

Environment

In addition to promoting the development and popularization of products and services that can help reduce the load on the environment, the NGK Group is endeavoring to preserve the global environment by improving manufacturing processes and developing and introducing manufacturing technology that has less environmental impact.

Activities covered

- NGK Headquarters, Nagoya Site, Chita Site, Komaki Site, Ishikawa Plant (does not include Tokyo Main Office, Osaka Branch, and six other sales 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 strives 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 CO₂ 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.

The site reports posted on the website contain details regarding the environmental impact of each of NGK Group's sites and manufacturing-related group companies both within Japan and overseas, as well as environmental conservation activities in which they are currently engaged.

<https://www.ngk-insulators.com/en/sustainability/sitereport/index.html>

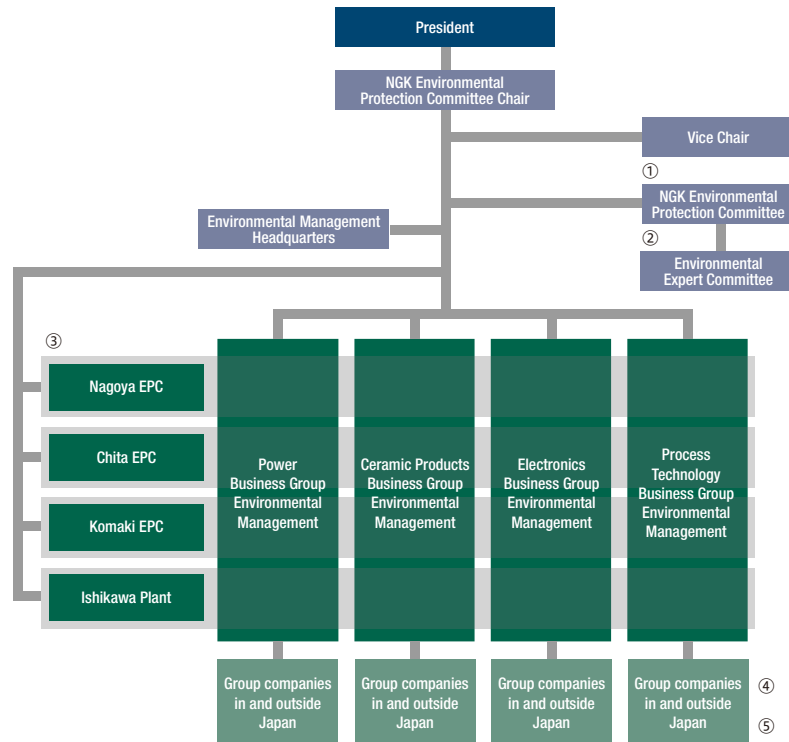
Environmental Management Frameworks and Environmental Management System

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 headquarters 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 chair.

Governing Structure

Chair	President makes decision in light of Executive Committee deliberations (As of July 2018, Director and Vice President)
Vice Chair	Appointed by NGK Environmental Protection Committee Chair (As of July 2018, General Manager of Environmental Management Dept.)
Members	Executive Vice President, Vice Presidents responsible for Headquarters 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 Dept., 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 Construction & Maintenance Dept., General Manager of Global Engineering Center, and others designated by the Committee Chair

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 Chair	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 at Each NGK Site (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, and communicates and discusses issues and topics in each area (all four areas meet twice each year for a total of eight meetings).

④ Sharing Information with Domestic Group Companies

The Environmental Performance Questionnaire is used to conduct an annual survey into the status of compliance with environmental laws at each company. The annual liaison meeting for all Group companies that are involved in manufacturing is also held. This enables the Group-wide policy on environmental initiatives to be conveyed to manufacturing Group companies and each company's environmental management status and information on effective initiatives to be shared, thus promoting 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. Group companies that are involved in manufacturing receive regular audits to monitor management systems and conditions. The Group provides support for improving corporate governance structure and facilities as required.

