

# Preservation of Global Environment

The NGK Group is engaged in ongoing environmental conservation efforts by means of improving manufacturing processes through the development and introduction of innovative manufacturing technologies and the development of products and services that contribute to reducing environmental impacts.

## Activities covered

- NGK Headquarters/Nagoya Site/Chita Site/Komaki Site/Ishikawa Plant (does not include Tokyo Main Office, Osaka Branch and six othersales offices)
- Group companies: 42 manufacturing-related consolidated subsidiaries (19 in Japan; 23 overseas)

## NGK's Core Policy on the Environment

Recognizing that protecting the environment is a vital issue that all of humanity must face, the NGK Group formulated its Core Policy on the Environment in April 1996 based on Environmental Philosophy and Environmental Action Guidelines in order to bring its corporate activities into harmony with the environment. On the basis of this policy, the NGK Group works to reduce the environmental impact of business activities, and actively strive to help protect the environment by developing products and technologies to that end.

### NGK's Core Policy on the Environment

#### Environmental Philosophy

Given its corporate philosophy—"NGK products and technologies must create new value and contribute to the quality of life"—NGK will contribute to tackling environmental issues through its "Triple-E" business segments of ecology, electronics, and energy to create a comfortable environment for future generations.

#### Guidelines for Environmental Action

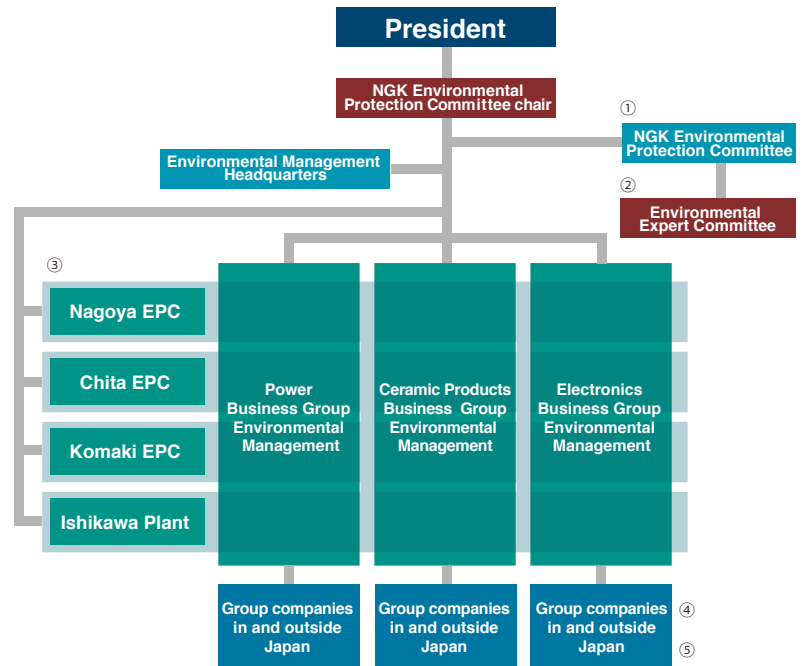
1. Strive to develop, design, and manufacture products that contribute to the environment and products with low environmental impact.
2. Work to reduce the environmental impact arising from business activities.  
Conduct design reviews to scientifically study and evaluate the environmental impact of business activities.
  - Promote energy conservation measures for all processes and facilities, and make efforts to control CO<sub>2</sub> emissions
  - Promote resource saving and recycling, and make efforts to control the generation of by-products.
  - Through the appropriate use and control of chemical agents, work to reduce the risks inherent in toxic substances.
  - Give precedence to environmentally friendly materials, parts, products, and facilities in procurement and purchasing, strengthening cooperative alliances with our business partners.
3. Enhance environmental management systems from a global perspective while continuously reducing our environmental impact.
4. Not only abide by environmental laws, regulations, and other requirements, but also institute voluntary standards and work to improve our own environmental conservation.
5. Provide environmental information to the public at the appropriate time and pursue dialogue with all stakeholders. Proactively develop social action programs. Also, engage in education and publicity in order to improve employees' environmental consciousness.

## Environmental Management Frameworks and Environmental Management System

The NGK Group promotes environmental conservation activities in accordance with our Core Policy on the Environment through initiatives pertaining to environmental management frameworks and the Environmental Management System (EMS) implemented by global Group companies working in conjunction with one another.

### Consolidated Environmental Management Promotion System

In addition to environmental management systems built independently at each site of NGK (Nagoya, Chita, Komaki, Ishikawa), we have established a consolidated management system to control environmental activities at all domestic and overseas Group companies under the leadership of each Business Group. The Five-Year Environmental Action Plan and the related annual plan are shared across the entire Group via the Business Groups to be incorporated into activity plans of each Group company. To promote unified environmental management for the entire Group, annual liaison meetings are held for Group companies in Japan, while head office personnel visit Group companies overseas on a regular basis. Thus, we create interactive discussion and support opportunities to address issues facing each company.



#### ① NGK Environmental Protection Committee

In principle, meets twice each year. Other meetings are held at the discretion of the chairman.

##### ◆ Governing Structure

Chairman	President makes decision in light of Executive Committee deliberations (As of June 2017, Director and Vice President)
Vice Chairman	Appointed by NGK Environmental Protection Committee Chair (As of June 2017, General Manager of Environmental Management Dept.)
Members	Executive Vice President, Vice Presidents responsible for Head Office Departments, Group Executives, General Managers, General Manager of Pollution Control at each site, General Manager of Environmental Management Dept., General Manager of Safety and Health Management, General Manager of Corporate Strategy Office, General Manager of Corporate Communications, General Manager of Human Resource Department, General Manager of Group Compliance, General Manager of Finance & Accounting Dept., General Manager of Legal Dept., General Manager of General Affairs Dept., General Manager of Purchasing Dept., General Manager of Public Relations, General Manager of Construction & Maintenance Dept., others designated by the Committee Chairman

#### ② Environmental Expert Committee

In principle, meets twice each year. Meets before the NGK Environmental Protection Committee to review and discuss items to be reported to the committee.

##### ◆ Governing Structure

Expert Committee Chair	General Manager of Environmental Management Dept.
Vice Chairman	General Manager of Construction & Maintenance Dept.
Members	General Manager of Business Planning Dept., Persons in charge of promoting environmental activities in each division, Group Manager of Environmental Management Dept., others designated by the Expert Committee Chair

#### ③ Environmental committees in each site of NGK (Nagoya Site, Chita Site, Komaki Site, Ishikawa Plant)

In principle, meets twice each year in each area. Thoroughly conveys matters determined by the NGK Environmental Protection Committee, communicates and discusses issues and topics in each area (all four areas meet twice each year for a total of eight meetings)

#### ④ Domestic Group company liaison meetings

Meets once each year. Conveys the Group-wide policy on environmental initiatives to manufacturing Group companies and attempts to share each company's environmental management status and information on effective initiatives to promote the unification of domestic Group company environmental conservation activities.

#### ⑤ Sharing information with overseas Group Companies

The Environmental Performance questionnaire is used to conduct an annual survey into the status of compliance with environmental laws at each company. Main Group companies are visited every 2-3 years to ascertain management conditions through hearings.

#### History of NGK's Environmental Activities

April	1972	Environmental Protection Committee and Environmental Preservation Office (currently, Environmental Management Dep.) established
June	1992	Waste Countermeasures Commission established
March	1993	NGK's Voluntary Plan for Environmental Conservation established
December	1994	Chlorofluorocarbons (CFCs) and 1,1,1-trichloroethane abolished
February	1995	Internal environmental audit conducted
April	1996	NGK's Core Policy on the Environment established
December	1996	CO <sub>2</sub> Countermeasures Commission established
March	1998	NGK's three production bases (Nagoya, Chita and Komaki) simultaneously received ISO 14001 certification
March	1999	Environmental Report published
April	1999	Environmental accounting introduced
October	1999	Green Purchasing Commission established
November	1999	Environmental audits of domestic Group companies started
February	2000	Environmental Partnership Organizing Club (EPOC) established and active participation therein begun
October	2000	Chemical Substances Safety Committee established; Chemical Substances Management System introduced
March	2001	First Five-Year Environmental Action Plan established
April	2001	Compilation of environmental performance data for domestic Group companies started
October	2001	Operating of Recycling Yard begun
January	2002	Compilation of environmental performance data for overseas Group companies started
April	2002	New "Green Management" three-year management plan instituted
April	2003	Moves made toward a full business group environmental management system; "Waste Countermeasures Commission" renamed "Recycling promotion Commission" and "wastes" renamed "by-products."

