

# FY2024 1<sup>st</sup> Half Results

(From April 1, 2024 to September 30, 2024)  
November 1, 2024

This is a translation of materials used for the analyst meeting held online, Japan November 1, 2024

President

Shigeru Kobayashi



**NGK INSULATORS, LTD.**

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**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.**

- Summary of Financial 1<sup>st</sup> Half Results for FY2024
- Forecast for FY2024 ( Ending March 31, 2025)
- Forecast for Each Business Segment
- Improving Enterprise Value
  - Capital Profitability and Growth Potential of Existing Business
  - Initiatives for Achieving NV1000
- R&D/ Capital Expenditures & Depreciation Costs
- Promoting ESG Management
- Capital Policy(Sustainable Finance)
- Total Assets & Dividend/ Summary of Cash Flow

# Summary of Financial 1st Half Results for FY2024

	(Bln. Yen)	FY2023 1st half	Announcement In April	FY2024 1st half	YOY Change FX Impact	Growth ratio
Net sales		282.9	295.0	298.4	+12.2	+5%
Operating Income		32.5	30.0	39.7	+7.7	+22%
Ordinary Income		28.9	28.0	38.4		+33%
Net income Attributable to Owners of the Parent		18.2	21.0	25.9		+42%
Exchange Rate	USD	141 yen	(145 yen)	152 yen		+11 yen
	EUR	154 yen	(155 yen)	165 yen		+11 yen

Sales and Income Increased Year on Year,  
with Sales Reaching a Record High for the Second Quarter

- Environment Sales decreased due to inventory adjustments and other factors from the slowdown in the Chinese and Southeast Asian markets. Operating income increased partly due to the positive effect of the weak yen and delay in expenses incurred.
- Digital Society Both sales and income increased due to the concentration of some projects for semiconductor manufacturing equipment products and increased demand for piezoelectric elements for HDDs driven by strong data center investments.
- Energy & Industry While sales of insulators remained strong on the back of investment in power transmission and distribution infrastructure in Japan and overseas, NAS® batteries increased the loss due to higher material procurement costs and other factors despite increased sales owing to shipments of overseas projects.

# Forecasts for FY2024

	(Bln. Yen)	FY2023	Announcement In April	FY2024	YOY Change FX Impact	Growth ratio
Net sales		578.9	620.0	620.0	+6.5	+ 7%
Operating Income		66.4	75.0	78.0	+5.4	+ 17%
Ordinary Income		63.0	71.0	74.0		+ 16%
Net income Attributable to Owners of the Parent		40.6	53.0	53.0		+ 31%
Exchange Rate	USD	144 yen	(145 yen)	147 yen	140yen	+3 yen
	EUR	157 yen	(155 yen)	161 yen	155yen	+4 yen

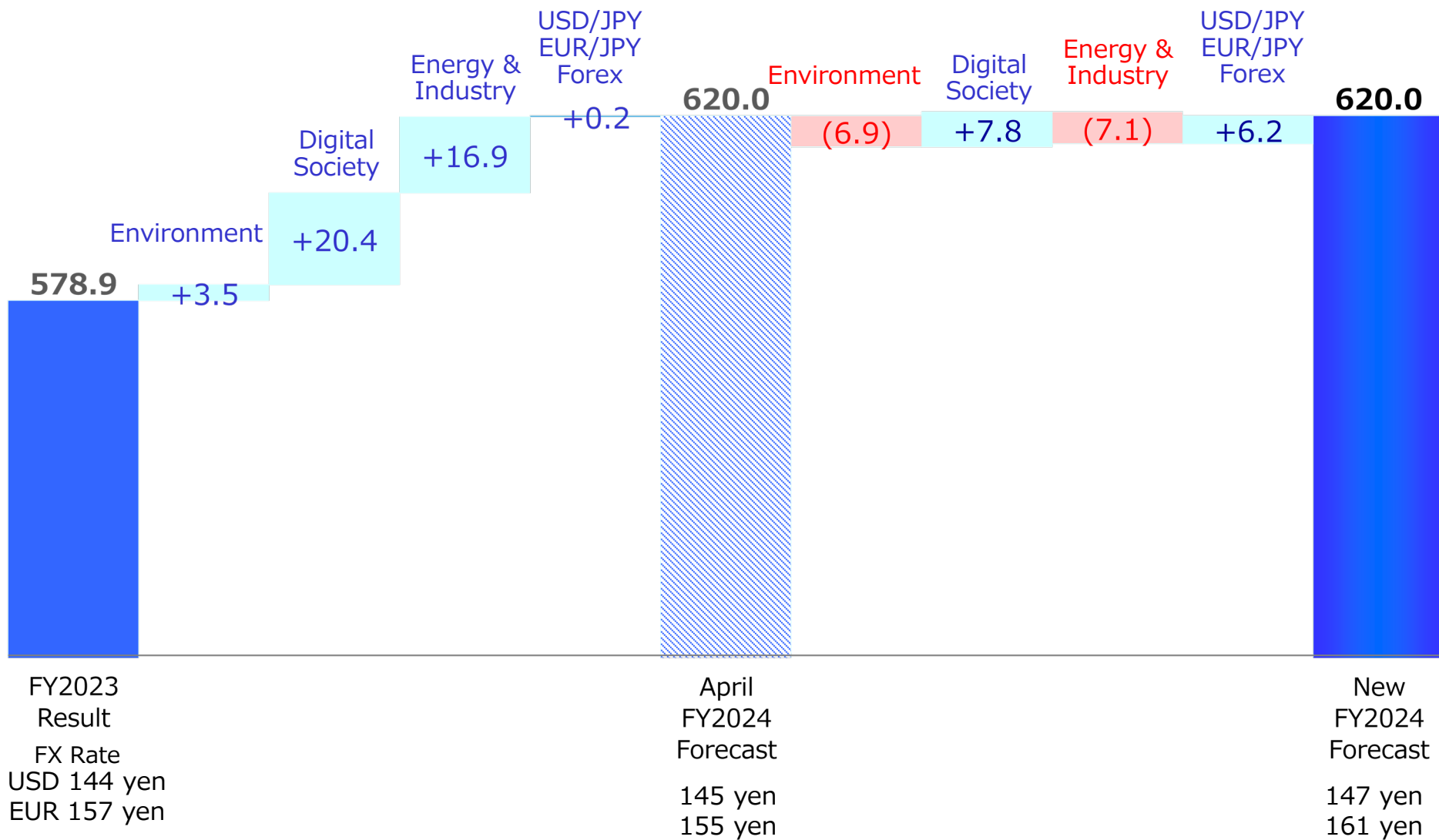
Assumed exchange  
rates in 2nd half

Sales and Income will increase Year on Year ,  
Compared to the April announcement, operating income and ordinary income will increase

- Environment Although the automotive market continues to slow down, sales will increase due to the postponement of the shipment of industrial heating systems for LiB cathode materials from the previous fiscal year and the positive effect of the weaker yen. Income is expected to increase as profitability improves due to cost reductions and price hikes of the automotive related products.
- Digital Society Both sales and income will increase due to some semiconductor manufacturing equipment demand being brought and the increased demand for piezoelectric elements for HDDs driven by strong data center investments.
- Energy & Industry As in first half, segment loss will increase, as profitability of NAS® batteries will deteriorate due to higher material prices despite higher sales for the shipment of a large project in Germany, while insulators will remain steady.

# Sales Change Analysis for FY2024

(Bln. Yen)



USD/JPY  
EUR/JPY  
Forex



# Forecasts for the Environment (EN) Business

## ■ Automotive related

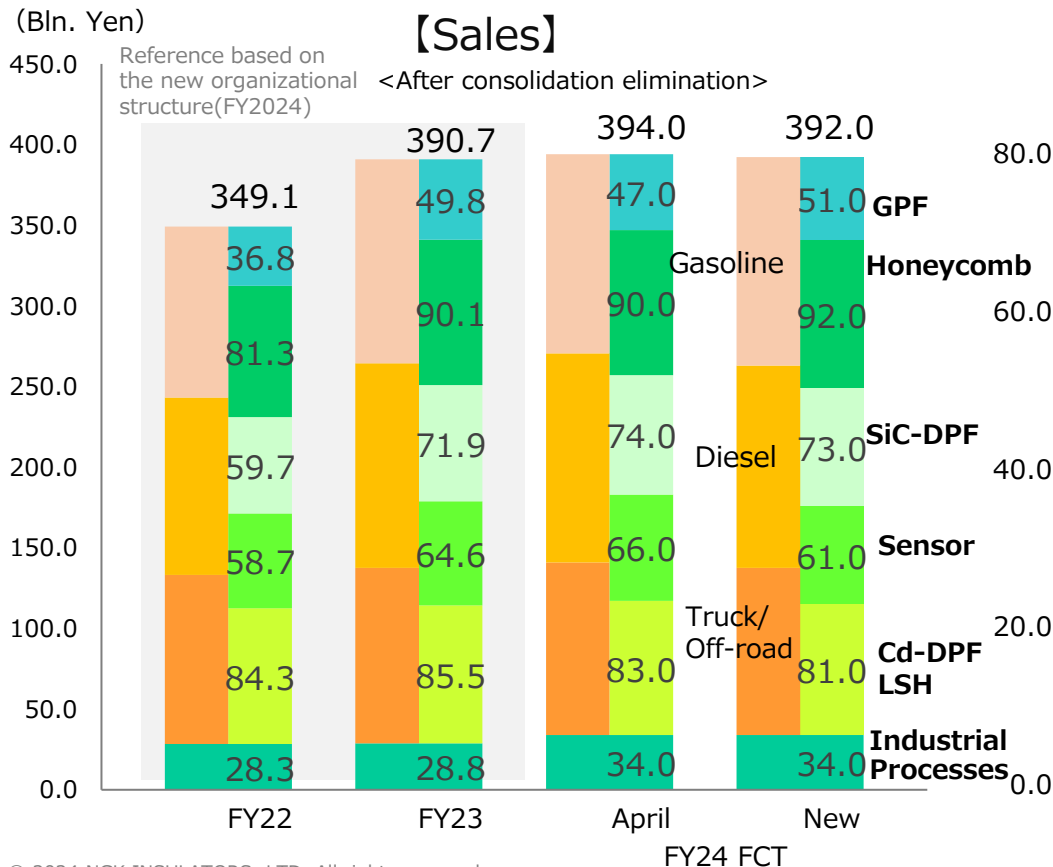
Sales and income are expected to decrease slightly from the April forecast, as demand for automotive-related products is weak due to weak demand in the Chinese market, delayed market recovery in Southeast Asia, and lower demand for agricultural and construction machinery in the U.S., although demand is expected to increase slightly due to a decrease in the ratio of non-internal combustion engine vehicles.

## ■ Industrial Processes

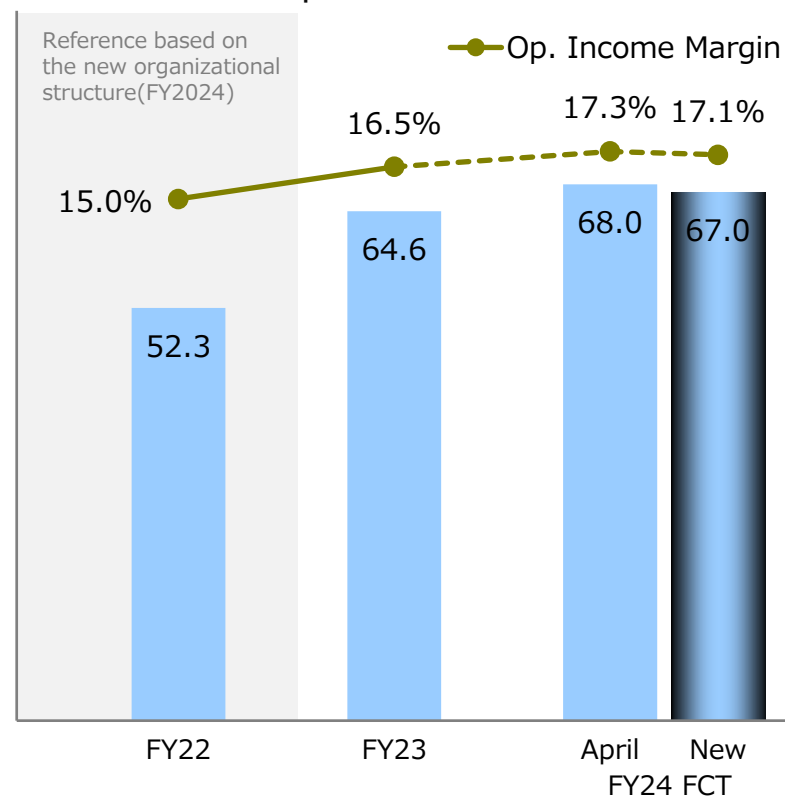
Sales and income are expected to be in line with the April forecast, due to increased demand for low-level radioactive waste treatment equipment, while demand for industrial heating systems for Lithium-ion battery cathode materials and demand for high-performance refractories for MLCCs decline.