History of NGK's Environmental Activities

April	1972	Environmental Protection Committee and Environmental Preservation Office (currently, Environmental Management Dep.) established	March	2004	Three-year and long-term plans for reduction of CO ₂ emissions instituted
June	1992	Waste Countermeasures Commission established	March	2005	Company-wide medium-term plan for the reduction in by-products established
March	1993	NGK's Voluntary Plan for Environmental Conservation established	April	2005	Environmental Action Guidelines revised; Green Procurement Guidelines revised
December	1994	Chlorofluorocarbons (CFCs) and 1,1,1-trichloroethane abolished	October	2005	Third-party review of environmental performance begun
February	1995	Internal environmental audit conducted	April	2006	2nd Five-Year Environmental Action Plan established
April	1996	NGK's Core Policy on the Environment established	September	2006	Initiated environmental surveys of overseas Group companies
December	1996	CO ₂ Countermeasures Commission established	May	2007	Introduction of a consolidated goal for CO ₂ and by-products for domestic Group companies
March	1998	NGK's three production bases (Nagoya, Chita, and Komaki) simultaneously received ISO 14001 certification	April	2008	Establishment of the Environmental Management Department
March	1999	Environmental Report published	January	2009	Introduction of goals to reduce CO ₂ by-products, and chemical substances for overseas Group companies
April	1999	Environmental accounting introduced	January	2010	Expanded scope of goals to reduce CO ₂ by-products, and chemical substances for overseas Group companies
October	1999	Green Purchasing Commission established	April	2011	Formulated the 3rd Five-Year Environmental Action Plan, "by-products" renamed "discarded materials."
November	1999	Environmental audits of domestic Group companies started	March	2012	Three NGK sites (Nagoya, Chita, and Komaki) received integrated ISO 14001 certification
February	2000	Environmental Partnership Organizing Club (EPOC) established and active participation therein begun	March	2013	The Ishikawa Plant received ISO 14001 certification (joint certification with three NGK sites)
October	2000	Chemical Substances Safety Committee established; Chemical Substances Management System introduced	April	2013	NGK established the Environmental Expert Committee as the authority handling matters related to CO ₂ discarded materials and other important environmental management items (created through the combination of the former CO ₂ Countermeasures and Recycling Promotion Commission)
March	2001	1st Five-Year Environmental Action Plan established	August	2013	Conducted environmental liaison meeting at overseas Group companies as part of attempts to strengthen global environmental management
April	2001	Compilation of environmental performance data for domestic Group companies started	February	2015	NAS Battery wins the Gold Prize at the 2015 Aichi Environmental Awards
October	2001	Operating of Recycling Yard begun	April	2016	Formulated the 4th Five-Year Environmental Action Plan
January	2002	Compilation of environmental performance data for overseas Group companies started	January	2018	NGK's ISO 14001 certification upgraded to 2015 version
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."			

Environmental Management System (ISO 14001, 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 42 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	6	3
	Ceramic Products Business	5	5
	Electronics Business	12	12
Overseas Group	Power Business	4	3
	Ceramic Products Business	10	8
	Electronics Business	7	7

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

Environmental Audits

NGK conducts internal audits and external audits (surveillance by third parties) of the environmental management system 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 2017, in the same way as with the previous year, there were no significant findings. In the event of a significant finding, the relevant division and Environmental Management Dept. 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 2017, 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.

Activities Conducted in Fiscal 2017

		Atmosphere	Water	Noise and vibrations	Chemical substances
Nagoya	Environmental patrols	3	2	2	2
	Emergency response drills	3	2	1	—
Chita	Environmental patrols	3	1	2	1
	Emergency response drills	—	3	6	—
Komaki	Environmental patrols	2	1	2	1
	Emergency response drills	—	9	9	—
Ishikawa	Environmental patrols	—	2	2	2
	Emergency response drills	—	2	2	—

Note: "—" indicates 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 ISO 14001 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 2017, 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 aims to build an environmental management system that can cope with changes in both our business plan and the state of the social environment.