March	2004	Three-year and long-term plans for reduction of CO <sub>2</sub> emissions instituted
March	2005	Company-wide medium-term plan for the reduction in by-products established
April	2005	Environmental Action Guidelines revised; Green Procurement Guidelines revised
October	2005	Third-party review of environmental performance begun
April	2006	Second Five-Year Environmental Action Plan established
September	2006	Initiated environmental surveys of overseas Group companies
May	2007	Introduction of a consolidated goal for CO <sub>2</sub> and by-products for domestic Group companies
April	2008	Establishment of the Environmental Management Department
January	2009	Introduction of goals to reduce CO <sub>2</sub> by-products, and chemical substances for overseas Group companies
January	2010	Expanded scope of goals to reduce CO <sub>2</sub> by-products, and chemical substances for overseas Group companies
April	2011	Formulated the third Five-Year Environmental Action Plan, "by-products" renamed "discarded materials."
March	2012	Three NGK sites (Nagoya, Chita and Komaki) received integrated ISO 14001 certification
March	2013	The Ishikawa plant received ISO 14001 certification (joint certification with three NGK sites)
April	2013	NGK established the Environmental Expert Committee as the authority handling matters related to CO <sub>2</sub> discarded materials and other important environmental management items (created through the combination of the former CO <sub>2</sub> Countermeasures and Recycling Promotion Commission)
August	2013	Conducted environmental liaison meeting at overseas Group companies as part of attempts to strengthen global environmental management
October	2013	Green Purchasing Commission established
February	2015	NAS Battery wins the Gold Prize at the 2015 Aichi Environmental Awards
April	2016	Formulated the Fourth Five-Year Environmental Action Plan

## Environmental Management System (ISO14001, etc.) Initiatives

The NGK Group encourages the acquisition of ISO 14001 or third-party certifications meeting this standard to systematically and continuously develop its environmental conservation activities in line with NGK's Core Policy on the Environment. Under this initiative, a total of 39 manufacturing sites, including those in Nagoya, Chita, Komaki and Ishikawa, have been certified appropriately. We will work to expand the certification initiative within the Group, particularly targeting new plants. The Group will make effective use of these environmental management systems going forward with the intention of reinforcing its environmental management.

### Certification of Environmental Management System

Categories		No. of manufacturing bases	No. of bases certified
NGK		4	4
Domestic Group	Power Business	7	4
	Ceramic Products Business	5	5
	Electronics Business	11	11
Overseas Group	Power Business	5	4
	Ceramic Products Business	9	8
	Electronics Business	8	8

The counting method of manufacturing bases was changed in fiscal 2016.

## Environmental Audits

NGK conducts internal environmental management system audits and is inspected by third parties at the Nagoya, Chita, and Komaki sites, as well as the Ishikawa plant. Group companies also conduct these same internal audits and external reviews of the environmental management systems are conducted by external auditors at all Group companies. In fiscal 2016, no significant findings were made. In the event of a significant finding, the relevant division and Environmental Management Department work together to review and implement countermeasures as well as inform environmental committees in each area in an attempt to horizontally deploy these measures.

## Environmental Risk Management

At the NGK Group, each manufacturing site has individually established environmental management systems to prevent environmental pollution. Each site periodically performs self-evaluation of its environmental risk management activities and reports evaluation results to NGK headquarters. Headquarters confirms the results and gives advice and support for improvement, as necessary. Thus, we are working to improve the management level for the entire Group.

## Regulatory Compliance

NGK conducts monitoring and assessments as well as vigorous control of exhaust and wastewater produced from its sites, observing relevant regulations and environmental preservation-related and other agreements with control authorities. Additionally, we organize environmental management specialist seminars on a regular basis for all Group companies in and outside of Japan to keep responsible persons updated on related topics, thereby enhancing our capabilities to prevent environmental pollution.

## Environmental Patrols and Emergency Response Drills

NGK implements environmental patrols in line with annual plans to prevent environmental pollution and conducts response drills based on emergency scenarios to minimize damage. In fiscal 2016, environmental patrols were conducted at the Nagoya, Chita and Komaki sites and the Ishikawa plant to prevent atmosphere and water pollution, ensure the appropriate management of chemical substances and suppress noise and vibrations. Response drills based on emergency scenarios were also conducted at these four areas. Going forward, NGK will continue to proactively engage in patrols and drills in an attempt to improve operational methods and mitigate environmental risks.

### FY2016 Activities Conducted

		Atmosphere	Water	Noise and vibrations	Chemical substances
Nagoya	Environmental patrols	2	2	2	1
	Emergency response drills	3	2	—	2
Chita	Environmental patrols	1	2	1	2
	Emergency response drills	3	5	—	—
Komaki	Environmental patrols	1	3	1	1
	Emergency response drills	12	7	—	—
Ishikawa	Environmental patrols	2	2	2	—
	Emergency response drills	4	2	—	—

\* - Indicate emergency response drills were considered of low importance and not conducted

## **Strengthening of Global Environmental Management**

In accordance with the Guidelines for Environmental Action, the NGK Group horizontally deploys domestic environmental impact reduction initiatives in overseas Group companies while creating mechanisms to strictly comply with amendments to environmental laws and regulations to propel our global environmental management to the next level.

### **Mitigating Environmental Risks throughout the Group**

All NGK Group companies in Japan and overseas have completed acquisition of ISO14001 or third-party certifications meeting this standard and implement environmental management in line with environmental management systems. NGK shares information regarding changes in domestic environmental laws and regulations with Group companies and has created a structure to ascertain the status of responses to these changes. Overseas, NGK Headquarters is enhancing its ability to regularly ascertain the status of responses and management in terms of important legal and regulatory system revision information in the countries and regions where Group companies are located.

Additionally, in fiscal 2016, we developed trend-based risk prevention systems using historical monitoring data for atmospheric, water and other types of environmental pollution, and introduced the systems to all Group companies in and outside of Japan. Also, NGK headquarters sent environmental management personnel to Group companies overseas to perform on-site environmental risk assessments and, for identified risks, countermeasures have been completed at relevant sites. We will continue with these efforts to mitigate environmental risks throughout the Group.

### **Strengthening Environmental Management Linked to Business Planning**

The NGK Group promotes environmental management responsive to continuously evolving business plans.

Initiatives aimed at reducing impacts on the environment in accordance with business plans include conducting forecast estimates and achievement evaluations in each business group, product line and global manufacturing base every six months to determine which initiatives to pursue next.

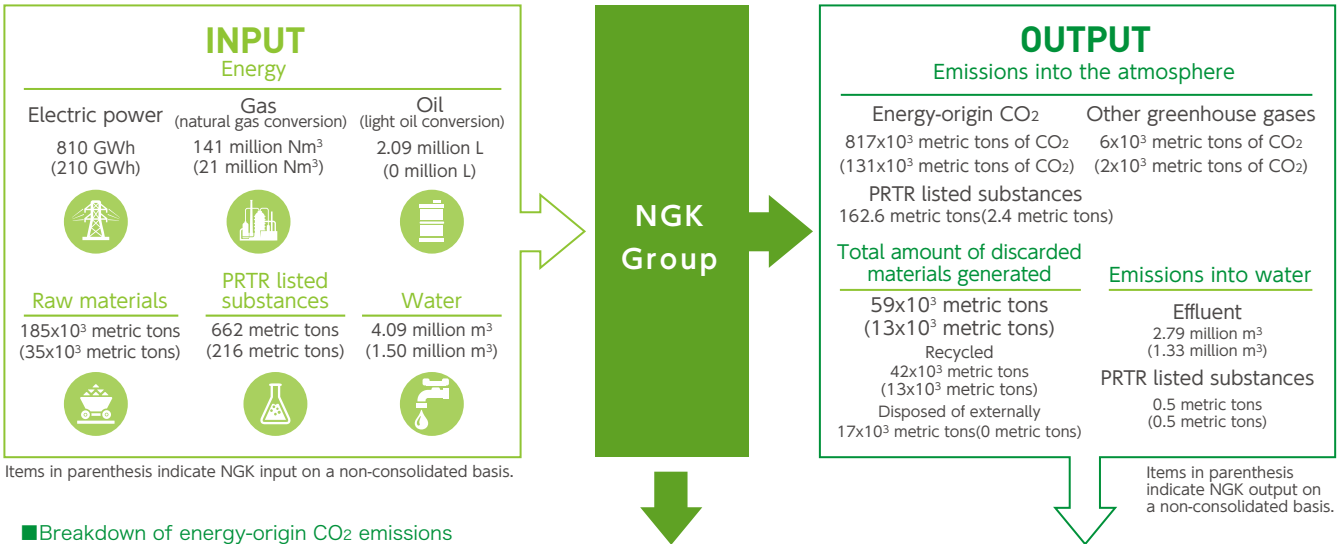
These efforts include the establishment of the Environmental Expert Committee under NGK Environmental Protection Committee, as a company-wide decision-making body. The Environmental Expert Committee facilitates discussions among managers from planning and production divisions who formulate and promote actual business planning in each business division, strengthening the company-wide environmental management system. Going forward, we will continue to strengthen management integration with the aim of promoting environmental management that combines global environmental protection and corporate growth.