Industrial Process was transferred from Energy & Industry Business to the Environment Business at the beginning of FY2024.

(Bln. Yen)

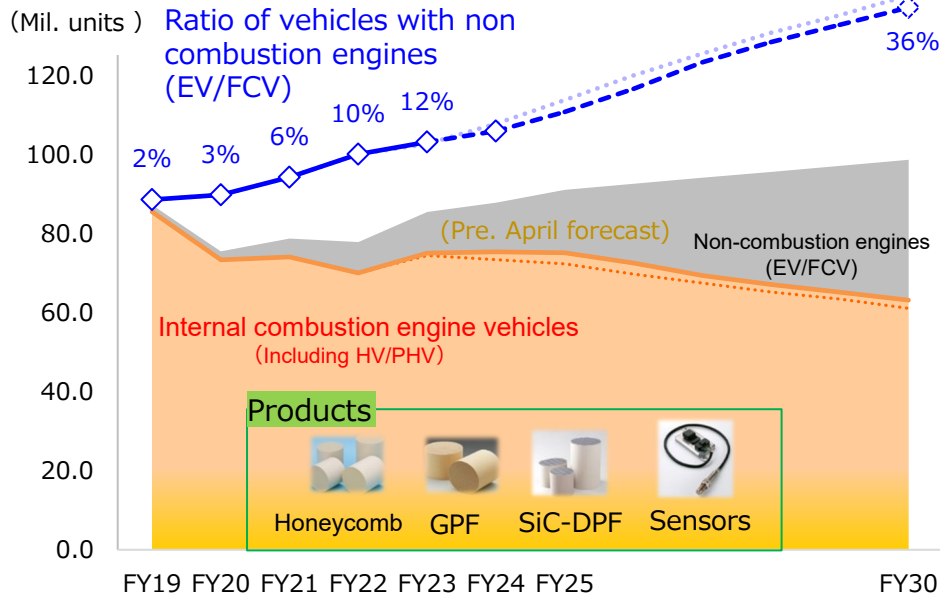


## 【Op. Income】



# The future perspective for the EN Business

## 〔Forecast for Automobile Sales〕 (NGK's Est.)



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

Markets	FY22	FY23	FY24	FY25	FY26	...	FY30
Japan	PPNLT(WLTC)				GE/GDI・MPI RDE		
Europe	EU6d-Full				EU7		
U.S.	Tier3 LEV III				PM1mg	<b>Tier4 (PM0.5mg)</b>	
China	China6a (All)	China6b (All)			China7		
India	BS6 Stage I	BS6 Stage II			BS7		
Thailand	EU4	EU5			EU6b		

There is no change in the assumption that the EV ratio will evolve. Demand for the company's products is expected to remain at a certain level due to the introduction of new products with more advanced functions in response to the strengthening of emissions regulations in various countries

## < Developing "Direct Air Capture" (DAC) ceramics >

### ●Organizational change

- ▶ CN Sales is newly established under the Environment Business Division to strengthen the sales strategy of DAC products from the second half.
- ▶ Accelerate commercialization by strengthening sales strategies under the division.



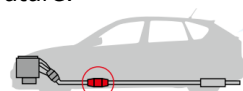
### ●Adopted as DAC Demonstration

#### Equipment for Expo 2025 Osaka, Kansai

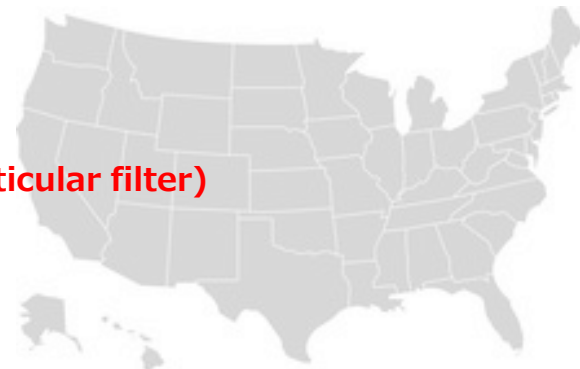
- ▶ Our ceramic base material for DAC will be used in the DAC equipment to be demonstrated by the Research Institute of Innovative Technology for the Earth (RITE) at the 2025 World Exposition in Japan (Expo 2025 Osaka, Kansai).

## <The impact of the new U.S. exhaust gas regulation "Tier4(PM0.5mg)">

The new U.S. exhaust gas regulation Tier4(PM0.5mg) is scheduled to be introduced from 2027. The regulation tightens emission standards for greenhouse gases (GHGs) and air pollutants, with particularly stringent limits on particulate matter (PM) emissions. We expect an increase in GPF volume in the future.



## GPF(gasoline particulate filter)





# Forecasts for the Digital Society (DS) Business

## ■ SPE Related (Components for semiconductor production equipment)

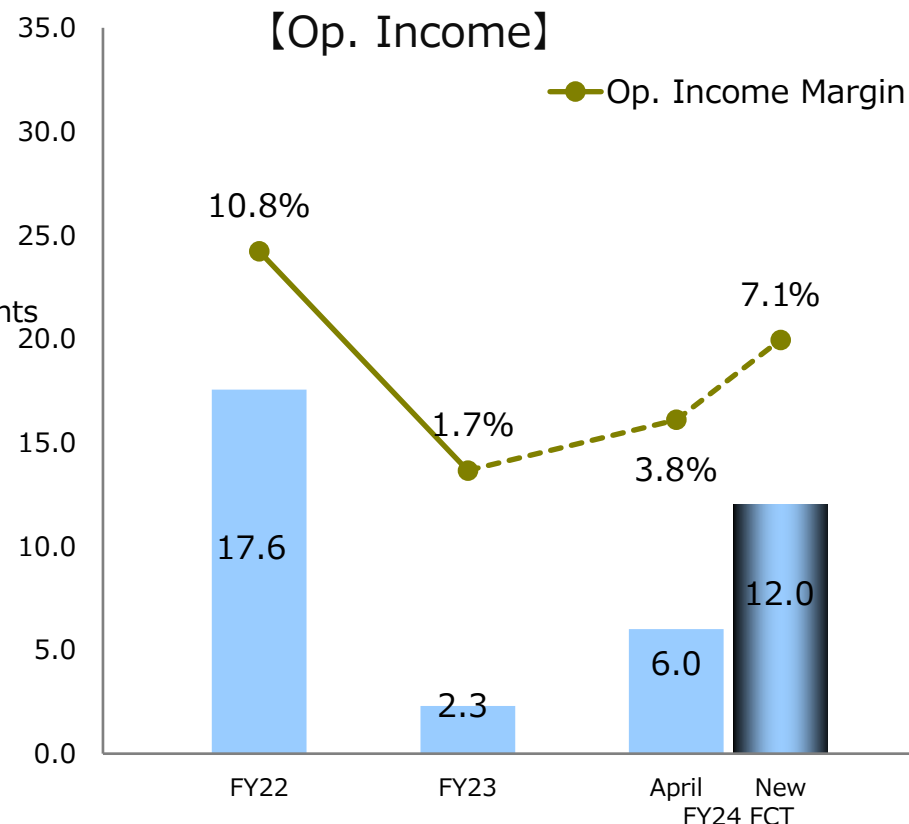
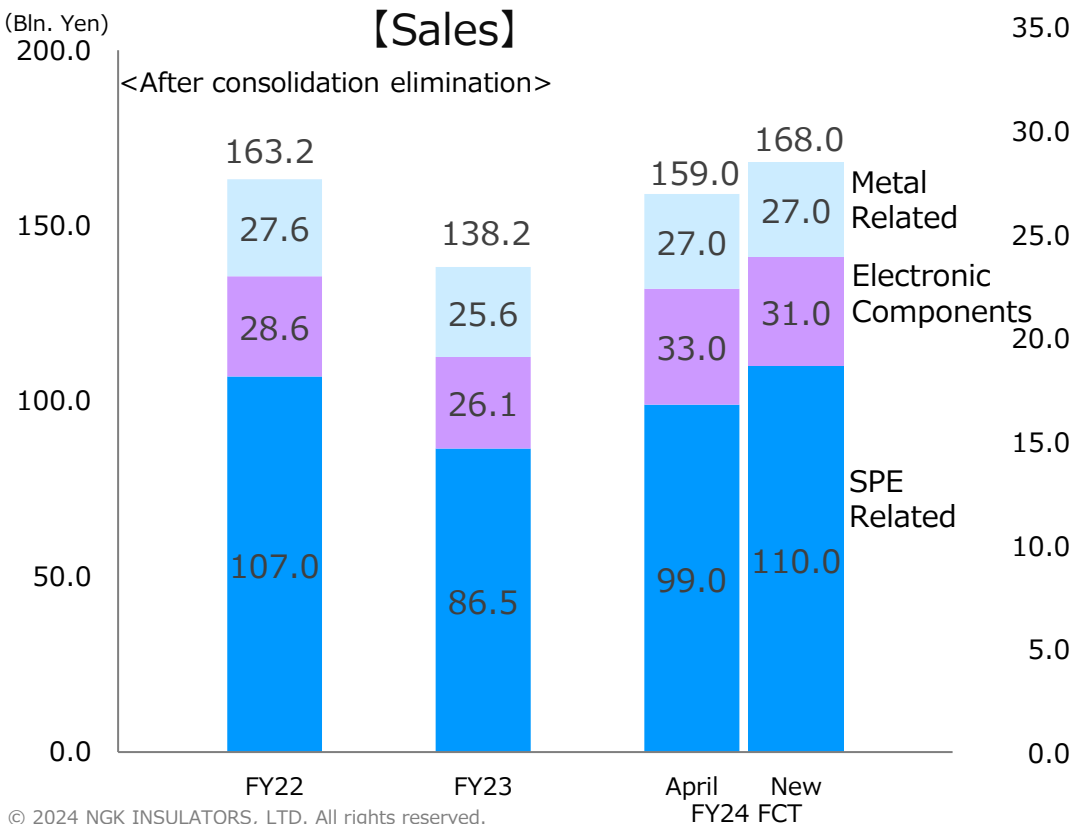
- Capital investment by major semiconductor manufacturers is expected to recover moderately in the second half of the year as a result of an improvement in the semiconductor supply-demand balance, which has been lingering mainly in memory chips. Due to price hikes and changes in the product mix, sales and income are expected to increase for the full year compared to the April forecast.

## ■ Electronic Components

- Sales and income of piezoelectric actuators for HDDs are expected to increase compared to the April forecast due to the gradual resumption of investment in data centers, which has remained strong.
- Sales and income of ceramic packages for crystals are expected to decrease from the April forecast, as inventory adjustment in the market took time until the first half of the year due to the deteriorated market in the previous year, and the market recovery was delayed beyond our expectation. Demand is expected to recover moderately in the second half of the year and beyond. We will promote profitability improvement through price hikes and cost reduction.
- Sales of Direct Copper Bonding(DCB) and Active Metal Blazing(AMB) substrates for power semiconductor modules will decrease from the April forecast due to lower demand caused by the slower progress of EV adoption.

