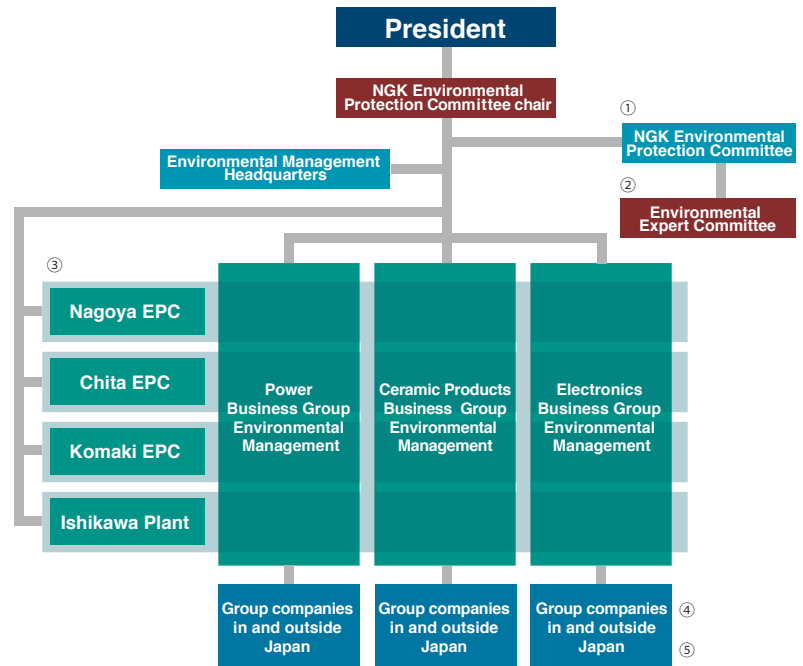


## Environmental Management Frameworks and Environmental Management System

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.

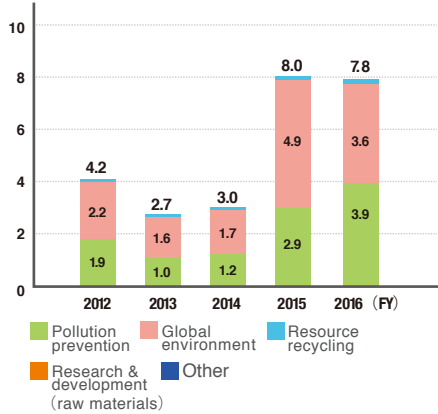
These efforts include the establishment of the Environmental Expert Committee under NGK Environmental Protection Committee, as a company-wide decision-making body. The Environmental Expert Committee facilitates discussions among managers from planning and production divisions who formulate and promote 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.

# 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.

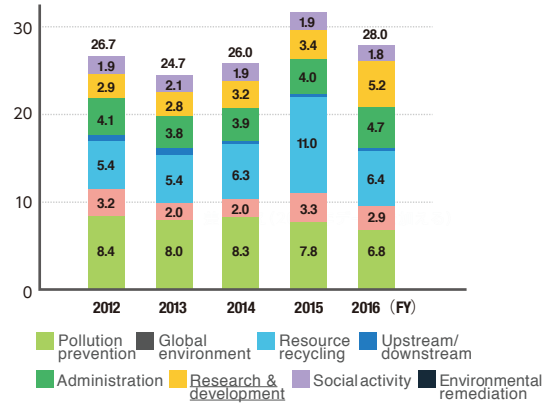
## Capital Investment (NGK and Domestic Group Companies)

(¥100 million)



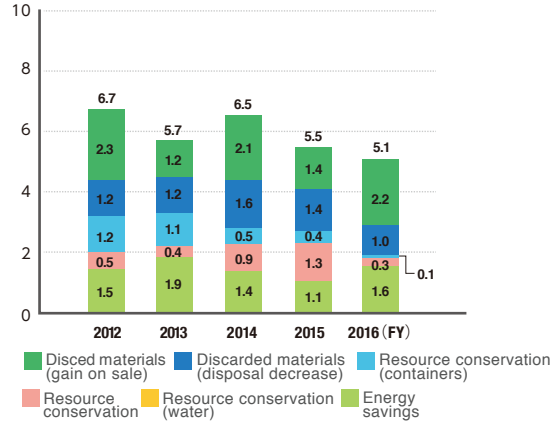
## Expenditures (NGK and Domestic Group Companies)

(¥100 million)

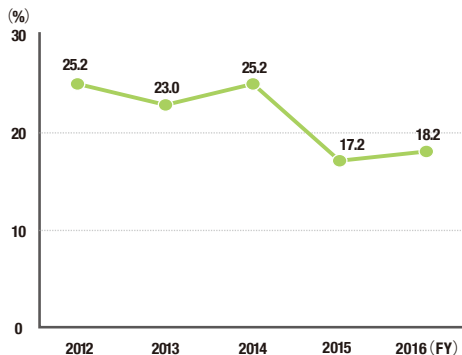


## Economic Benefits (NGK and Domestic Group Companies)

(¥100 million)

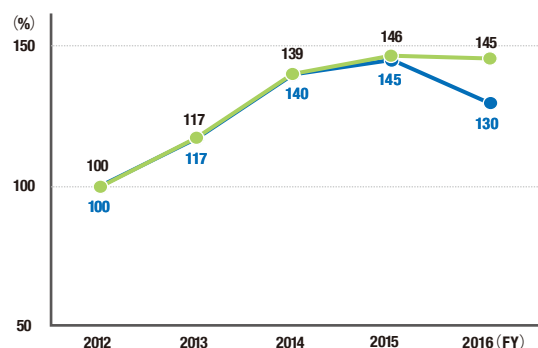


## Cost-Effectiveness (NGK and Domestic Group Companies)



$$\text{Cost-effectiveness} = \frac{\text{Benefits}}{\text{Costs}}$$

## Environmental Efficiency (NGK and Domestic Group Companies)



$$\text{CO}_2 \text{ eco-efficiency} = \frac{\text{net sales}}{\text{CO}_2 \text{ emissions}}$$

$$\text{Discarded materials eco-efficiency} = \frac{\text{net sales}}{\text{Total discarded materials generated}}$$

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).