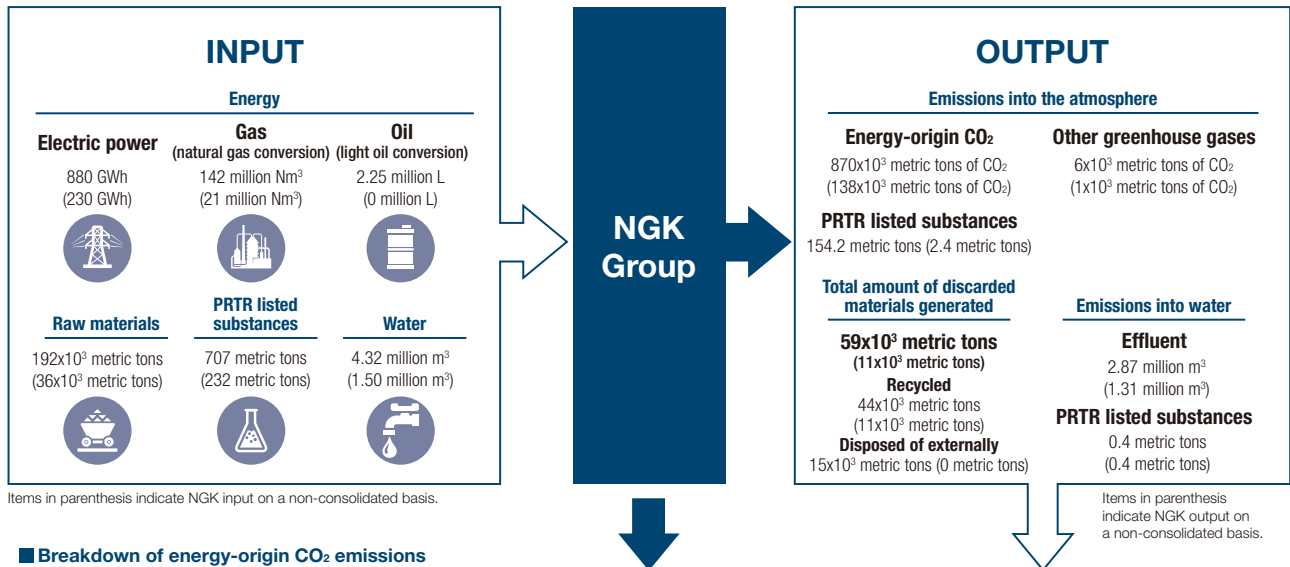
Initiatives aimed at reducing environmental impact in accordance with business plans include conducting biannual forecast estimates and achievement evaluations in each business group, product line, and manufacturing base to determine which initiatives to pursue next.

These efforts include the establishment of the Environmental Expert Committee under the 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.

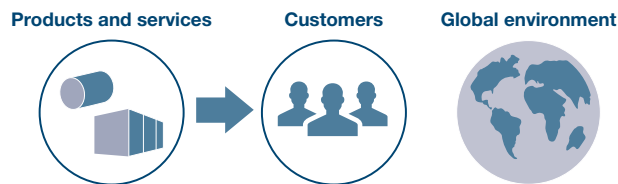
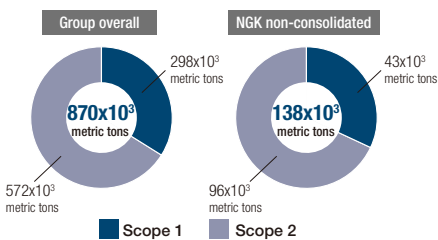
Overall Perspective of Environmental Impact

The diagram below shows aggregate inputs to and outputs from manufacturing operations of the entire NGK Group 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 CO₂ emissions



Notes:

1. NGK CO₂ emissions on a non-consolidated basis were calculated based on the amount of electric power, city gas, and LNG purchased by NGK. When calculated using the CO₂ conversion factor determined in the Enforcement Ordinance for the Act on Promotion of Global Warming Countermeasures (revised in May 2016), the fiscal 2017 energy-origin actual CO₂ emissions for NGK on a non-consolidated basis were 155x10³ metric tons.
2. Environmental performance values in this report have been rounded off for convenience; therefore the sum of individual values may not match the totals.
3. "Discarded materials" indicates the total amount of industrial waste and valuables.