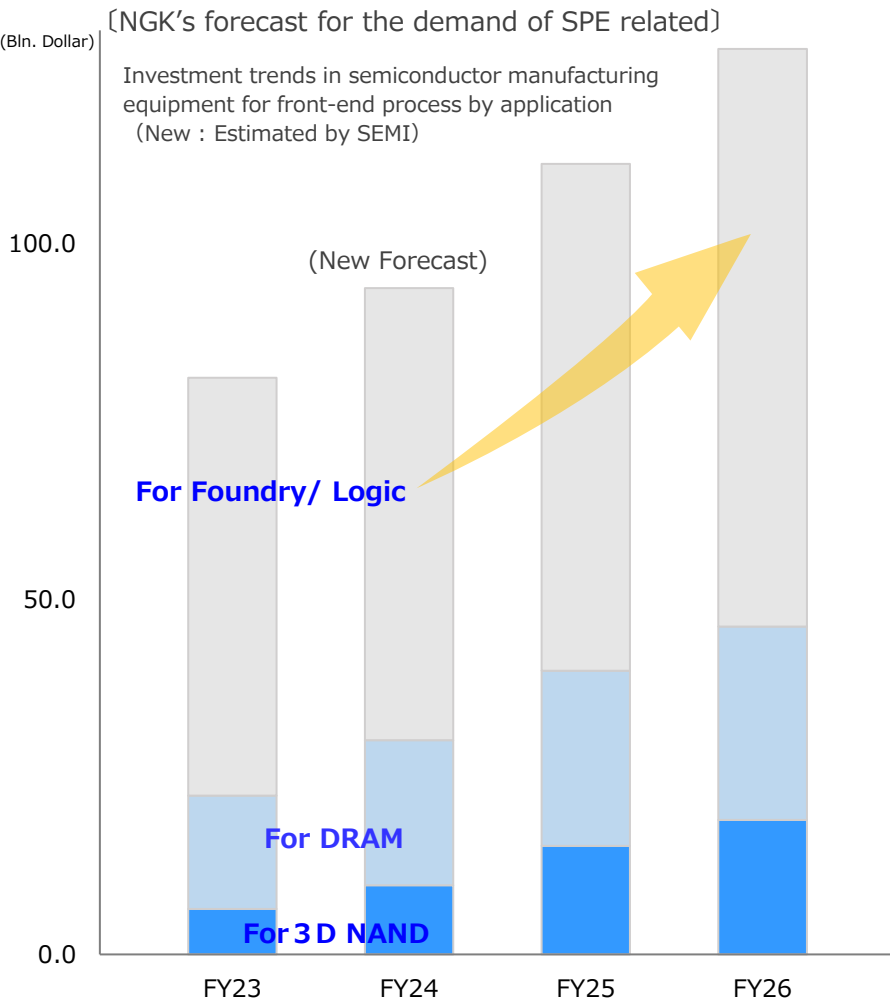
## ■ Metal Related

- Demand is expected to remain strong, especially in the industrial facilities and consumer electronics industries, and both sales and income are expected to increase slightly.



# The future perspective for the DS Business

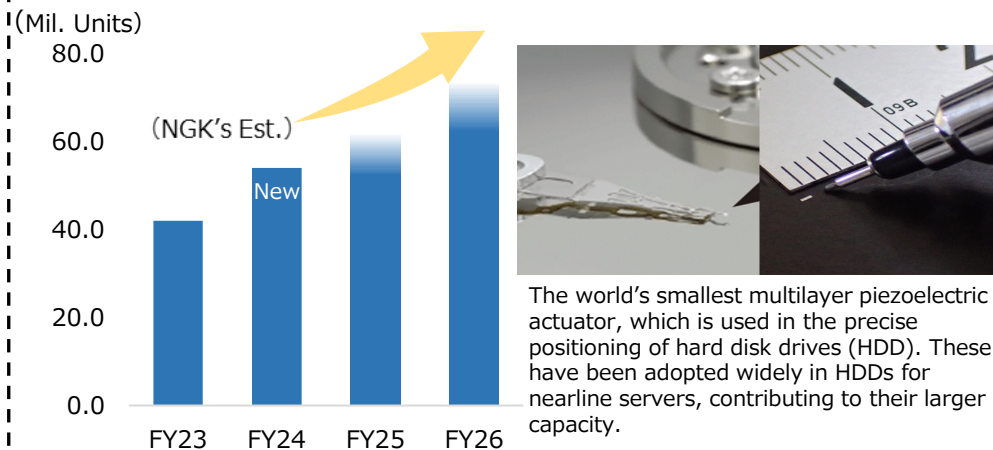
## ■ Components for Semiconductor Production Equipment (SPE)



With the current semiconductor supply-demand adjustment, WFE investment is expected to recover moderately from the second half of 2024. The market will further expand due to the spread of AI-equipped smartphones, the expansion of the cloud AI market, and other advances in the digitalization of society, and we will continue to invest in increased production to ensure that demand for our products is captured.

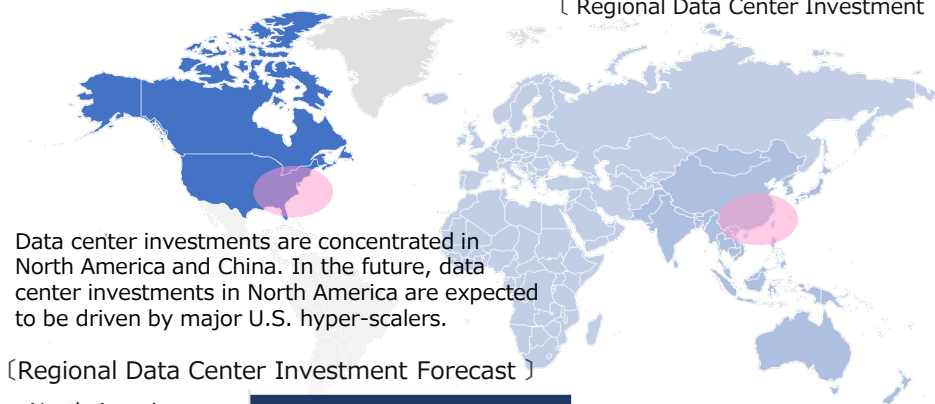
## ■ Electronic Components (Piezoelectric Actuators for HDD)

(Expected sales volume of HDD installed in near-line servers)



The major U.S. hyper-scalers have completed inventory adjustments in their supply chains and have resumed investment in data centers at the moment. In the mid- to long-term, demand for HDDs for near-online servers is also expected to increase due to higher investment in data centers for more data generated for AI learning and other purposes.

(Regional Data Center Investment)



(Regional Data Center Investment Forecast)



## ■ Insulators

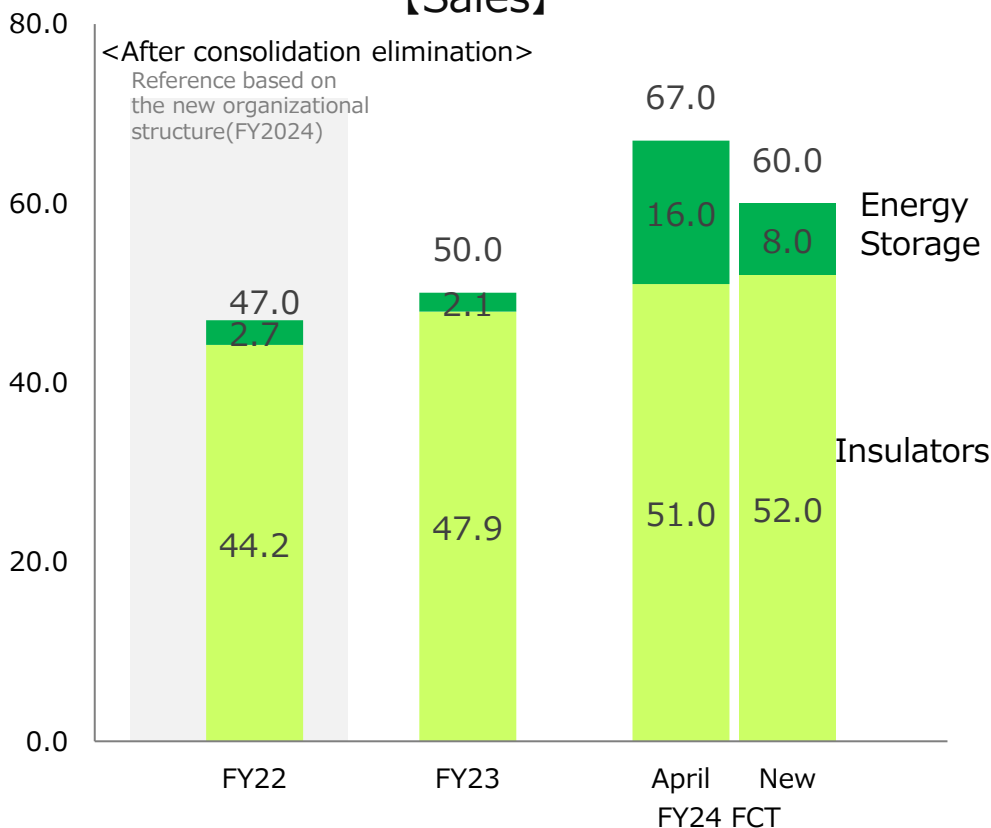
- In Japan, capital investment is progressing as planned due to the revenue cap system for general electricity transmission and distribution utilities.
- Overseas, in the U.S. and Australia, renewable energy-related investments remain strong. Both sales and income are expected to increase due to the weak yen, although they are almost in line with the April forecast.

## ■ Energy Storage

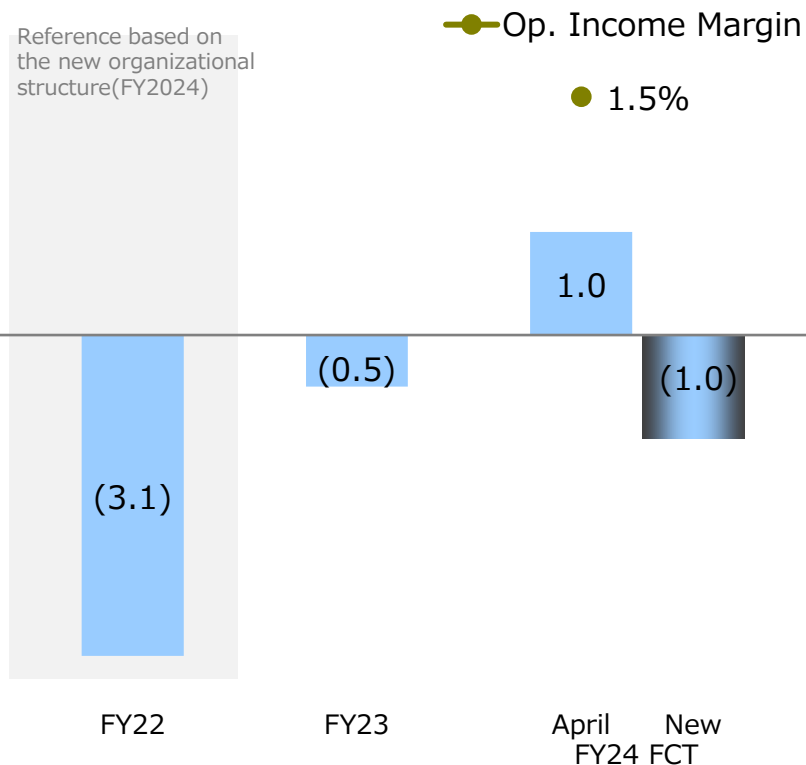
- Sales are expected to be significantly lower than the April forecast mainly due to delays in orders and shipments of large-scale overseas projects under the sales alliance with BASF.
- In addition to cost reductions, we aim to improve profitability and business growth by strengthening supply chains in order to cope with continued large-scale orders.

