Mid- to Long-Term Vision

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President

Shigeru Kobayashi
NGK Group Vision

Road to 2050
NGK Group Vision

What we want to be

A company to contribute to carbon neutrality and digital society with our unique ceramic technologies

What we must do

Convert our business structure through 5 Transformations
Social Issues and NGK

Backcasting from the envisioned society of 2050

- Development of electric power
- Environmental regulations and global competition
- Insulator business
- Diversification and growth

Extreme changes in the world

With our unique and original ceramic technologies, we will realize things that are usually regarded as impossible

Implementing our services in society by expanding from products to solutions

NGK has been providing values to society with SDGs-like concepts

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Image of the Future Society 2050

Making mobility clean and safe

- EVs as driving electronic devices
- Fully autonomous cars
- Photovoltaics + EVs
- Space elevators
- Mobile offices
- Flying cars

Making clean energy more efficient

- Carbon capture and utilization/carbon capture and storage (CCU/CCS)
- Floating offshore wind-power generation
- Distributed regional power supply
- High-efficiency photovoltaic cells
- Space power generation
- Remote power supply
- Nuclear fusion
- Hydrogen fuel
- Methanation
- Biomass fuel

Making industries innovative

- Smart factories
- Vegetable factories
- Carbon-neutral factories
- Sterilization/antimicrobials
- Industrial water/water recycling
- Pharmaceutical manufacturing equipment

Making smart society more comfortable

- 6G
- IoT Everywhere
- Optical networks
- Super-virtual reality
- Quantum computers
- Ultra-small wearables
- Quantum communications
- Maintenance-free IoT modules

Digital Society

Carbon Neutrality
NGK's Contribution Items

Making mobility clean and safe
- New ceramic packages
- Chip-type ceramic rechargeable batteries (EnerCera®)
- Wafers for next-generation power semiconductors
- Metalized ceramic substrates for power semiconductors
- Sensors for mobility
- Beryllium-copper alloys
- Ceramic packages

Existing Products
- HONEYCERAM®
- Diesel particulate filters
- Gasoline particulate filters
- NOx sensors
- Ceramic packages
- Bonded wafers
- Piezoelectric elements for HDDs

New Products
- Bonded wafers for next-generation telecommunications networks
- All-ceramic batteries
- Metal-air electrochemical cells
- High-power NAS® batteries
- New bonded wafers
- Metalized ceramic substrates for power semiconductors

Future Products
- New bonded wafers for sensing devices
- Beryllium-copper alloys
- Components for Semiconductor Production Equipment (SPE)
- Heat-resistant jigs
- Corrosion-resistant equipment and systems

Making clean energy more efficient
- Making mobility clean and safe
- Making smart society more comfortable
- Making industries innovative

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Making industries innovative
- Making mobility clean and safe
- Making smart society more comfortable
- Making clean energy more efficient
New Value to Be Provided by NGK

**New products**

- Under harsh usage, realizing high-precision separation and capture of CO₂
- Large ceramic membranes that can separate CO₂ at the molecular level with our unique hydrothermal synthesis technologies

**CN (Carbon Neutrality)**

- As there is no risk of fire accidents, they can be installed indoors and safely realize emergency power supply and renewable energy utilization
- Zinc rechargeable batteries

**Ceramic Technologies**

- Materials
- Processes
- Mass-production technology

**Future products**

- **SOEC (Solid oxide electrolysis cells)**
  We will use ion-conducting ceramics to create fuels and raw materials from CO₂ and water with high efficiency.

- **Honeycomb structural reactors for synfuel**
  We will utilize large-scale extrusion and separation membrane technologies to make fuel and raw-material synthesis more efficient.
Examples in CCU / CCS

CCU: Carbon Capture and Utilization
CCS: Carbon Capture and Storage

- **CO₂ separation membranes for industrial exhaust gas**
- **CO₂ separation and capture**
  - DAC: Direct Air Capture (atmospheric CO₂ adsorption)
  - Atmospheric CO₂ adsorptive modules
  - Atmospheric CO₂ capture
  - CO₂ underground storage
  - EOR: Enhanced Oil Recovery (CO₂-EOR)
- **CO₂ recycling**
  - Beryllium copper for hydrogen infrastructure
- **Fuel and chemical products**
- **Honeycomb structural reactors for synfuel**
- **Forests**
- **Water and CO₂ electrolysis**
  - SOEC
- **Natural gas and biogas**
- **Examples in CCU / CCS**

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New Value to Be Provided by NGK

New products

- Realizing a maintenance-free IoT
- More secure smart cards
- Wearable devices closer to our life

EnerCera®

Highly heat-resistant, high-capacity, high-power, fast-charging and ultra-small and thin batteries utilizing our unique crystal-orientation control

DS
Digital Society

Ceramic Technologies

Materials
Processes
Mass-production technology

Contribution to 5G and next-generation telecommunications networks with high speed and high data capacity

Wafers

Highly functional bonded wafers realized by our unique precision-polishing and bonding technologies

Future products

Sensors for mobility

Our high-precision package technology will contribute to the realization of autonomous driving, such as the evolution of LiDAR*

New bonded wafers (for sensing devices and next-generation telecommunications networks)

Contributing to autonomous driving sensors and ultra-high-speed communication by utilizing ultra-thin polishing and multi-materials bonding technologies

*Light Detection and Ranging
Our Aim

Carbon neutrality and the digital society related businesses:

Achieve 80% of sales by 2050
Our Prospect for the Next 5 Years

Input cash into new growth to achieve the conversion of business structure

Sales (total)

FY16-20 total

FY21-25 total

For internal combustion engines (HONEYCERAM®, DPF, etc.)

For digital society

For carbon neutrality

Demand for internal combustion engine remained scenario

Zero scenario

Capital investment

R&D

Operating income

Free Cash Flow

Interest-bearing liabilities

Prospects for FY2025

Sales

600 billion yen

Operating income

90 billion yen

Net income

60 billion yen

ROE

10%

Dividend payout ratio

30%

Earnings per share (EPS)

200 yen

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5 Transformations

To Realize What We Want to Be

ESG as a foundation of management

NGK Group Environmental Vision:
- Contributing to achievement of CN through products and services
- Realizing net zero CO₂ emissions in our own activities by 2050

Solutions to social issues through businesses
- Recruitment and cultivation of human resources

Gradual reform of governance
- Development of a culture of openness

Achievement of ‘New Value 1000’

- Attain more than 100 billion yen of sales in newly launched businesses* in 2030
- Investment of 300 billion yen in R&D over the next 10 years
  - Concentration in the CN and DS areas (80%)

ESG Management

Profitability Improvement

Commercialization

Digital Transformation (DX*)

Research & Development

Propulsion for the whole transformation

Increase of earning power, creating a cycle for growth

ROIC / Analysis and improvement of profitability in each business

Strengthening entire process chain

Reinforcement of societal implementation of our products

Improvement of cross-divisional marketing capabilities

Expansion of collaboration with outside partners

Expanding solution business

Digitization of all processes in the company

Training of IT liaisons in each division

*DX: Digital Transformation
  Transform business models and corporate structure with digital technology

*Businesses just launched and to be newly launched in the future
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What we must do

Convert our business structure through 5 Transformations
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