INPUT

1. Energy

Electric power:

Consumption amount of electric power

Gas: Consumption volume of each type of fuel gas converted into natural gas volume = Σ (Consumption volume of each fuel gas \times Unit heating value of each fuel gas / Unit heating value of natural gas)

<Unit heating value of fuel gas>

Natural gas: 40.9 MJ/Nm³ City gas: 45.0 MJ/Nm³

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

Oil: Consumption volume of each type of fuel converted into light oil volume = Σ (Consumption volume of each fuel \times Unit heating value of each fuel / Unit heating volume of light oil)

<Unit heating value of fuel>

Light oil: 38.2 MJ/L Fuel oil A: 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 CO₂ emission volume

Energy-origin CO₂ emission volume = Σ (Consumption of each energy \times CO₂ conversion factor of each energy)

<CO₂ conversion factor of energy>

(Unit of electric power factor: kgCO₂/kWh Unit of fuel factor: kgCO₂ / 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 (Nm³): 2.02; City gas (Nm³): 2.29; LPG (kg): 3.007; LNG (kg): 2.70;

Light oil (L): 2.64; Fuel oil A (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 \times Emission factor \times Global warming potential

<Global warming potential>

CO₂: 1; CH₄: 25; N₂O: 298; HFC: Differs by type; PFC: Differs by type; SF₆: 22800; NF₃: 17200

7. Effluent

Total amount of effluent excluding rainwater

8. PRTR Type 1 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 Type 1 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.

Outline of the Fourth Five-Year Environmental Action Plan (2016–2020)

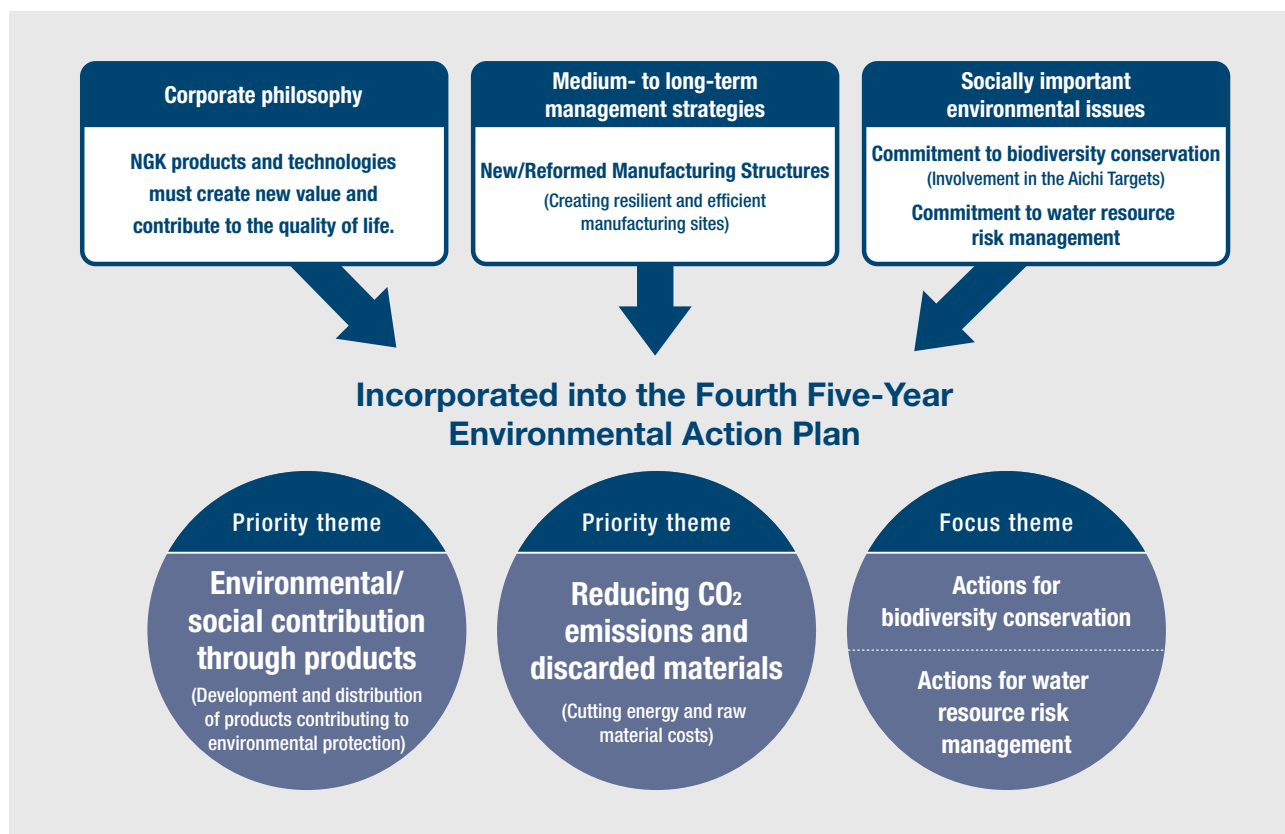
The NGK Group organizes environmental initiatives by creating five-year action plans. The Fourth Five-Year Environmental Action Plan, initiated in fiscal 2016, has been formulated to broadly encompass major global environmental challenges that businesses are expected to take, and to select two key issues each for two groups of themes, namely, priority themes and focus themes.