(Bln. Yen)

## 【Sales】



## 【 Op. Income(loss) 】



# The future perspective for the E&I Business

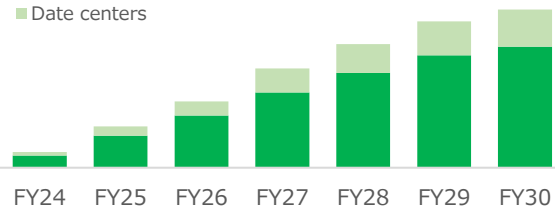
## ■ Insulators

▶ In Japan, the Ministry of Economy, Trade and Industry (METI) has taken the lead in the development of the power transmission and distribution network, which was carried out at the initiative of each area's electric power company, and a revenue cap system for power transmission and distribution companies began in April 2023. Demand for our power transmission and distribution products is expected to remain stable due to our efforts to enhance inter-regional interconnection lines under the revenue cap system, with the aim of introducing a large amount of renewable energy and strengthening the resilience of electric power, as well as the expected construction of new data centers and semiconductor plants.

▶ In the U.S., investment in renewable energy will continue with the goal of making electricity 100% carbon-free by 2035. As power consumption in data centers is also increasing rapidly due to the spread of generative AI, investments in new and additional transmission lines are expected to continue going forward in order to support an adequate power supply.

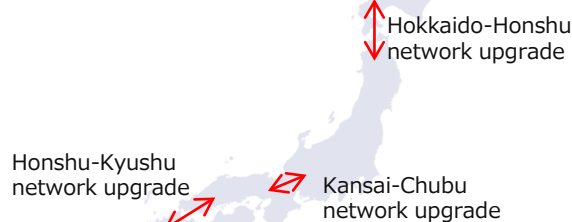
<Maximum Power Demand Forecast for New Data Centers and Semiconductor Plants (Image)>

■ Semiconductor plants  
■ Data centers



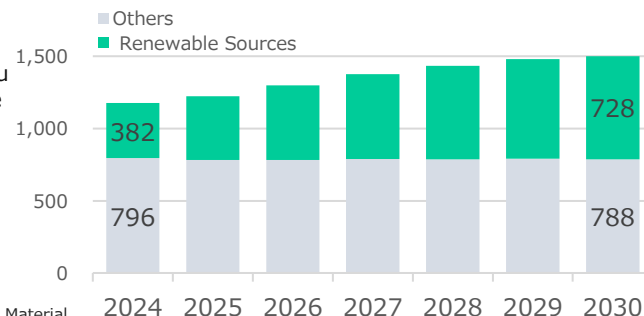
(Source) Compiled by the Company based on "Organization for Cross-regional Coordination of Transmission Operators, Japan (OCCTO) website: FY2024 Demand Projections for the Entire Nation and Each Supply Area"

<Main Development Plan of Inter-Regional Lines>



(Source) Compiled by the Company based on Material 11, 70th Electricity and Gas Basic Policy Subcommittee (February 27, 2024)

<U.S. Power-Generation Facilities Capacity (GW)>



(Source) Compiled by the Company based on U.S. Energy Information Administration

## ■ NAS<sup>®</sup> batteries (Energy storage)

Jointly with BASF Stationary Energy Storage GmbH, a subsidiary of BASF, a German diversified chemical manufacturer, we developed the NAS MODEL L24, an improved NAS battery with improved performance from the conventional large-capacity NAS storage battery(container type), and launched it for overseas markets.



<Overseas projects and applications>

**Bulgaria** Improvement of efficiency of renewable energy in operation Spt,2023~



**South Korea** Hydrogen Production Equipment in operation Aug,2020~  
Improvement of efficiency of renewable energy in operation Apr,2023~



Shipped MODEL L24 on the first shipment (12 containers) to HH2E in Germany for BASF project(as of October)

**Maldives** Decarbonized desalination system in progress



**Australia** Supplying renewable energy to the mine in operation May,2023~

# Improving Enterprise Value

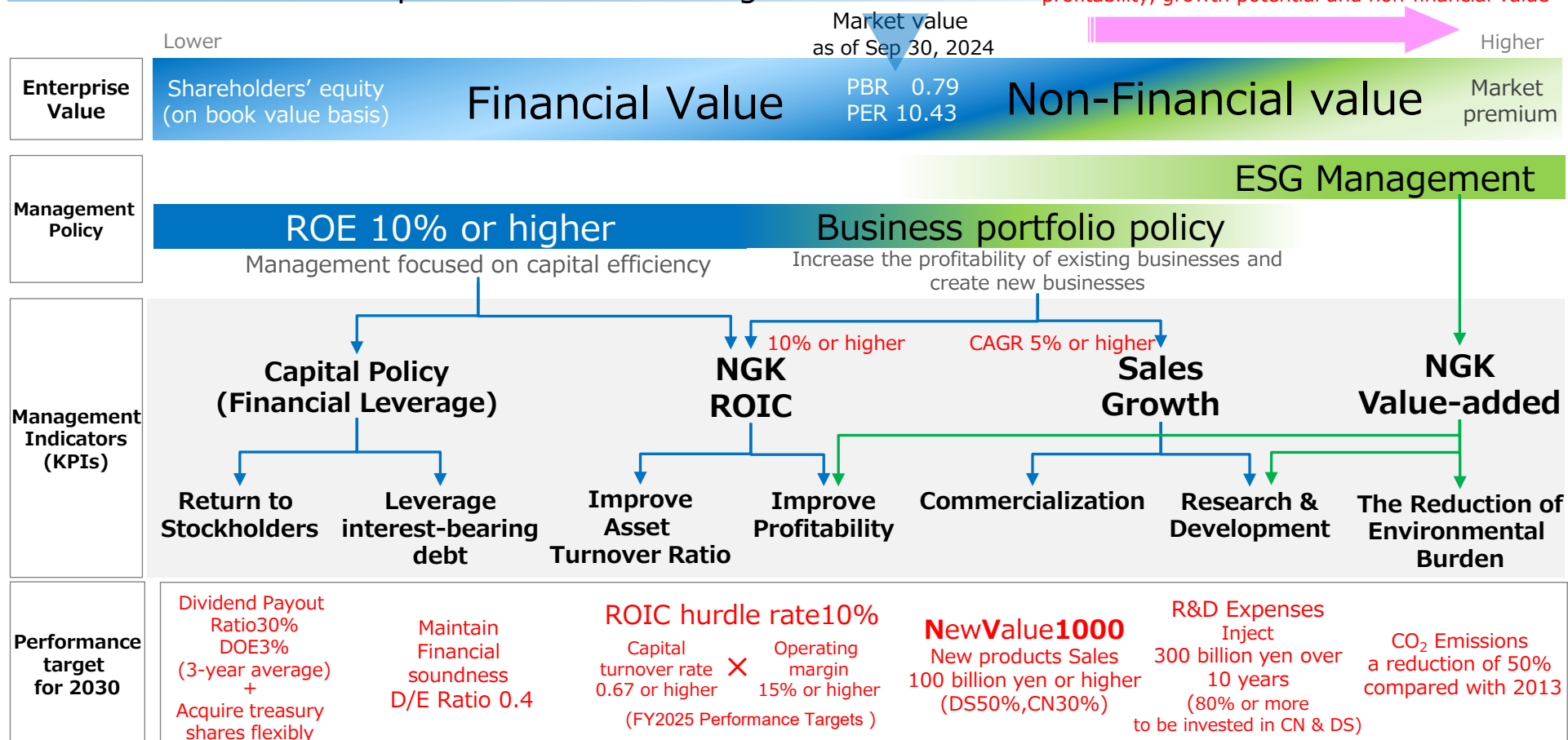
- **Enhance capital profitability** via corporate management that is conscious of the formula,  $\text{Equity spread} = \text{ROE} - \text{Cost of shareholders' equity}$ .
- **Ensure growth potential** through advancing **business portfolio management**, and **investment in intellectual capital** (R&D, etc.) and **human capital** for growth.
- **Upgrade non-financial value** primarily via **an effort to reduce environmental footprint and respect human rights**.

## Estimation of the NGK's Capital Cost

After-tax Debt Cost	1.0%
Capital Cost	<b>7.8%</b> (CAPM)
D/E Ratio	0.36
WACC	6.0%
Pre-tax WACC	<b>8.7%</b> (Hurdle rate)

## Relations between Enterprise Value and Management Indicators

Aim to increase enterprise value by enhancing capital profitability, growth potential and non-financial value



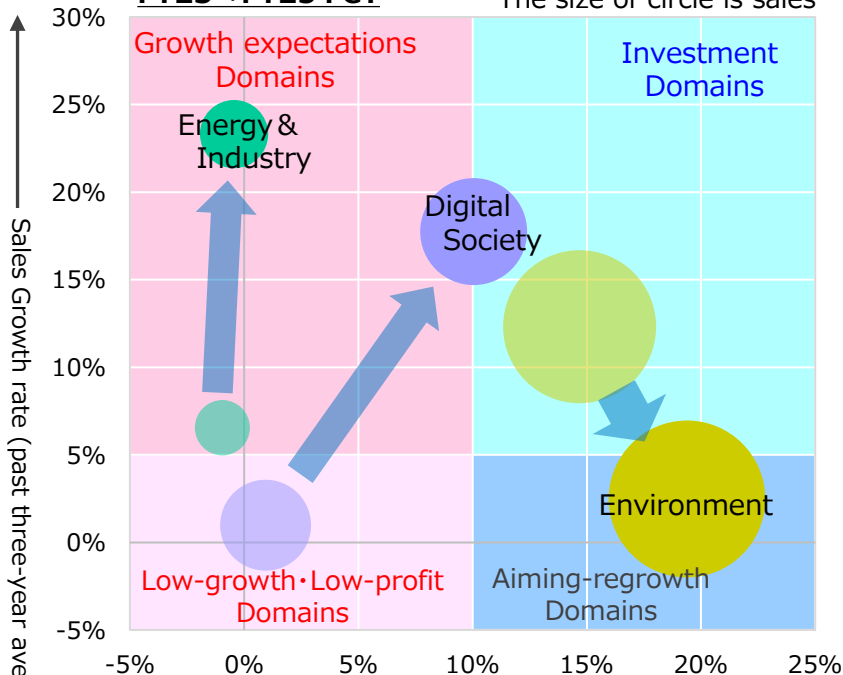
# Capital Profitability and Growth Potential of Existing Business

## Business portfolio policy

- Portfolio management pivoting on profitability and growth
- Scrutinize each product by using NGK-version of ROIC of 10% and a sales growth rate of 5% as the criteria.
- Inject management resources into investment domains and domains where we expect growth.
- Consider deciding whether or not to continue the business of each product that belongs to low-growth and low-profit domains.

FY23⇒FY25 FCT

The size of circle is sales



\* NGK ROIC in FY25 → High (high profitability)

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

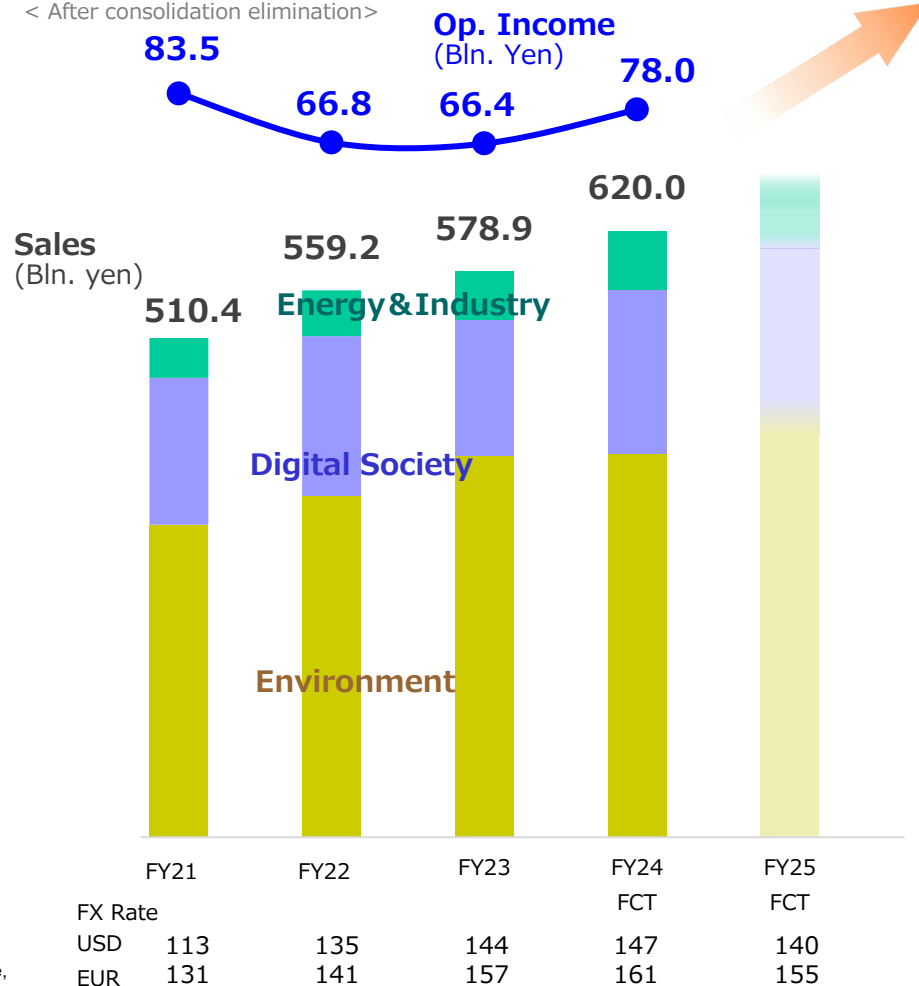
Instead of "capital" and "liabilities", this is calculated based on business assets (accounts receivable, inventories, fixed assets) that can be managed by business divisions

In the Environment Business, the industrial process Engineering Division will be incorporated, and the business will be converted into the CN/Bio business.