## Overall Perspective of Environmental Impact

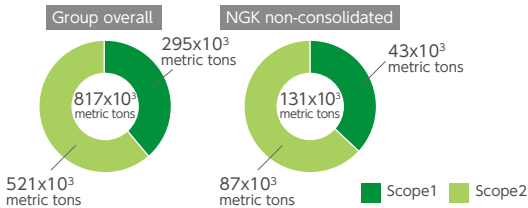
The diagram below shows aggregate inputs to and outputs from manufacturing operations of the entire NGK Group engaged in at all domestic and overseas sites.

Inputs represent data for raw materials and energy etc. and outputs for manufactured products and services as well as substances that are discharged into the atmosphere and into water.

### NGK Group Material Balance (Input and Output)



#### Breakdown of energy-origin CO<sub>2</sub> emissions



#### Notes:

1. Environmental performance values in this report have been rounded up for convenience; therefore the sum of individual values may not match the totals.
2. "Discarded materials" indicates the total amount of industrial waste and valuables.
3. CO<sub>2</sub> conversion factors (kg-CO<sub>2</sub>/unit) used in calculating NGK's CO<sub>2</sub> emissions on a non-consolidated basis are as follows (units are indicated in parentheses): Purchased electric power (kWh): 0.42, Fuel oil A (liters): 2.677, Diesel fuel (liters): 2.64, Kerosene (liters): 2.49, City gas (Nm<sup>3</sup>): 2.29, LPG (kg): 3.007, LNG (kg): 2.70, Gasoline (liters): 2.322 Sources: The Federation of Electric Power Companies of Japan (actual figures for fiscal 1990), Ministry of the Environment. Some factors calculated independently by NGK have been used. Incidentally, the fiscal 2016 energy-origin actual CO<sub>2</sub> emissions volume for NGK on a non-consolidated basis is 146x10<sup>3</sup> metric tons when using the CO<sub>2</sub> conversion factor provided by the Order for Enforcement of the Act on Promotion of Global Warming Countermeasures (revised in May 2016).

## INPUT

### 1. Energy

Electric power: Consumption amount of electric power

Gas: Consumption volume of each type of fuel gas converted into natural gas volume =  $\Sigma(\text{Consumption volume of each fuel gas} \times \text{Unit heating value of each fuel gas} / \text{Unit heating value of natural gas})$

<Unit heating value of fuel gas>

Natural gas: 40.9 MJ/Nm<sup>3</sup> City gas: 45.0 MJ/Nm<sup>3</sup>

LPG: 50.2 MJ/kg LNG: 54.5 MJ/kg

Oil: Consumption volume of each type of fuel converted into light oil volume =  $\Sigma(\text{Consumption volume of each fuel} \times \text{Unit heating value of each fuel} / \text{Unit heating value of light oil})$

<Unit heating value of fuel gas>

Light oil: 38.2 MJ/L Fuel oil: 39.1 MJ/L Kerosene: 36.7 MJ/L

### 2. Water

Total consumption volume of city water, industrial water, well water and rainwater

### 3. PRTR Substances

Total amount handled of Japan's PRTR Type 1 listed substances

### 4. Raw materials

Total weight of raw materials used in product manufacturing

## OUTPUT

### 5. Energy-origin CO<sub>2</sub> emission volume

Energy-origin CO<sub>2</sub> emission volume =  $\Sigma(\text{Consumption of each energy} \times \text{CO}_2 \text{ conversion factor of each energy})$

<CO<sub>2</sub> conversion factor of energy>

(Unit of electric power factor: kgCO<sub>2</sub>/kWh Unit of fuel factor: kgCO<sub>2</sub>/fuel unit)

Electric power Japan: 0.42; United States: 0.709; Belgium: 0.292; France: 0.061; Poland: 0.986; South Africa: 1.096; China: 0.983; Thailand: 0.687; Indonesia: 0.790; Australia: 1.390; Mexico: 0.741

Fuel Natural gas (Nm<sup>3</sup>): 2.02; City gas (Nm<sup>3</sup>): 2.29; LPG (kg): 3.007; LNG (kg): 2.70;

Light oil (L): 2.64; Fuel oil (L): 2.677; Kerosene (L): 2.49; Industrial steam (MJ): 0.06

### 6. Emission volume of other greenhouse gases

Emission volume of other greenhouse gases = active mass × emission factor × global warming potential

<Global warming potential>

CO<sub>2</sub>: 1, CH<sub>4</sub>: 25, N<sub>2</sub>O: 298, HFC: Differs by type, PFC: Differs by type, SF<sub>6</sub>: 22800, NF<sub>3</sub>: 17200

### 7. Effluent

Total amount of effluent excluding rainwater

### 8. PRTR Type1 listed substances

Emissions into water: Total emission amount of Japan's PRTR Type 1 listed substances into public waters

Emissions into atmosphere: Total emission amount of Japan's PRTR Type1 listed substances into atmosphere

### 9. Total amount of discarded materials generated

Total amount of discarded materials generated = Externally disposed amount\*1 + externally recycled amount

Recycled amount: Externally recycled amount = Paid disposal\*2 + Valuable amount (selling off)

\*1 Externally disposed amount: Direct disposal by landfill, or simple incineration

\*2 Paid disposal: Outsourcing disposal and paying for recycling



## Five-Year Environmental Action Plan

The NGK Group has established the Fourth Five-Year Environmental Action Plan (2016-2020). To achieve the goals of the Plan, we are promoting environmental activities, setting annual targets.

### Results of the Third Five-Year Environmental Action Plan (2016-2020)

The NGK Group organizes environmental initiatives by creating five-year action plans. The Fourth Five-Year Environmental Action Plan, initiated in fiscal 2016, has been formulated to broadly encompass major global environmental challenges that businesses are expected to take responsible actions to address, and to select two key issues each for two groups of themes, namely, priority themes and focus themes. The two priority themes are: environmental/social contribution through products; and reducing CO<sub>2</sub> emissions and discarded materials. The first priority theme directly reflects the core concept of the corporate philosophy, while the other theme closely relates to NGK's medium- to long-term initiative of new/reformed manufacturing structures for increasing competitiveness. For focus themes, we have also set two issues: biodiversity conservation and water resources risk management/response, both being major challenges for which socially responsible corporate action is required with greater urgency.

[Base year, target year, control scope]

**Base year: fiscal 2013; target year: fiscal 2020**

The new Five-Year Environmental Action Plan has been designed to correspond with the business initiative of New/Reformed Manufacturing Structures. Accordingly, the base year and target year of the Plan have been set to coincide with the initiative. In principle, activities will be managed on a consolidated basis, embracing those based in and outside of Japan, in place of the previous method of managing domestic and overseas activities separately. The consolidation method has been adopted to improve management efficiency and effectiveness in response to the recent changes in our global production output structure, particularly increased amounts from overseas manufacturing sites as well as from production chains through multiple global locations.










## FY2016 Progress of Initiatives within the Fourth Five-Year Environmental Action Plan

The initiatives planned under the Fourth Action Plan and their progress (targets and results for fiscal 2016; targets for fiscal 2017 and 2020, the final year) are summarized in the table below.