The two priority themes are: environmental/social contribution through products; and reducing CO₂ 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 resource 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.



Five-Year Environmental Action Plan Progress Report

The initiatives planned under the Fourth Action Plan and their progress (targets and results for fiscal 2017; targets for fiscal 2018 and 2020, the final year) are summarized in the table below.

In fiscal 2017, the annual goals for nearly all of the cumulative quantitative goals were achieved, while progress on other items proceeded according to the plan established at the start of the period. In particular, the efforts undertaken by NGK's business groups produced results for basic unit per net sales for discarded materials that significantly exceeded the annual goal. Progress on the current five-year plan is proceeding steadily at a pace above that anticipated at the time of the plan's creation. Notably, the target reduction rate against BAU for CO₂ and discarded materials was achieved ahead of schedule and was, therefore, adjusted upwards. For fiscal 2018, as well, the NGK Group is working in concert to undertake environmental activities that will enable target goals to be met.

Category	Item	KPI	Fiscal 2017			Fiscal 2018	Fiscal 2020	
			Target	Result	Self-evaluation*1	Target	Target	
Environmental/social contribution	 Environmental/social contribution through products	Develop and distribute products contributing to environmental protection	Sales growth (%) (consolidated)	Increase by 30% from fiscal 2013	Increased by 37% from fiscal 2013	○	Increase by at least 43% from fiscal 2013	Increase by at least 60% from fiscal 2013
		Promote green procurement	Plan progress (%)	At least 99% of NGK's suppliers in Japan agree to comply with the CSR Procurement Guidelines	99.9% agreed (100% including suppliers who partially agreed)	○	At least 99% of NGK's suppliers in Japan agree to comply with the CSR Procurement Guidelines	Maintain in Japan, expand overseas
	 Promotion of environmental communication	Contribute to local communities	Plan progress (%)	Send instructors to guest lecture programs, participate in local environmental protection activities	Sent instructors to local children's centers, participated in local environmental protection activities	○	Send instructors to guest lecture programs, participate in local environmental protection activities	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 (%)	Continue biodiversity survey at company-owned site, promote employee participation in My Action Declaration project	Exhibited survey results on-site, 4300 employees participated in My Action Declaration project	○	Extend My Action Declaration project to domestic Group companies	Expand and enhance content of Aichi Targets actions
Environmental impact reduction	 Prevention of global warming	Reduce CO ₂ emitted from manufacturing	Basic unit per net sales (consolidated)	Reduce by 11% from fiscal 2013	Reduced by 14% from fiscal 2013	○	Reduce by 14% from fiscal 2013	Reduce by 20% from fiscal 2013
			Reduction rate against BAU (%)**2 (consolidated)	Reduce by at least 15% from fiscal 2013	Reduced by 18% from fiscal 2013	○	Reduce by 18% from fiscal 2013	Reduce by 18% from fiscal 2013 (upward revision from initial 15% target)
		Reduce CO ₂ emitted from supply chains	Basic unit per transport volume**3 (non-consolidated)	Reduce by 1% per year on five-year average**4	Increased by 4.5% per year on five-year average**4	×	Reduce by 1% per year on five-year average**4	Reduce by 1% per year on five-year average**4
	 Effective use of resources	Reduce discarded materials emitted from manufacturing	Basic unit per net sales (consolidated)	Reduce by 17% from fiscal 2013	Reduced by 28% from fiscal 2013	○	Reduce by 28% from fiscal 2013	Reduce by 30% from fiscal 2013
			Reduction rate against BAU (%)**2 (consolidated)	Reduce by at least 19% from fiscal 2013	Reduced by 22% from fiscal 2013	○	Reduce by 23% from fiscal 2013	Reduce by 23% from fiscal 2013 (upward revision from initial 20% target)
		Promote resource recycling	Recycling rate (Japan)	At least 99%	99.1%	○	At least 99%	Maintain at least 99%
Manage and respond to water resource risks		Plan progress (%)	Conduct third-party water risk surveys	Conducted surveys at 6 sites	○	Continue water risk surveys, give feedback on survey results to bases	Strengthen actions by production bases 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 our fourth Five-Year Environmental Action Plan initiated in fiscal 2016, as a top priority, NGK is committed to the development and distribution of products contributing to environmental protection. We aim to achieve a 60% increase in sales of products that contribute to environmental protection compared with figures for 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, although we market seven products that contribute to environmental protection, as detailed below, when we develop new products that meet our internal criteria, at such point we will add them to the list.