In the Digital Society business, we will expand the business with input including in-organic to meet high growth expectations.

## Consolidated performance trends

< After consolidation elimination >



FX Rate

	FY21	FY22	FY23	FY24	FY25
USD	113	135	144	147	140
EUR	131	141	157	161	155

The business segments were renamed from the beginning of FY2024.

As a result of this change, the operating results prior to FY2023 have been rearranged and presented using the same segment classification.

The Industrial Process Business was transferred from the Energy & Industry Division to the Environment Division.



## ■ In FY2030, the target is new business sales of 100 billion yen (NV1000)

We aim to achieve commercialization from the demonstration and development phases of an item with expected sales of 200 billion yen, and strive for the achievement of NV1000

### Products in the development phase : About 100 billion yen



#### Hydrogen, Methanation related

Next generation DAC, SOEC, Hydrogen separation, membranes, Beryllium copper for hydrogen infrastructure. etc.



#### Semiconductors, SPE related

Next-generation wafer (GaN, AlN, SiC)  
Next-generation SPE components etc.

#### Renewable and New energy related

Beryllium pebbles for nuclear fusion,  
Green energy business etc.

#### Smartphone, Communication (Optical, Next-generation) related

High-Function package for information communication,  
Bonded wafers for optical communications etc.

Elemental technology research phase

200 Bln. Yen

Development Phase

### Products in the commercialization and demonstration phase : About 100 billion yen



Capture CO<sub>2</sub> contained in the atmosphere directly  
**DAC (Direct Air Capture)**

CO<sub>2</sub> separation, crude oil production, etc.

#### Sub-nano Ceramic Membrane

Contribute to stable operation of EV power semiconductors

#### Active Metal Brazing (AMB) and Direct Copper Bonding(DCB) Substrates

Contribute to stable operation of renewable energy

#### VPP (Virtual Power Plant) Service



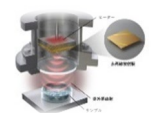
Contribute to stabilized communication

#### Next-generation bonded wafer

Support infrastructure resilience



#### ZNB (Zinc rechargeable batteries)



Contribute to unmet medical needs

#### Organic Compound Crystal Search Service

Toward achieving NV1000!

Demonstration Phase

#### Commercialization phase

Active Metal Brazing (AMB) and Direct Copper Bonding(DCB) Substrates : 20 billion yen

Organic Compound Crystal Search Service : 3 billion yen

New Product Sales (Bln. yen)

FY23

FY25

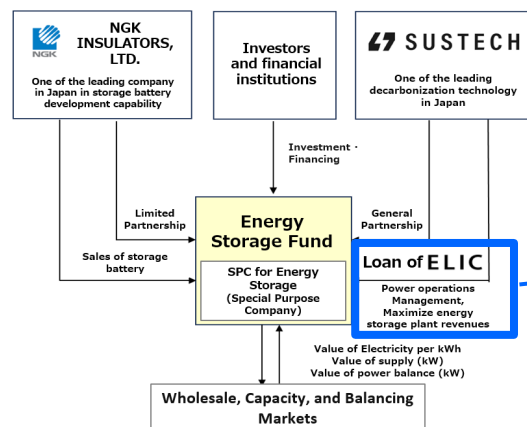
FY30

# Businesses Contributing to NV1000

## Energy storage plant business (Collaboration with Sustech)

We have commenced the operation of storage power plants utilizing NGK's battery technology and AI technology, as well as Sustech's ELIC, which boasts high predictive accuracy using power operation know-how.

We have invested in Sustech and have begun considering the establishment of a storage power plant fund to aim for further development.

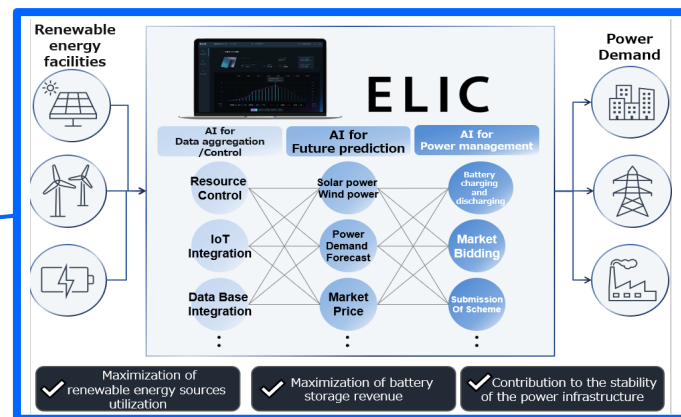


## Establish Energy Storage Fund

We will establish an energy storage fund, and SPC will operate the facility using ELIC. We will distribute the profits earned to attract further investment and establish new energy storage facilities.

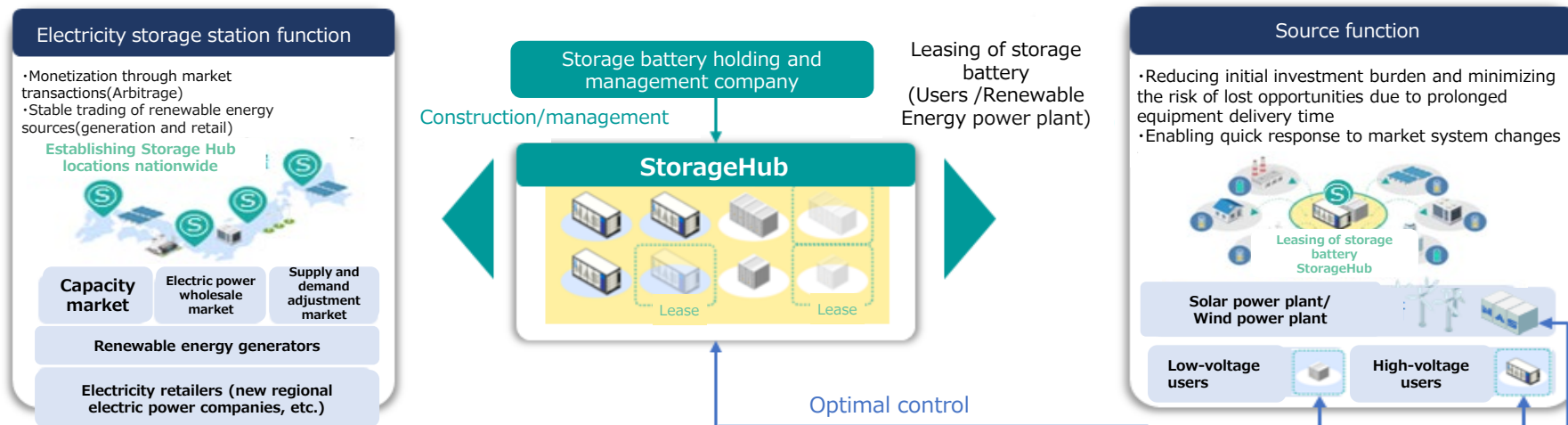
### ELIC

Power platform for data aggregation, future forecasting, and power operations with high precision using multi-layer AI



## Hybrid electricity storage station with sharing capabilities (StorageHub)

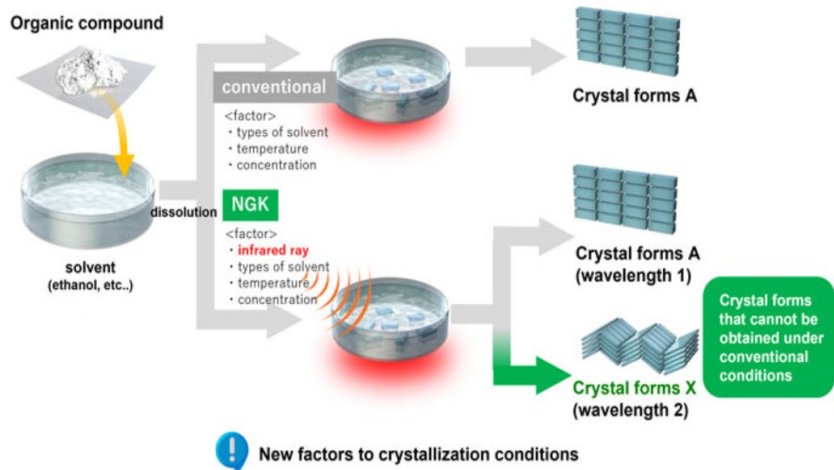
NGK and Daiwa Energy & Infrastructure Co. Ltd. are developing a business model that utilizes a hybrid electricity storage station with sharing capabilities and, with a view to establishing storage battery holding and management company. It can deal with various needs in a wide range of situations, from electricity storage stations to large and small user installations.





# Businesses Contributing to NV1000

## Organic Compound Crystal Search Service Business



The world's first organic compound crystal search service based on infrared light of specific wavelengths contributes to pharmaceutical development and unmet medical needs.

- In April 2024, we started the world's first "crystal search service for organic compounds" business based on our proprietary infrared technology.
- Pharmaceuticals may have different structures when crystallized, even if they are the same compound, and differences in structure affect their effectiveness and safety.
- This service aims to explore a wide variety of crystal forms, and its greatest feature is a new approach of infrared rays to conventional search methods.
- It contributes to drug development by increasing the possibility of discovering unknown crystal forms that are difficult to find using conventional methods.
- In addition, we are also developing our own crystal prediction software using artificial intelligence (AI), which we plan to implement in FY2025.

## HICERAM Carrier

### <Conventional use>



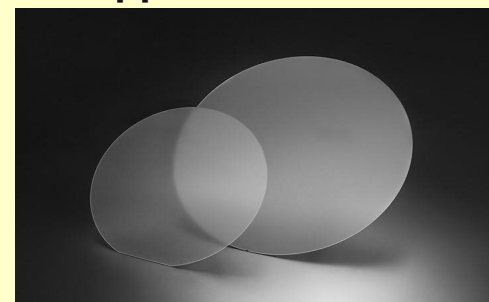
- Translucent alumina「HICERAM」  
Used as a tube material for light-emitting tubes such as high-pressure sodium lamps and metal halide lamps.

### Requirements for new approach

- ① Minimizing warpage due to the difference in thermal expansion coefficient between resin and substrate
- ② Transparency is required, as the laser is applied from the backside of the support wafer during the delamination process.
- ③ Chemical resistance is required due to repeated use with chemicals

The HICERAM material, which met the three characteristics required for the new application, was evolved into a support wafer material using proprietary technology, making it possible to package many chiplet integrations at once.