For the fiscal 2016 initiatives, almost all yearly numerical targets have been achieved, and for non-numerical targets steady progress was made as initially planned, indicating that we have made a successful start to the Five-Year Plan. In particular, a distinctive achievement was recorded in the area of reduction in discarded materials, where we considerably exceeded the initial target, as a result of persistent efforts of business divisions. We will continue promoting environmental activities across the Group to achieve the targets for fiscal 2017 and onward.

Category	Item	KPI	Fiscal 2016			Fiscal 2017	Fiscal 2020	
			Target	Result	Self-evaluation <sup>1</sup>	Target	Target	
Environmental/social contribution	 Environmental/social contribution through products	Develop and distribute products contributing to environmental protection	Sales growth (%)	Increase by 25% from fiscal 2013 (consolidated)	Increased by 26% from fiscal 2013 (consolidated)	○	Increase by 30% from fiscal 2013 (consolidated)	Reduce by at least 60% from fiscal 2013 (consolidated)
		Promote green procurement	Plan progress (%)	At least 99% of NGK's suppliers in Japan agree to comply with the CSR Procurement Guidelines	99.4% agreed (100% including suppliers who partially agreed)	○	Maintain the level for Japanese suppliers, conduct research on approaches for overseas suppliers (study other companies, etc.)	Maintain in Japan, expand overseas
	 Promotion of environmental communication	Contribute to local community	Plan progress (%)	Send instructors to guest lecture programs	Sent instructors to local children's centers	○	Send instructors to guest lecture programs	Continually enhance actions partnering with communities
		Raise environmental awareness	Plan progress (%)	Provide environmental education for employees, establish employee communication on environmental themes, encourage participation in environmental events	Provided training programs by job grade, organized CSR Talk Live, installed "green curtains"	○	Provide environmental education for employees, establish employee communication on environmental themes, encourage participation in environmental events	Continually enhance environmental training and information disclosure
	 Conservation of biodiversity	Promote actions based on biodiversity conservation guidelines	Plan progress (%)	Explore and implement new approaches/initiatives	Conducted biodiversity surveys at company-owned sites, requested partner companies to conduct similar surveys	○	Continue biodiversity survey at company-owned sites, promote an action commitment declaration project for employees	Expand and enhance the content of Aichi Target actions
Environmental impact reduction	 Prevention of global warming	Reduce CO <sub>2</sub> emitted from manufacturing	Basic unit per net sales	Reduce by 9% from fiscal 2013 (consolidated)	Reduced by 10% from fiscal 2013 (consolidated)	○	Reduce by 11% from fiscal 2013 (consolidated)	Reduce by 20% from fiscal 2013 (consolidated)
			Reduction rate against BAU (%)* <sup>2</sup>	Reduce by at least 12.3% from fiscal 2013 (consolidated)	Reduced by 15% from fiscal 2013 (consolidated)	○	Reduce by 15% from fiscal 2013 (consolidated)	Reduce by 15% from fiscal 2013 (consolidated)
		Reduce CO <sub>2</sub> emitted from supply chains	Basic unit per transport volume* <sup>3</sup>	Reduce by 1% per year on five-year average (unconsolidated)* <sup>4</sup>	Increased 2% on average per year (unconsolidated)* <sup>4</sup>	×	Reduce by 1% per year on five-year average (unconsolidated)* <sup>4</sup>	Reduce by 1% per year on five-year average (unconsolidated)* <sup>4</sup>
	 Effective use of resources	Reduce discarded materials emitted from manufacturing	Basic unit per net sales	Reduce by 13% from fiscal 2013 (consolidated)	Reduced by 19% from fiscal 2013 (consolidated)	○	Reduce by 17% from fiscal 2013 (consolidated)	Reduce by 30% from fiscal 2013 (consolidated)
			Reduction rate against BAU (%)* <sup>2</sup>	Reduce by at least 11.6% from fiscal 2013 (consolidated)	Reduced by 18% from fiscal 2013 (consolidated)	○	Reduce by 19% from fiscal 2013 (consolidated)	Reduce by 20% from fiscal 2013 (consolidated)
		Promote resource recycling	Recycling rate	Maintain at over 99% (in Japan)	Maintained at 99.2% (in Japan)	○	Maintain at over 99% (in Japan)	Maintain at over 99% in Japan
Manage and respond to water resources risks	Plan progress (%)	Conduct a third-party water risk survey	Conducted surveys at five sites	○	Continue water risk surveys	Strengthen actions by production base for evaluating risks and streamlining water use		

### Notes:

1. Self-evaluation standards for achievement level: ○: Target achieved ×: Target not achieved
2. Reduction rate against BAU (business as usual) indicates the percentage rate of emissions reduction resulting from implemented actions against a computed value for the hypothetical absence of the actions. By not incorporating the influence of foreign exchange movements and other factors, this indicator allows a direct grasp of the efforts by each site.
3. NGK basic unit per transport volume expresses in metric ton-kilometers the amount of crude oil equivalent fuel used.
4. Based on the computation criteria stipulated in the Act on the Rational Use of Energy

## Creating Products that Contribute to the Environment

The NGK Group considers the provision of products and services that contribute to a better social environment to be one of its most important missions. For nearly a century since its founding, NGK has made use of accumulated technologies to develop and provide products and technologies that reduce burdens on the global environment.

### Development and distribution of products contributing to environmental protection

Under the Fourth Five-Year Environmental Action Plan, initiated in fiscal 2016, NGK is committed to the development and distribution of products contributing to environmental protection as a top priority theme. We aim to achieve a growth in sales for products contributing to environmental protection of 60% compared to fiscal 2013 (and maintain the sales percentage for products contributing to environmental protection at over 50% of all products) by fiscal 2020, the final year of the Five-Year Plan. Currently, we market five products contributing to environmental protection, as detailed below, which meet internal criteria. Going forward, newly qualified products will be added to the list.

In fiscal 2016, we achieved sales growth of 26% from fiscal 2013, exceeding the annual target of 25%. In fiscal 2017, we will continue with these new development and distribution efforts to achieve the targets.

#### Sales growth for products contributing to environmental protection



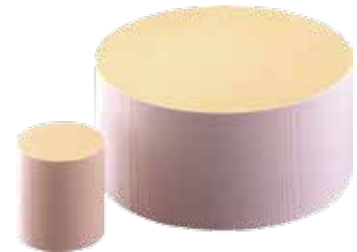
\* Figures are indexed with fiscal 2013 set at 100.

### Development and distribution of products contributing to environmental protection

#### HONEYCERAM®

HONEYCERAM is a ceramic substrate for catalytic converters to purify harmful contents in the exhaust gases of automobiles. The products' honeycomb structure is effective for carrying the catalyst to detoxify harmful substances by chemical reaction. Since the launch of its commercial production in 1976, the product has been supplied all over the world for many years as an essential component for meeting automobile exhaust gas regulations, which have become increasingly more stringent and wider in scope. Production has grown to record cumulative shipment exceeding 1.4 billion units, while manufacturing bases have expanded to a current total of eight countries in Europe, North America, Asia and Africa. HONEYCERAM is an indispensable component of clean vehicles.

NGK's HONEYCERAM production eliminates a total of four million tons of NOx per annum\*1, equivalent to double the annual NOx emissions in Japan\*2.



NOx elimination: **4 million tons annually**

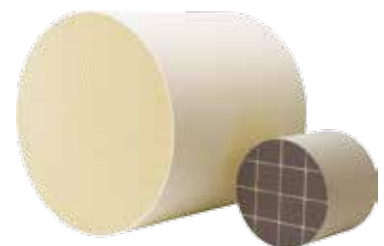
\*1 Assumption based on installation of exhaust gas system in new cars that are not equipped with such systems

\*2 Source: OECD Environmental Statistics (2012)

#### Diesel particulate filter (DPF)

The DPF is a porous ceramics filter used worldwide in the exhaust systems of diesel vehicles. With a pore structure, the filter ensures particulate matter (PM) is captured to purify the exhaust gas emitted from diesel vehicles. NGK is the only company to produce two types of DPFs based on both cordierite and silicon carbide. NGK's ceramics technologies support further developments for diesel vehicles.

The honeycomb structure, where the inlet and outlet of the through-holes are alternately sealed, enables the thin ceramic walls to efficiently capture PM while exhaust gas passes through.