In fiscal 2017, we achieved sales growth of 37% from fiscal 2013, exceeding the annual target of 30%. In fiscal 2018, in addition to endeavoring to expand sales of such products, we will continue to make the effort to develop more products to protect the environment, such as fuel cells.

Sales growth for products contributing to environmental protection (NGK Group)

Sales growth (%)*



*Figures are indexed with fiscal 2013 set at 100.

Products Contributing to Environmental Protection

HONEYCERAM®

HONEYCERAM is a ceramic substrate for catalytic converters to purify harmful contents in the exhaust of automobiles. The product's honeycomb structure is effective for carrying the catalyst to detoxify harmful substances by chemical reaction.

Since the launch of its mass 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 eliminates a total of four million metric tons of NOx per annum*1, equivalent to double the annual NOx emissions in Japan*2.



NOx elimination: **4 million metric tons annually**

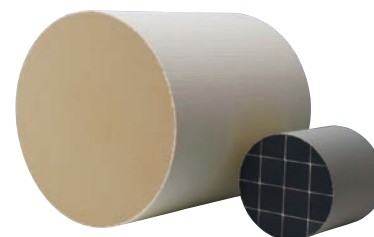
*1 Assumption based on installation of exhaust gas system in new cars that are not equipped with such systems

*2 Source: OECD Environmental Statistics (2012)

Diesel Particulate Filters (DPF)

The DPF is a porous ceramic 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 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 passes through.

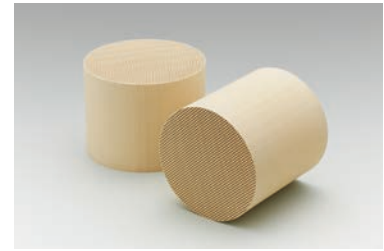


Eliminates up to **99%** of PM

Gasoline Particulate Filters (GPF)

GPFs are ceramic filters that remove particulate matter (PM) from the exhaust of gasoline-powered vehicles. We developed this filter based on diesel particulate filter (DPF) technology, and succeeded in producing a GPF that can achieve high performance (captures more PM) and low pressure loss (lower fuel costs and higher output) at the same time through the use of our proprietary micropore creation and control technologies. We were the first to commercialize a GPF in 2012, and commenced mass production in January 2016 at one of our subsidiaries.

As automobile emission regulations throughout the world become stricter, we expect that demand for GPFs will increase. We are therefore proceeding with investment in GPF production facilities in Poland and China.



NOx Sensors

NGK developed the world's first in-vehicle sensor to measure concentrations of nitrogen oxides (NOx) in exhaust 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 noxious substance. 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® Batteries

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 Radioactive Waste Treatment Systems

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.