### < New approach >



- **HICERAM Carrier**  
It supports packages when chiplet integration is performed using the FOWLP (Fan-Out Wafer Level Package) method in semiconductor manufacturing

### FOWLP process on the "Support Wafer"

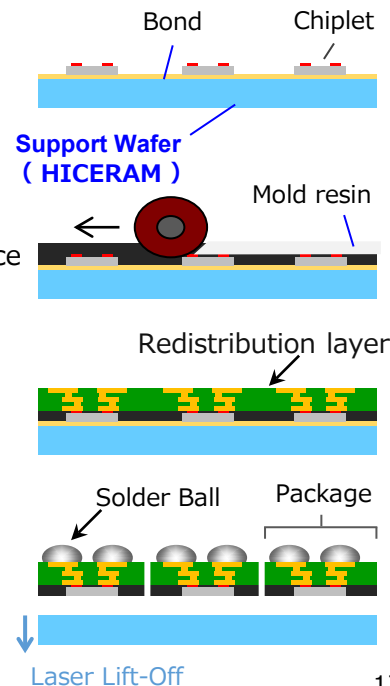
Repeated use after cleaning

① Temporary fixation

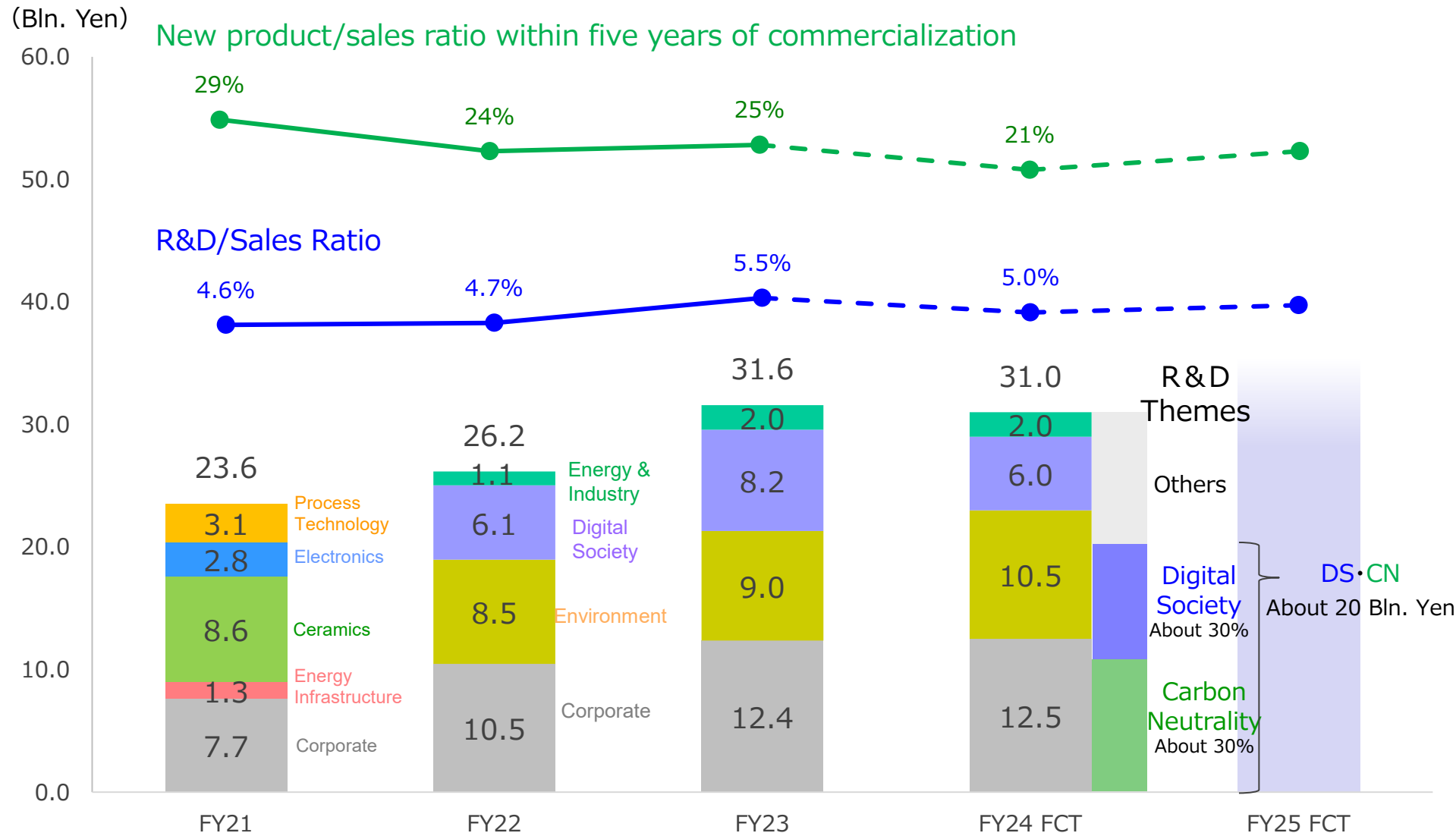
② Molding・Surface grinding

③ Formation of Redistribution layer

④ Delamination・Dicing



# R&D Input

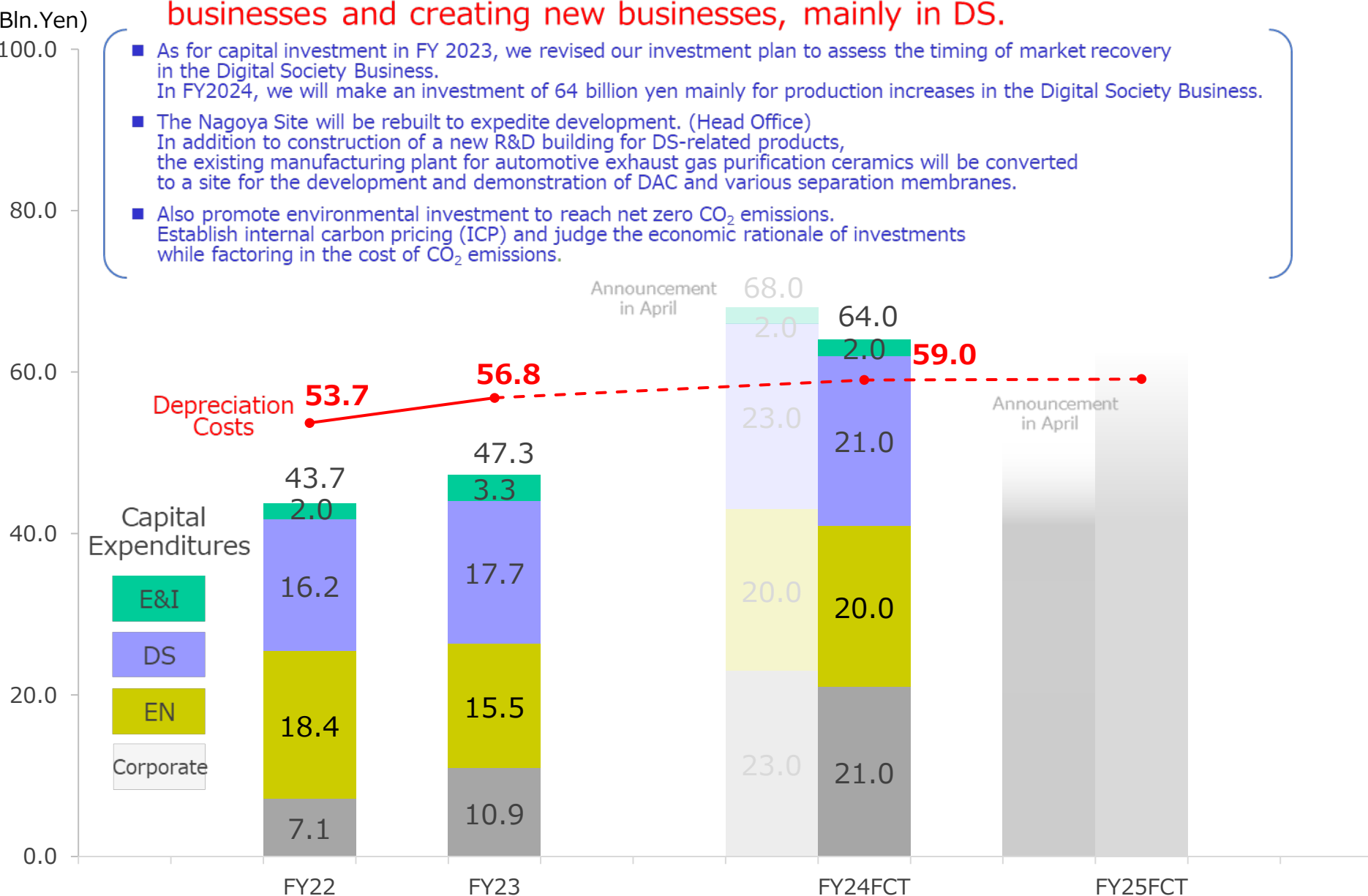


- In order to achieve NV1000, we expect to continue record high R&D spending, especially on CN and DS.
- To enhance our own technologies, the Corporate NV Creation, the Corporate R&D and the Corporate Manufacturing Engineering coordinate and proceed with the development of new products in each theme steadily. Simultaneously, actively acquire technologies and resources from outside.

# Capital Expenditures & Depreciation Costs

Invest funds for expanding sales and income of existing businesses and creating new businesses, mainly in DS.

- As for capital investment in FY 2023, we revised our investment plan to assess the timing of market recovery in the Digital Society Business.  
In FY2024, we will make an investment of 64 billion yen mainly for production increases in the Digital Society Business.
- The Nagoya Site will be rebuilt to expedite development. (Head Office)  
In addition to construction of a new R&D building for DS-related products, the existing manufacturing plant for automotive exhaust gas purification ceramics will be converted to a site for the development and demonstration of DAC and various separation membranes.
- Also promote environmental investment to reach net zero CO<sub>2</sub> emissions.  
Establish internal carbon pricing (ICP) and judge the economic rationale of investments while factoring in the cost of CO<sub>2</sub> emissions.



# Improvement of Corporate Value by Promoting ESG Management

We will achieve sustainability management by solving social issues through our products and services, thereby improving our corporate value over the long term.

As part of this effort, we have formulated materiality, including ESG issues, to promote initiatives focusing on "E: Environment," "S: Social," and "G: Governance," which are the foundations of our business activities, and we follow up on them by setting KPIs.

	ESG Materiality	KPI	Main initiatives	Results
Environment	Initiatives for climate change	CO2 emissions, CO2 emission reduction rate relative, Renewable electricity procurement rate	Assessment and disclosure of emissions	<p>Accelerated initiatives for carbon neutral and started initiatives for coexistence with nature and a circular economy.</p> <ul style="list-style-type: none"> <li>• Achieved FY2023 targets for CO2 emissions, renewable electricity procurement rate, etc.</li> <li>• The net-zero CO2 emissions target for 2050 has been certified under the SBT Initiative's net-zero standard (90% reduction for Scope 3).</li> <li>• Started Scope 3 calculations using the CDP supply chain program.</li> <li>• Implemented prior partial disclosures under the Taskforce on Nature-related Financial Disclosures (TNFD)</li> <li>• Company-owned forests certified as "Nature symbiosis sites" by the Ministry of the Environment and registered in the international database</li> </ul>
	Promotion of resource recycling	Emissions generated per unit of sales etc.	Reduction of emissions, Effective use of water resources	
	Prevention of environmental pollution	Number of training Participants, Number of incomplete notifications etc.,	Management of chemicals	
	Conservation and restoration of biodiversity	TNFD disclosure schedule	Cooperation with suppliers Biodiversity impact assessments and response	
Social	Enhancing value of human resource	Rate of participation in mental care education by position, Paid leave utilization rate, Rate of female managers	Activities to promote mental and physical health, Systems and initiatives to support the active participation of diverse human resources	<p>Promoted human capital management and respected the human rights of all people affected by our business activities</p> <ul style="list-style-type: none"> <li>• Established Health of Conduct to achieve Management Strategy Map</li> <li>• Continued "Aichi Women's Career Success"</li> <li>• Formulated The NGK Group Supplier Code sustainable procurement. Started obtaining supplier consent.</li> </ul>
	Respecting human rights	Frequency of self-checks	Performing human rights due diligence	
	Promotion of sustainable procurement	Rate of consent among major suppliers	Demands toward suppliers	

As a foundation to support these:

## Governance

- Strengthen the supervisory function of the Board of Directors by increasing the number of Outside Directors, etc.