Eliminates up to **99%** of PM

## NOx sensors

NGK has developed the world's first in-vehicle sensor to measure concentrations of nitrogen oxides (NOx) in exhaust gas in real time with high precision. Specifically, the sensor is capable of measuring NOx concentration at the parts per million (ppm) level and can thus detect even very small amounts of the gases. The sensor supports precise control of the exhaust purification device used in diesel vehicles, which leads to a reduction in NOx emissions and helps to promote the use of clean diesel vehicles.



## NAS<sup>®</sup> Battery

One of the most frequent uses of the NAS battery is for stabilizing the supply of renewable energy. While electricity from renewable sources, such as wind and solar power, is clean and, in principle, unlimited, its major limitation is that its output is affected by weather conditions, resulting in supply instability. The NAS battery resolves this limitation by storing excess renewable energy when generation exceeds demand, and supplying the stored energy to the grid when renewable output is low or demand is high. NAS systems enable the global growth of stable renewable energy.



NGK was the world's first manufacturer to commercialize the NAS battery megawatt-class storage system. Featuring a large capacity, high energy density, and long life, the battery can support the reliable, long-term stable supply of electricity. Also, the NAS system allows for a more compact housing compared with conventional lead-acid batteries.

NAS systems are the world's most popular  
grid-scale battery storage

Installed at over **200** locations  
worldwide with a **530,000** kW capacity

(as of June 2017)

## Low-level radwaste treatment system

NGK has developed a wide range of systems to safely treat low-level radioactive waste generated from nuclear facilities and has supplied these systems to nuclear power stations and related facilities across Japan. The systems are developed utilizing NGK's proprietary treatment technology and high-performance filter-based dust collection technology.

We undertake a variety of engineering projects including design, manufacturing and site construction, and also provide a long-term maintenance service to deliver stable and high-level radioactive decontamination. NGK thereby provides essential support for the safe and stable operation of nuclear facilities. In addition, we focus on the development of new systems for treating various types of radwaste expected to be generated from the decommissioning and dismantling of aging nuclear reactors.



## Importance of treating radioactive waste

When treating and disposing of waste generated in radiation controlled areas, including nuclear power stations, it is critically important to prevent the spread of radioactivity via the release of radioactive matter. This requires special treatment and disposal methods that differ from those for general waste.

## Preventing Global Warming

The NGK Group strives to reduce CO<sub>2</sub> emissions, a major cause of global warming, setting reduction targets for the entire Group, including its manufacturing sites in and outside of Japan.

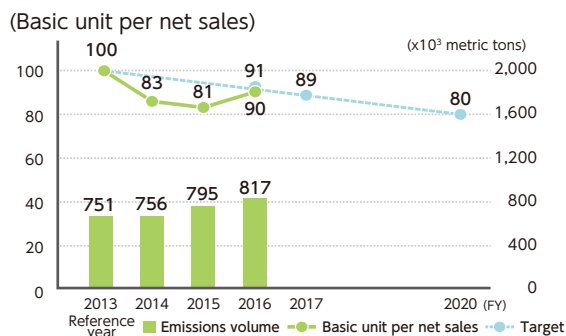
### Reducing CO<sub>2</sub> Emissions from Manufacturing Activities

Toward the achievement of CO<sub>2</sub> emissions reduction targets set under the Five-Year Action Plan, we have achieved steady results by creating and implementing annual improvement plans in line with the business plan at each manufacturing site in and outside of Japan.

We achieved the fiscal 2016 targets to make steady progress under the Five-Year Action Plan. This accomplishment resulted from our successful efforts to carry out reduction measures as initially planned, despite the basic unit per net sales decreasing from the previous year due to a number of negative factors, such as the stronger yen, change in the product mix, and a new production line launched overseas. The reduction rate against BAU, an indicator newly introduced under the Fourth Action Plan to present more directly the effect of measures to reduce emissions from the manufacturing division, reached the 2020 target of 15%, backed by a significant improvement in the basic unit per production volume.

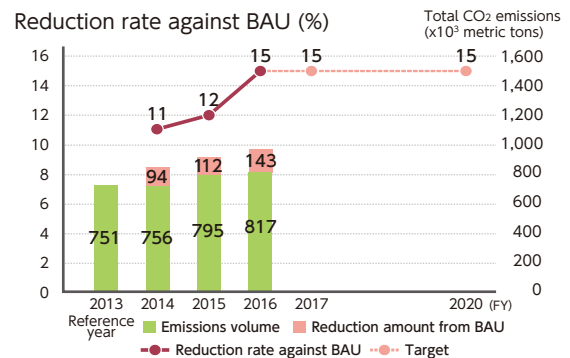
For fiscal 2017, we will exert additional efforts to achieve annual targets in order to overcome the temporary rise in CO<sub>2</sub> emissions expected owing to two extraordinary events, namely, the completion of a new large factory overseas and starting the mass production of new products. To address this challenge, we will strive to carry out reduction measures even more effectively across the entire manufacturing division while focusing on cost cutting efforts.

CO<sub>2</sub> emissions/basic unit per net sales (NGK Group)



\* Basic unit per net sales calculated with the value in fiscal 2013 set at 100.

CO<sub>2</sub> emissions/reduction rate against BAU\* (NGK Group)



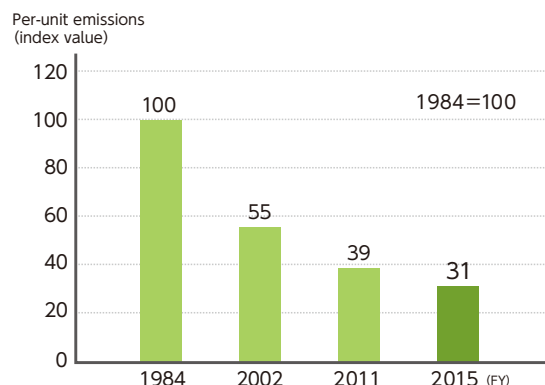
\* Reduction rate against BAU: The percentage rate of emissions reduction resulting from implemented actions against a computed value for the hypothetical absence of the actions.

### Adoption of Environmentally Friendly Production Processes

Through the introduction of highly-efficient equipment and the promotion of the collection and use of exhaust heat and improved production efficiency, the NGK Group makes efforts to reduce environmental impacts resulting from production. Also, our "Reformed Manufacturing Structures" aimed at enhancing competitiveness significantly contribute to the realization of eco-processes. We will create further advanced eco-processes through our "New/Reformed Manufacturing Structures".

(See the lower right graph for change in CO<sub>2</sub> emissions from continuous kilns, which constitute major production equipment at NGK.)

### Change in CO<sub>2</sub> emissions from continuous kilns by the year of introduction



### Measures to Reduce CO<sub>2</sub> Emissions and Effects

As it continues to expand overseas manufacturing, the NGK Group is particularly striving to raise manufacturing efficiency at its overseas sites in order to reduce the amount of CO<sub>2</sub> and discarded materials released from the Group. We have made steady progress through applying innovative processes and improvements to facilities and operations practiced in Japan to our overseas sites as well as promoting energy-saving activities for general-purpose equipment.

In fiscal 2016, these overseas initiatives achieved significant results, including an annual CO<sub>2</sub> reduction effect of 9,500 metric tons (a reduction rate of 1.2%).

## Examples of initiatives aimed at reducing CO<sub>2</sub> emissions

Categories	Measures	Effects
Highly efficient manufacturing processes	Main production efficiency initiatives at overseas locations <ul style="list-style-type: none"> <li>▪ Introduction of innovative production processes</li> <li>▪ Equipment improvements</li> <li>▪ Management improvements</li> </ul>	CO <sub>2</sub> reduction effect Domestic: 5,200 metric tons Overseas: 9,500 metric tons  Of which
Group company energy-saving diagnostics	<ul style="list-style-type: none"> <li>▪ An English version of the voluntary energy-saving guidelines and a best practice catalog created and distributed to overseas sites</li> <li>▪ Conducted in conjunction with local employees</li> </ul>	<ul style="list-style-type: none"> <li>▪ Production process improvements</li> </ul> Domestic: 1,900 metric tons Overseas: 7,300 metric tons
General-purpose equipment energy-saving activities	Horizontally deployed main improvements <ul style="list-style-type: none"> <li>▪ Replacing boilers with more efficient models</li> <li>▪ Eradicated air and steam leaks from plumbing</li> <li>▪ LED lighting</li> <li>▪ Eliminated wasteful air conditioning</li> </ul>	<ul style="list-style-type: none"> <li>▪ General purpose equipment energy savings</li> </ul> Domestic: 3,300 metric tons Overseas: 2,200 metric tons

### Energy-Saving Activities for General-Purpose Equipment through Cooperation between the Manufacturing Division and the Head Office

The NGK Group promotes energy-saving activities for its general-purpose equipment, such as lighting, air conditioners, boilers and compressors. In this, the head office plays a central function in terms of sharing know-how among different manufacturing locations, thereby achieving more efficient activities. In fiscal 2016, an energy center was established under the head office Engineering Department to direct energy-saving activities at the Group's manufacturing sites.