Wavelength Control Drying Systems

Our wavelength control drying system uses a proprietary heater unit developed in-house to promote the evaporation of solvents.

This system uses specific infrared frequencies to effectively facilitate evaporation, shortening drying time to approximately $\frac{1}{2}$ to $\frac{1}{3}$ of that required for conventional drying methods using heat, and reducing power consumption by 30 to 50%. It is also possible to suppress binder segregation, which is an expression of variations in concentration that occur due to drying of the soluble component in films during drying, by 30 to 40% (in-house binder segregation study).



Preventing Global Warming

The NGK Group strives to reduce CO₂ emissions, a major cause of global warming, setting reduction targets for the entire Group, including its manufacturing sites in and outside of Japan.

Reducing CO₂ Emissions Associated with Manufacturing Activities

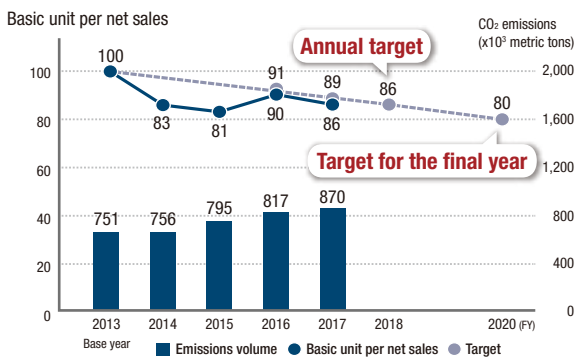
By creating and implementing annual improvement plans in line with the business plans of each of our manufacturing sites both within Japan and overseas, the NGK Group has been making steady progress toward achieving the CO₂ emissions reduction targets set under our Five-Year Action Plan.

Fiscal 2017 saw a large new factory come online overseas and the commencement of mass production of new products, resulting in a temporary increase in CO₂ emissions. Yet despite this and the strict annual targets that we had set in the Five-Year Action Plan, we were still able to exceed those reduction targets. This was thanks to carrying out more reduction efforts across all manufacturing divisions and minimizing startup losses. Furthermore, the reduction rate against BAU, an indicator newly introduced under the Five-Year Action Plan to help visualize the effect of measures to reduce emissions, was achieved ahead of schedule, thanks to steady ongoing progress backed by a significant improvement in the basic unit per production volume. We have therefore revised target values upward, aiming for a further improvement.

For fiscal 2018, although there are negative elements, such as the planned opening of a new factory in Japan, we will intensify our efforts to achieve our reduction targets under the Five-Year Action Plan.

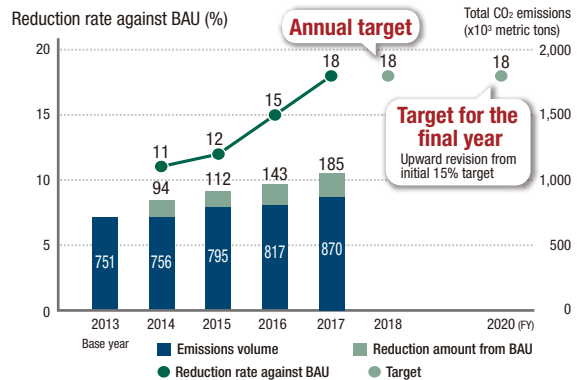
Believing that preventing future global warming is one of our most important duties as a company, from a long-term perspective we have already started deliberating on how to further reduce CO₂ emissions after the end of our current Five-Year Action Plan. As part of this we are considering where we want to be as a company during the period between 2030 and 2050, and the policies that we will need to implement to realize that.