## Others

- Conduct intellectual property activities that contribute to "creation and early commercialization of new businesses" and "enhancement of competitiveness of existing businesses" in line with business and development strategies.

# Capital Policy

- **Ensure profitability exceeding capital costs and financial soundness at the same time.**  
Focus on capital efficiency with ROE as a management indicator and utilization of interest-bearing debt
- **Proactive shareholder returns from a medium- to long-term perspective**  
Pay dividends while targeting a three-year average payout ratio of 30% and a three-year average DOE of 3%, and acquire and cancel treasury shares in a flexible manner.
- **Keep the income rate, assets turnover and financial leverage at healthy levels consistent with business strategy**

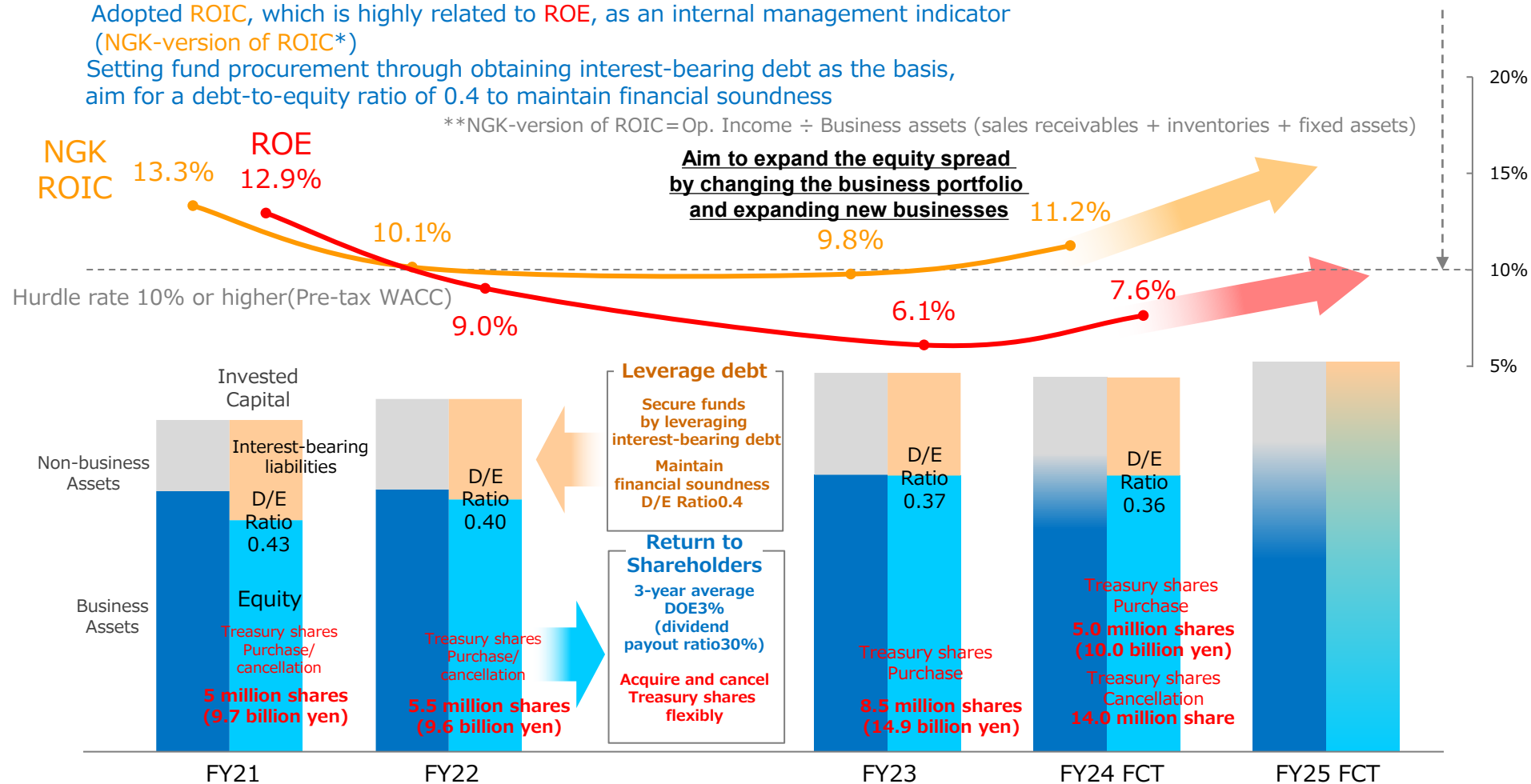
Adopted ROIC, which is highly related to ROE, as an internal management indicator (NGK-version of ROIC\*)

Setting fund procurement through obtaining interest-bearing debt as the basis, aim for a debt-to-equity ratio of 0.4 to maintain financial soundness

\*\*NGK-version of ROIC = Op. Income ÷ Business assets (sales receivables + inventories + fixed assets)

## Estimation of the NGK's Capital Cost

After-tax Debt Cost	1.0%
Capital Cost	7.8%(CAPM)
D/E Ratio	0.36
WACC	6.0%
Pre-tax WACC	8.7%(Hurdle rate)



# Capital Policy ~Sustainable Finance(ESG Management)~

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

## ■ Status of Fund Allocation for Each Green Bonds

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

(Bln. Yen)

Eligible project categories	Project cases	Seventh series of NGK INSULATORS, LTD. unsecured straight bonds (The first green bond)	Eighth series of NGK INSULATORS, LTD. unsecured straight bonds (The second green bond)	Eighth series of NGK INSULATORS, LTD. unsecured straight bonds (The second green bond)	Total
		Allocating amount (January 2022 to March 2023) 15-Month Results	Allocating amount (December 2022 to March 2023) 4-Month Results	Allocating amount (December 2023 to March 2024) 4-Month Results	
Batteries	•NAS® Batteries •Zinc Rechargeable Batteries ®	4.7	1.5	3.4	9.6
Next-generation power semiconductors	•Gallium Nitride (GaN) Wafer •DCB Circuit Substrate	2.3	1.3	3.0	6.6
CCU/CCS and hydrogen/ammonia	•CO <sub>2</sub> Separation Membrane	2.2	1.7	3.3	7.3
Clean energy utilization	•Install Photovoltaic Equipment Systems using NAS® Batteries	0.5	0.2	0.2	1.0
Energy-efficient manufacturing	• Invest in the high-efficiency facilities meeting Energy-efficient standard sufficiently	0.2	0.2	0.2	0.6
Total(except issuance costs)		*9.9	*4.9	10.1	25.0

\* All funds have been applied except for issue expenses.

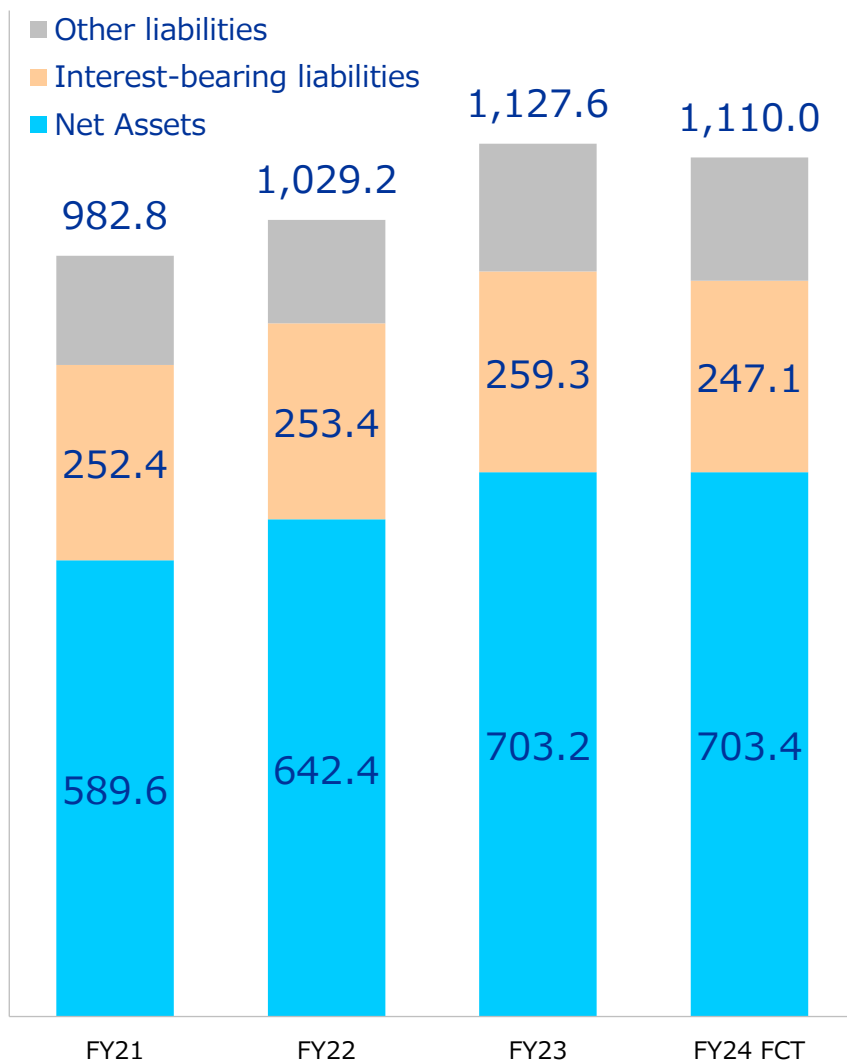
## ■ Fourth Series of Green Bonds in 2024(Plan)

Tenth Series of NGK INSULATORS, LTD. Unsecured Straight Bonds	
Issuance amount	5 billion yen (Degree)
Issuance date	November, 2024 onwards
Maturity	5 years

In addition to reinvesting retained earnings, we will secure financing through interest-bearing debt and provide growth inputs related to carbon neutrality while maintaining both financial soundness and capital efficiency.