#### (1) Head office supporting energy-saving activities at overseas manufacturing sites

The head office Engineering Department has, over the years, sent personnel to overseas manufacturing sites to perform energy audits and, as necessary, help local staff develop and carry out effective energy-saving measures using the know-how gained from practices in Japan. These efforts have produced solid results at overseas companies, including NGK Insulators Tangshan. (See “Energy-Saving Activities at Group Companies.” )

#### (2) Creating and distributing a printed version of the energy-saving catalogue and guidelines

We have created a printed version (Japanese, English) of our energy-saving guidelines and catalog of best practices, both of which were previously available only in digital formats. Copies have been distributed to each manufacturing site in and outside of Japan to be kept handy at worksites for easy reference. This is expected to help enhance activities to reduce CO<sub>2</sub> emissions.



### Promoting energy-saving activities globally using 100 best practices

Environmental Management Department  
 Toru Oka

We have issued the Energy-Saving Best Practices catalog. This catalog is a compilation of around 100 successful measures taken to address various issues, categorized under compressors, boilers, lighting, air-conditioning and other functions, specifically describing improvement methods and cost-effectiveness. In addition, the Energy-Saving Guidelines for General-Purpose Equipment have been created to provide instructions and advice for effective activities. Containing plenty of photos and illustrations, these easy-to-understand manuals have been well received by Group companies overseas as well as in Japan. They are also utilized by the Energy Center to give instructions and advice to Group companies. The two tools will be expanded by adding new practices, thereby facilitating energy-saving activities across the Group.





## Energy-Saving Activities at Group Companies

### NGK Insulators Tangshan Co., Ltd.

NGK Insulators Tangshan has introduced measures conducted at Japanese sites to reduce CO<sub>2</sub> emissions. Our efforts started with encouraging the daily practice of switching off lighting and other equipment when not in use, with the primary intention of raising employee awareness. We are continually working to improve activities with the help of the Komaki Site, which sends personnel to Tangshan every six months to perform an on-site inspection and suggest improvement plans.



### NGK Ceramics Polska Sp. z o.o.

Since 2011, NGK Ceramics Polska has been focusing on improving processes for manufacturing SiC-based DPFs, its main product. Target areas include particularly energy-intensive calcination and drying processes, for which we have carried out various measures to reduce our CO<sub>2</sub> emissions. To further improve our performance, we will introduce new measures, including technologies provided by the Nagoya Site.



### NGK Metals Corporation

NGK Metals is reducing CO<sub>2</sub> emissions by updating control systems and improving the operation of production equipment. Among various efforts, a particularly distinctive effect resulted from automating the control units of the oil circulation system for rolling mills. The automation eliminated unnecessary around-the-clock operation, a measure taken to address inefficient activation/deactivation processes, as well as simplifying complex manual processing. This change helped reduce electric power consumption as well as CO<sub>2</sub> emissions.

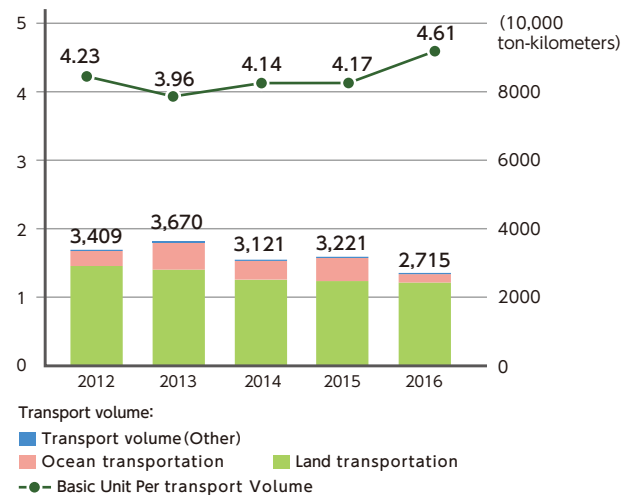


## Reduction of CO<sub>2</sub> from Logistics

NGK works to reduce CO<sub>2</sub> emissions from logistics, setting a target of reducing the basic unit per transport volume by 1% year on year on a five-year average, as required by the Energy Saving Act. To achieve this target, we have implemented a number of measures, including raising loading efficiency and promoting a modal shift. For fiscal 2016, we recorded a 2.1% increase on a five-year average, reflecting the considerable lowering of the rate of marine transport, a mode emitting less CO<sub>2</sub>, to address a change in the product mix.

### Transport Volume / Basic Unit Per Transport Volume (NGK)

Basic Unit Per Transport Volume  
(KL/100,000 ton-kilometer)



## Starting to Report SCOPE 3 CO<sub>2</sub> Emissions

The NGK Group reports Scope 1 and 2 CO<sub>2</sub> emissions data for the Group overall and for NGK independently in relation to logistics (for shipment). In addition to this, NGK has begun to prepare Scope 3 data on a non-consolidated basis in response to emerging expectations for businesses to expand the relevant data reporting scope to include the supply chain.

### Introduction of Green Power

As part of our corporate activities aimed at harmony with the environment, NGK began introducing Green Power (energy sources such as wind and solar power and biomass fuels) in 2002, earlier than any other company. The Green Power Certification System contract we signed with Japan Natural Energy Company Limited calls for them to generate two million kilowatt hours of wind power for us each year.

This accounts for about 60% of the power consumed annually at the NGK headquarters building, attaining a reduction effect of approximately 1,000 metric tons of CO<sub>2</sub> emissions per year (based on the fiscal 2016 results; CO<sub>2</sub> conversion factor: 0.532), or the annual amount of CO<sub>2</sub> absorbed by approximately 71,000 cedar trees.





## Promoting Effective Use of Resources

To boost yield from manufacturing process improvements, NGK Group reuses in-process materials in an effort to curb discarded materials while also focusing efforts on recycling to reduce final disposal volumes to promote resource recycling.

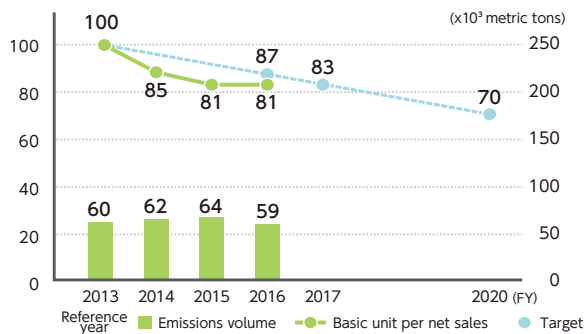
### Reducing Discarded Materials from Manufacturing Activities

Similar to its efforts to reduce CO<sub>2</sub> emissions, the NGK Group works to suppress its generation of discarded materials by formulating and managing annual improvement plans to achieve the Five-Year Plan targets for the reduction of discarded materials.

In fiscal 2016, we exceeded the annual targets, securing the basic unit per net sales at the level of the previous year despite negative factors such as the unfavorable exchange rate affecting net sales and the launch of a new manufacturing line. This achievement resulted from the manufacturing division's outperforming efforts directed at an increased material utilization rate and production yield for each process and a higher recycling rate within processes, attaining a significant improvement from the previous year in the basic unit per production volume for many mainstay products. The reduction rate against BAU, which indicates improvement from the fiscal 2013 level, grew substantially from the previous year to 18%. In fiscal 2017, we will continue with these ongoing efforts, aiming to accomplish the Five-Year Plan targets.

