energy & Industry Business composed of Energy Storage, Insulators and Industrial Processes.

Sales by Product (Semi Annual)

(¥ Bil.)



<After inter-segment elimination>	FY2021		FY2022 Forecast	
	1 st . Half	2 nd . Half	1 st . Half	2 nd . Half
Honeycomb filters	35.8	34.6	40.0	41.0
GPF	16.1	17.8	18.4	23.6
Cd-DPF・LSH	40.9	37.4	39.8	50.2
SiC-DPF	22.7	23.6	27.2	29.8
Sensors	32.1	31.7	27.8	32.2
Environment Business ^{※1}	147.6	145.1	153.1	176.9
SPE related	45.8	51.1	59.0	57.0
Electronics components	14.0	15.5	16.4	14.6
Metal related	11.7	12.2	12.7	14.3
Digital Society Business ^{※2}	71.5	78.8	88.2	85.8
Energy Storage	0.8	0.5	1.1	1.9
Insulators	19.1	20.2	20.0	23.0
Industrial Processes	11.1	15.8	12.3	17.7
Energy & Industry Business ^{※3}	31.1	36.4	33.4	42.6
Total	250.2	260.3	274.7	305.3

※1 The Ceramics Business has been renamed the Environment Business since the beginning of FY2022

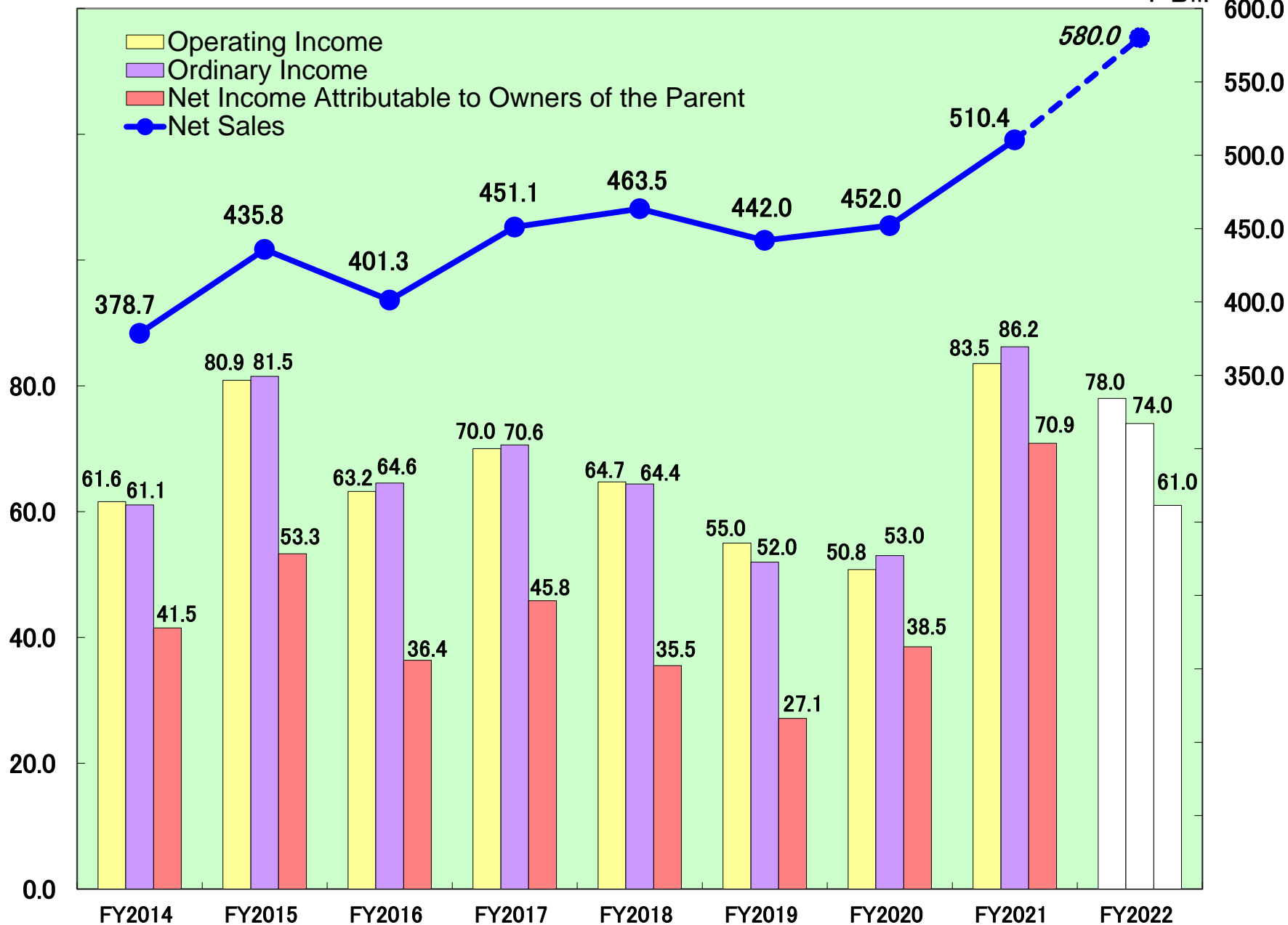
※2 The Electronics Business has been dissolved and reorganized into the Digital Society Business composed of SPE related, Electronics components, and Metal-related since the beginning of FY2022.

※3 The Energy Infrastructure Business has been dissolved and reorganized into the Energy & Industry Business composed of Energy Storage, Insulators and Industrial Processes.

Consolidated Operating Results

¥ Bil.

¥ Bil.



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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