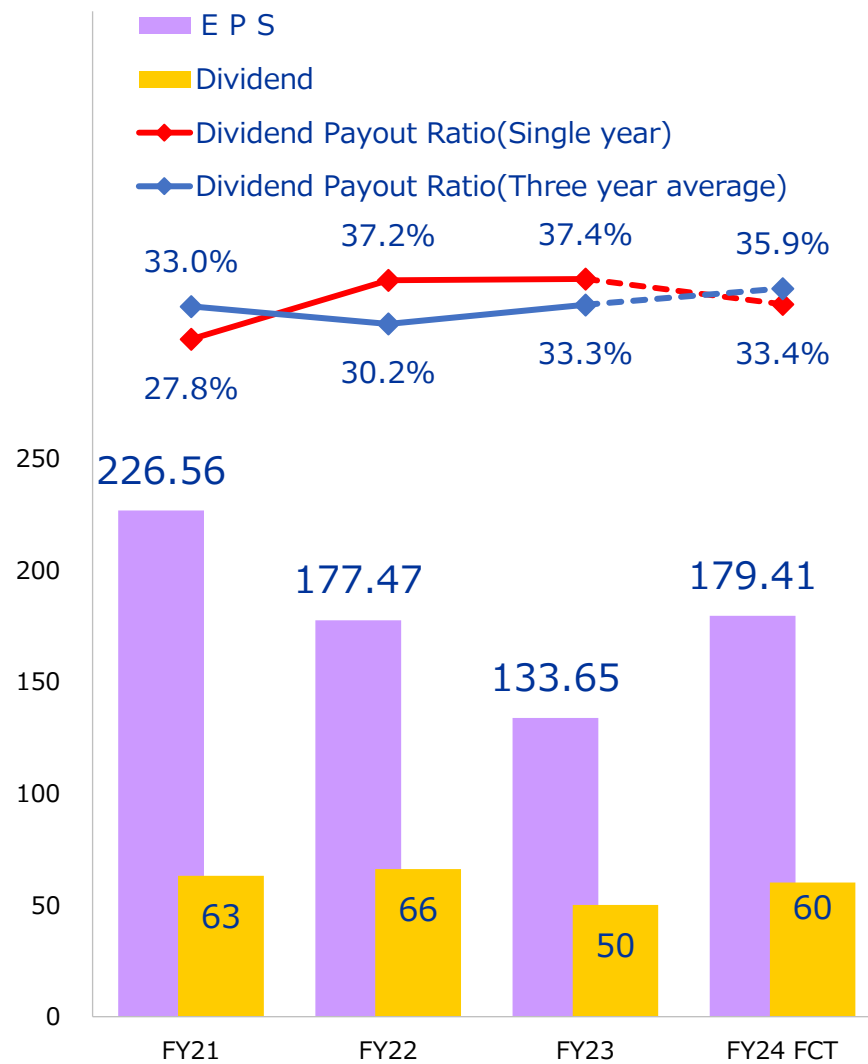
# Total Assets & Dividend

(Bln. Yen)



ROE	12.9%	9.0%	6.1%	7.6%
D/E Ratio	0.43	0.40	0.37	0.36
Equity ratio of 50% or higher will be maintained				

(Yen)



DOE				
Single year	3.6%	3.4%	2.3%	2.5%
Three-year average	3.0%	3.0%	3.0%	2.7%

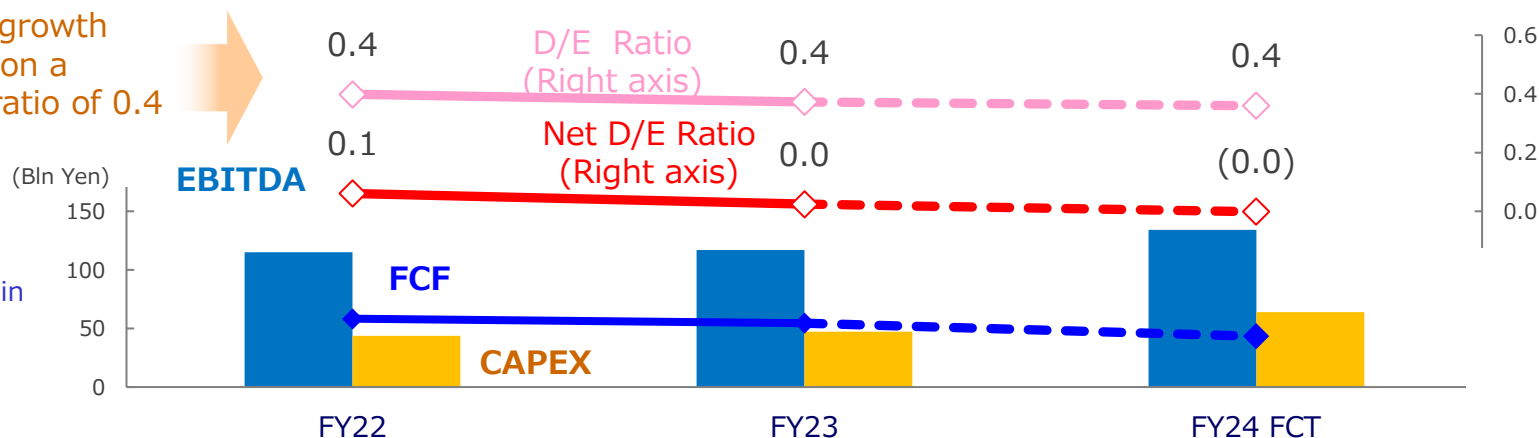


# Summary of Cash Flow

(Bln. Yen)	FY2022	FY2023	FY2024 Forecast	
			April Announcement	New Forecast
Operating Activities	97.9	99.2	106.0	114.0
Investing Activities	(52.0) Investment (43.1)	(68.6) Investment (45.1)	(48.0) Investment (68.0)	(34.0) Investment (64.0)
Financing Activities	(34.6) New loans +29.6 Repayment (32.8) Treasury shares Purchase (9.6)	(36.1) New loans +34.5 Repayment (36.4) Treasury shares Purchase (14.9)	(30.0) New loans +25.0 Repayment (38.0)	(37.0) New loans +25.0 Repayment (35.5) Treasury shares Purchase (10.0)
Effect of Exchange Rate Changes on Cash & Cash Equivalents	2.6	8.1	1.0	(2.5)
Net Increase (Decrease) in Cash & Cash Equivalents	14.0	2.6	29.0	40.5
Cash & Cash Equivalents at End of Period	168.9	171.4	200.5	212.0

Invest funds in growth domains based on a debt-to-equity ratio of 0.4

Free cash flow is expected to remain positive despite aggressive investment in digital society (DS), which is a growth domain.





# Sales by Product (Annual)

(Bln. Yen)



<After consolidation elimination>	FY2021	FY2022	FY2023	FY2024 Forecast
Honeycomb filters	70.4	81.3	90.1	92.0
GPF	33.9	36.8	49.8	51.0
Cd-DPF・LSH	78.3	84.3	85.5	81.0
SiC-DPF	46.3	59.7	71.9	73.0
Sensors	63.7	58.7	64.6	61.0
Industrial Processes *	26.9	28.3	28.8	34.0
<b>Environment Business</b>	<b>319.5</b>	<b>349.1</b>	<b>390.7</b>	<b>392.0</b>
SPE related	96.9	107.0	86.5	110.0
Electronics components	29.5	28.6	26.1	29.0
Metal related	23.9	27.6	25.6	27.0
<b>Digital Society Business</b>	<b>150.3</b>	<b>163.2</b>	<b>138.2</b>	<b>168.0</b>
Energy Storage	1.3	2.7	2.1	8.0
Insulators	39.3	44.2	47.9	52.0
<b>Energy &amp; Industry Business</b>	<b>40.6</b>	<b>47.0</b>	<b>50.0</b>	<b>60.0</b>
<b>Total</b>	<b>510.4</b>	<b>559.2</b>	<b>578.9</b>	<b>620.0</b>

\*The business segments have been changed from the beginning of FY2024.

As a result of this change, the operating results prior to FY2023 have been rearranged and presented using the same segment classification.  
Industrial Processes Business was transferred from the Energy & Industry Division to the Environment Division.

# Sales by Product (Semi Annual)

(Bln. Yen)

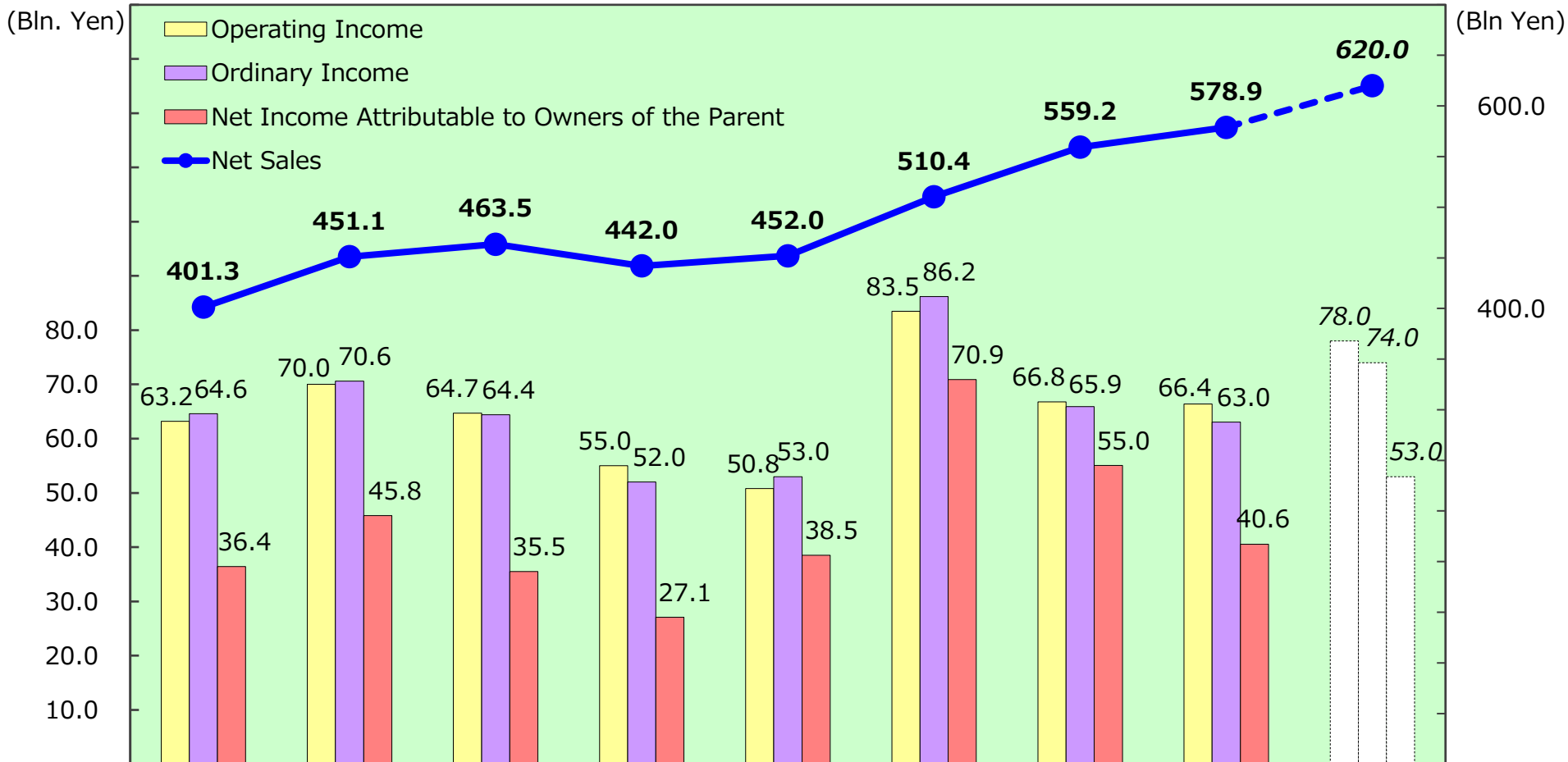
<After consolidation elimination>	FY2023		FY2024 Forecast	
	1H	2H	1H	2H
Honeycomb filters	45.2	44.9	45.6	46.4
GPF	24.9	24.9	25.0	26.0
Cd-DPF・LSH	42.9	42.6	41.1	39.9
SiC-DPF	34.0	37.9	36.8	36.2
Sensors	32.9	31.8	30.2	30.8
Industrial Processes *	13.5	15.4	13.7	20.3
Environment Business	193.3	197.4	192.3	199.7
SPE related	41.8	44.7	50.6	59.4
Electronics components	11.7	14.4	15.7	15.3
Metal related	12.6	13.0	12.9	14.1
Digital Society Business	66.1	72.1	79.1	88.9
Energy Storage	0.7	1.4	2.4	5.6
Insulators	22.8	25.1	24.4	27.6
Energy & Industry Business	23.5	26.5	26.9	33.1
Total	282.9	296.0	298.4	321.6

\*The business segments have been changed from the beginning of FY2024.

As a result of this change, the operating results for FY2023 have been rearranged and presented using the same segment classification.

The Industrial Process Business was transferred from the Energy & Industry Division to the Environment Division.

# Consolidated Operating Results



FX Rate	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
USD	¥109	¥111	¥111	¥109	¥106	¥113	¥135	¥144	¥147
EUR	¥119	¥129	¥128	¥121	¥124	¥131	¥141	¥157	¥161
ROE	8.8%	10.4%	7.6%	5.8%	7.9%	12.9%	9.0%	6.1%	7.6%
EPS	¥112.71	¥142.42	¥110.35	¥84.73	¥121.61	¥226.56	¥177.47	¥133.65	¥179.41
Dividend	¥40	¥44	¥50	¥50	¥30	¥63	¥66	¥50	¥60

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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