#### Amount of discarded materials generated/basic unit per net sales (NGK Group)

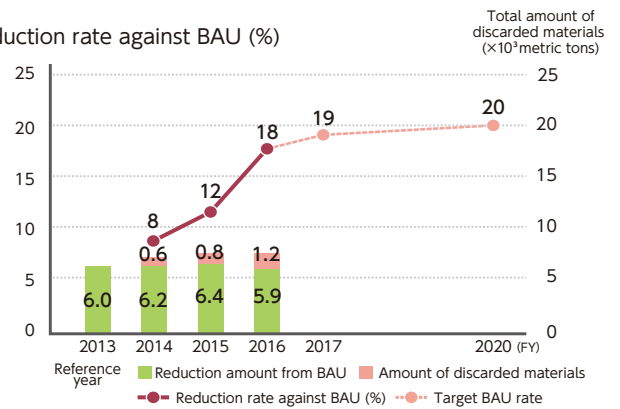
(Basic unit per net sales)



\* Basic unit per net sales calculated with the value in fiscal 2013 set at 100.

#### Discarded Materials/Reduction Rate against BAU\* (NGK Group)

Reduction rate against BAU (%)



\* Reduction rate against BAU: The rate of reduction compared to the value if no efforts were made

### Promoting of Resource Recycling

At the NGK Group, we promote resource recycling initiatives, pursuing rigorous sorting and separating practices and seeking out new methods of recycling.

In fiscal 2016, we focused particular efforts on NGK Electronics Devices, a consolidated subsidiary from fiscal 2014 that was included in the reporting scope from fiscal 2016, and Akechi Insulators, which was looking for new service providers. With assistance from NGK headquarters, both companies successfully carried out recycling programs while keeping treatment costs at a reasonable level, significantly decreasing the amount of landfill disposal. As a result, we have maintained a domestic recycling rate of 99% or higher since fiscal 2013, a target set under the Five-Year Plan. NGK, by itself, achieved zero landfill disposal, or a recycling rate of 100%. At overseas Group companies, where situations vary by country and region, suitable targets are set taking into account circumstances specific to each location. The overseas recycling rate has remained at around 90% based on calculations that exclude three companies that generate non-recyclable discarded materials, out of a total of 16 overseas manufacturing Group companies.

#### Overseas Group Company Implementation Examples

At overseas Group companies, waste material separation management is strictly enforced. Waste separation rules are posted where waste materials are stocked and color-coordinated containers are provided for each category of waste to avoid confusion.



NGK Ceramics Europe



NGK Ceramics USA

## Risk management of water resources and Response

The NGK Group recognizes the management of water resources as an important issue for the company in achieving a sustainable society, and promotes relevant initiatives as described below.

### Water Risk Evaluation

At the NGK Group, to ascertain water supply risks for each manufacturing site in and outside of Japan, we perform a simplified internal survey to assess water shortage risks based on the water supply capacity of rivers in the respective regions. In fiscal 2016, we newly introduced a third-party survey to provide advanced analyses for sites where concerns are identified from the internal screening. For water supply/demand risks, the external assessment employs a range of indicators, from the river's water supply capacity and seasonal fluctuations in groundwater flow to the reservoir capacity of dams and other systems, and produces a supply/demand forecast. The assessment also analyzes risks of flooding and water quality deterioration.

The external survey reported that no serious water risks have been identified at any surveyed site. We plan to expand the advanced assessment to all overseas bases. We will also work to keep up with related regulatory trends to ensure stable operations in the future.

### Water Usage Guidelines

NGK created guidelines (an implementation status checklist) aimed at appropriate water usage and, in fiscal 2015, launched inspections to ascertain the efficiency of water usage at all manufacturing sites in and outside of Japan. Going forward, we will enhance these guidelines through internal and external case studies while encouraging efforts at each location to strengthen the operational structure against a future tight water supply.

#### Promoting efficient water use at Group companies

##### **NGK Ceramics Mexico, S. de R.L. de C.V.**

We strive to use precious water resources as appropriately and efficiently as possible, including the recycling of water used inside plants, at Group companies located in highly water-stressed regions. For example, at NGK Ceramics Mexico, manufacturing process waste water is filtered using reverse osmosis membranes and the recycled water is reused as coolant and boiler water or sprinkled on vegetation.



Filtration device using reverse osmosis membranes

### Cooperation with Suppliers

Believing that it is important to address issues related to water resources throughout the supply chain, the NGK Group asks its suppliers to practice water resources-related risk management and efficient water usage via the CSR Procurement Guidelines, which includes relevant items. In fiscal 2016, a total of 723 companies, accounting for 99.4% of NGK's domestic supply chain, agreed to our request

## Biodiversity Initiatives

The NGK Group recognizes the conservation of biodiversity as an important issue for the company in achieving a sustainable society, and promotes relevant initiatives as described below.

### Activities Aimed at Achieving the "Aichi Target"

The NGK Group has been pushing forward with activities pursuant to "Aichi Target" international goals for biodiversity agreed upon at the 10th Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 10). In fiscal 2016, we prioritized relevant activity areas and set two new ones: biodiversity survey of company-owned sites and cooperation with suppliers.

Aichi Target		NGK Activities
<b>Target 1</b> Spread awareness	People are aware of the value of biodiversity and actions to be taken to conserve it.	Employee environmental education, next-generation education, cooperation with suppliers
<b>Target 4</b> Sustainable production and consumption	Stakeholders at all levels have taken steps to achieve sustainable production and consumption.	Expanding sales of products contributing to environmental protection, CO <sub>2</sub> reduction, effective use of resources, cooperation with suppliers
<b>Target 5</b> Inhibit loss of all natural habitats	The rate of loss of all natural habitats, including forests, is at least halved, and degradation and fragmentation is significantly reduced.	Voluntary employee participation in forestation and other environmental conservation activities, biodiversity survey/appropriate control of company-owned sites
<b>Target 8</b> Control pollution by chemical substances, etc.	Pollution from use of chemicals, including fertilizers and agrichemicals, has been brought to levels that are not detrimental to the ecosystem.	Chemical substance management, management of exhaust and wastewater, expanding sales of products that prevent air pollution, cooperation with suppliers
<b>Target 9</b> Alien species	Invasive alien species are controlled or eradicated.	Biodiversity survey/appropriate control of company-owned sites
<b>Target 11</b> Conserve protected areas	At least 17% of terrestrial and inland water areas and 10% of coastal and marine areas are placed under appropriate conservation management.	Voluntary employee participation in forestation and other environmental conservation activities
<b>Target 14</b> Ecosystem services	Ecosystems that provide essential natural services are restored and safeguarded.	Voluntary employee participation in forestation and other environmental conservation activities, biodiversity survey/appropriate control of company-owned sites

Notes:

1. Source: "Guidelines for Action by the E&E Industries concerning Biodiversity Conservation" (The Biodiversity Working Group, The 4 Electrical and Electronic Industry Associations)
2. NGK activities commenced in fiscal 2016 are marked in red.

### Cooperation with Suppliers

We have added to the CSR Procurement Guidelines items pertaining to water resources-related initiatives and biodiversity conservation initiatives. We have won the almost full agreement of our suppliers in Japan to comply with the expanded Guidelines.

### Biodiversity Survey of Company-owned Sites

NGK performed a biodiversity survey of a site owned for welfare purposes in Midori-ku, Nagoya City. Major findings include the identification of 23 avian species and 80 botanical species, with no rare or non-native species requiring urgent protective or removal actions detected. This indicates that the site is appropriately managed.



## Environmental Education and Communication

In accordance with NGK's Core Policy on the Environment, we conduct ongoing environmental education and awareness activities through the establishment of action guidelines for educational and publicity activities aimed at increasing employee environmental awareness. Our aim is to deepen the understanding of environmental problems among each employee to inculcate an awareness of environmental conservation activities.

We also provide on-site classes at elementary schools and conduct environmental events and provide information to a wide range of stakeholders including the next generation to increase environmental awareness.

### Participating in Local Environmental Education

#### Offering Guest Lectures at Elementary Schools and Children's Centers

NGK sends instructors to participate in the guest lecture program for youth hosted by the Environmental Partnership Organizing Club (EPOC) every year. In fiscal 2016, the program was held at Yatomi City Tobu Children's Center (Aichi Prefecture), where our instructors offered a laboratory to teach how soil can purify water under the theme of water resources and usage. NGK provides ongoing environmental education programs, including its participation in the guest lecture program, which have been attended by a cumulative total of 2,100 participants.



#### Employee Volunteers Teaching Parent-Child Insect Classes

At Tsuruma Park in Nagoya's Showa Ward, NGK employees teach Summer Break Insect Observation classes for children and their parents (sponsored by the Nagoya City Greenery Association), introducing the various names and the ecosystem of insects living in the park. In August 2016, volunteer employee instructors were commended by the Nagoya Green Society for contribution to the local environmental education project, receiving a certificate of appreciation.



### Raising Environmental Awareness

#### Environmental Education inside the Company

To familiarize employees with the aims and content of NGK's environmental policies, we conduct position-based training related to environmental management systems. We also provide two different levels of environmental training: specialized programs targeting personnel in charge of environmental management and general programs for the entire workforce.

#### Promoting the Acquisition of Qualifications

To continue conducting environmental conservation activities in compliance with laws and regulations, we make an effort to develop and increase the skills of legally qualified personnel through support in each department for the acquisition of environment-related legal qualifications targeting managers engaged in pollution prevention required for the management of each area.

We systematically educate Qualified Energy Managers in the Engineering Department, Special Controlled Industrial Waste Managers and others involved in waste-related activities in the Environmental Management Department and other business divisions.

#### Qualifications Acquired as of March 31, 2017 (NGK)

Pollution Control Managers			Qualified Energy Managers	Special Controlled Industrial Waste Managers	Waste Disposal Facility Technical Managers
Air	Water	Noise/Vibration			
71	84	27	21	14	4

## Support for Acquisition of Eco Test Certification

NGK supports employees sitting for the Eco Test\* in an aim to ensure each employee acquires a strong environmental awareness and a wide range of knowledge with respect to the environment. Our Board of Directors are also actively acquiring certification.

Support provided by NGK includes lending reference materials to those who require them and providing test-related expenses. To date, a total of 590 people, more than 10% of NGK (alone) employees, have passed the test. In fiscal 2016, 116 passed the test.

\* The Eco test is an environmental and social certification test administered by the Tokyo Chamber of Commerce and Industry focused on a wide-range of environmental issues.

## NGK Eco Point System

NGK promotes its Eco Point System in an effort to contribute to regional environmental improvement. Employees earn points for environmental behavior conducted at work and in the home, a portion of which is converted into cash and donated to local government-managed funds (environmental funds). In addition to the company's three sites in Nagoya, Komaki and Chita and the Ishikawa Plant, the System was newly introduced to the Tokyo Main Office and Osaka Branch and sales offices in fiscal 2016.

### The First Recognition of Top-Ranked NGK Eco Point Collectors

The NGK Eco Points earned by individual employees through their engagement in environmental activities are aggregated on an annual basis for each site (Nagoya, Chita, Komaki, Ishikawa), and top scorers are commended every year. For earned points, employers select from two options: exchange for Eco goods or donate to local funds. The number of employees choosing donation is growing every year, indicating increasing environmental awareness.



#### Voice of one of the top NGK point earners

Electrical Insulator Division,  
Power Business Group

#### Koichi Kato

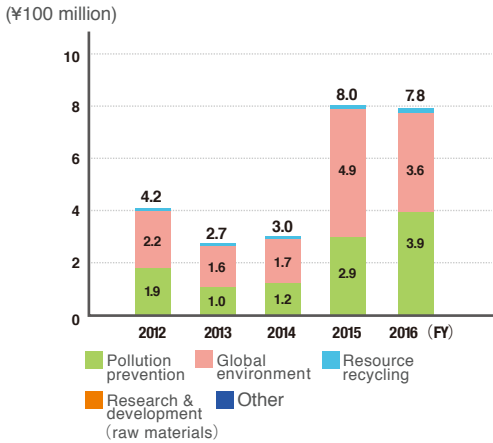
I am happy to have been selected as a fiscal 2016 award recipient. My points earned for this year largely relate to privately undertaken home building, specifically, selecting energy-efficient structures and materials, employing what basically amounts to a solar-powered all-electric home system and purchasing energy-saving home appliances. In fiscal 2017, I will aim to be an award recipient again, but for less costly efforts.



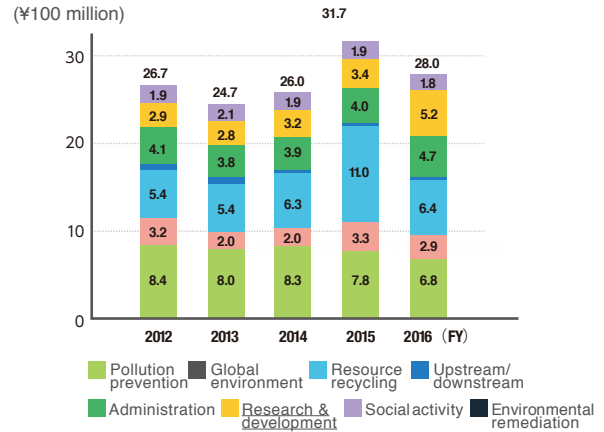
# Environmental Accounting

As an important index of environmental management, NGK has begun conducting environmental accounting and announcing the results. In addition to announcing the costs of environmental conservation (capital investment, expenses), the economic benefits of environmental accounting, and the cost effectiveness of environmental accounting, information on the environmental efficiency of CO<sub>2</sub> and discarded materials has been added since FY2007.

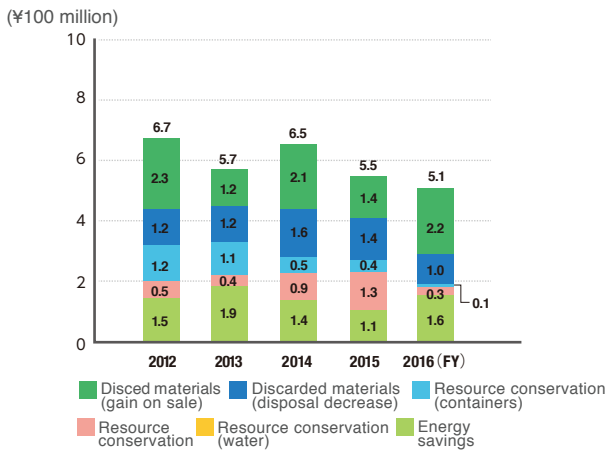
## Capital Investment (NGK and Domestic Group Companies)



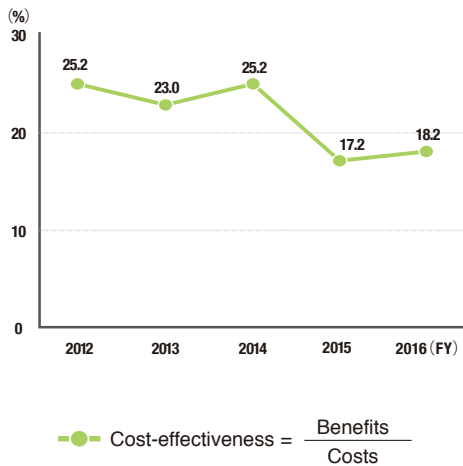
## Expenditures (NGK and Domestic Group Companies)



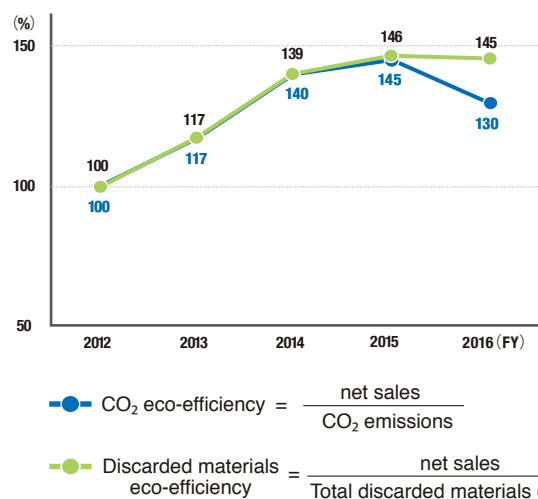
## Economic Benefits (NGK and Domestic Group Companies)



## Cost-Effectiveness (NGK and Domestic Group Companies)



## Environmental Efficiency (NGK and Domestic Group Companies)



The above charts do not include data for NGK Electronics Devices, Inc. and other subsidiaries, depending on the target year: specifically, from FY2012 to FY2015 for charts (1) to (4); and in FY2012 for chart (5).