CO₂ emissions / basic unit per net sales* (NGK Group)



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

CO₂ emissions / reduction rate against BAU* (NGK Group)

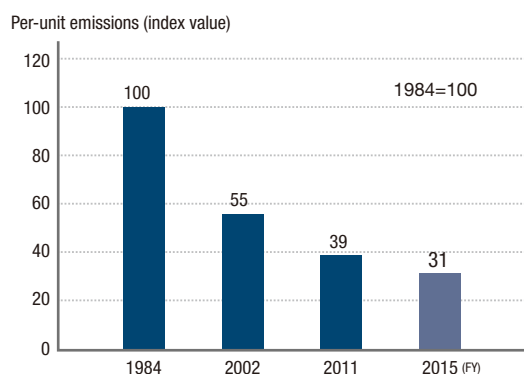


*Reduction rate against BAU: The percentage rate of emissions reduction resulting from implemented actions against a computed value for the hypothetical absence of the actions.

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 graph on the right for change in CO₂ emissions from continuous kilns, which constitute major production equipment at NGK.)

Change in CO₂ emissions from continuous kilns by year of introduction



Measures to Reduce CO₂ Emissions and Effects

As we continue to expand overseas manufacturing, the NGK Group is particularly striving to raise manufacturing efficiency at our overseas sites in order to reduce the CO₂ emissions of the Group as a whole. We have made steady progress by introducing the innovative manufacturing processes and improvements to facilities and operations that we have implemented to date in Japan in our overseas manufacturing sites, as well as promoting energy-saving activities for general-purpose equipment.

In fiscal 2017, these initiatives achieved an annual CO₂ reduction effect of approximately 22,000 metric tons (a reduction rate of 2.4%), 60% or more of which was achieved by improvements carried out at our overseas sites.

Examples of initiatives aimed at reducing CO₂ emissions

Category	Measures	Effects
Highly efficient manufacturing processes	Main production efficiency initiatives at overseas sites <ul style="list-style-type: none"> • Introduction of innovative production processes • Facility improvements • Operational improvements 	CO ₂ reduction effect (22,000 metric tons) Japan: 7,800 metric tons Overseas: 13,800 metric tons
Group company energy-saving diagnostics	Promoted energy savings at overseas sites <ul style="list-style-type: none"> • An English version of the voluntary energy-saving guidelines and a best practice brochure created and distributed to overseas sites • Headquarters staff visited overseas sites and conducted activities with local employees 	Of which <ul style="list-style-type: none"> • Production process improvements Japan: 5,000 metric tons Overseas: 12,400 metric tons
General-purpose equipment energy-saving activities	Horizontally deployed main improvements <ul style="list-style-type: none"> • Replaced boilers with more efficient models • Eradicated air and steam leaks from plumbing • LED lighting • Renewed air-conditioning equipment and eliminated wasteful air conditioning 	<ul style="list-style-type: none"> • General-purpose equipment energy savings Japan: 2,700 metric tons Overseas: 1,400 metric tons

Energy-Saving Activities for General-Purpose Equipment and Buildings

The NGK Group has been actively promoting energy-saving activities in relation to general-purpose equipment, such as lighting, air conditioners, boilers, and compressors. The headquarters plays a central role in this in terms of sharing know-how among different manufacturing locations, thereby achieving more efficient activities.

Whenever our buildings are built or altered, we ensure that large-scale energy-saving measures and ZEB (zero energy building) principles are incorporated.

(1) Headquarters Supporting Energy-Saving Activities at Overseas Manufacturing Sites

The headquarters 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 “Global Warming Countermeasures Taken by Group Companies.”)

(2) Creating and Distributing a Printed Version of the Energy-Saving Brochure and Guidelines

We have created a printed version (Japanese, English) of our energy-saving guidelines and brochure 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 CO₂ emissions.



(3) Efforts to Conserve Energy within Buildings

Whenever there is the opportunity to build or renovate a building, we actively endeavor to utilize high-efficiency equipment and introduce renewable energy, and carefully consider each location so as to be able to effectively utilize any natural advantages, such as low-temperature waste heat from adjacent factories and natural ventilation/lighting, to achieve significant energy savings. The administration/welfare wing, which is currently under construction in Mizuho, Nagoya, is going to be a zero energy building (ZEB) that achieves a reduction in CO₂ emissions of 54% from the official standard. Our initiative to use pioneering CO₂ reduction technology for this building was recognized by the Japanese government, and the construction project was adopted as a Leading Sustainable Building Project (CO₂ Reduction) by the Ministry of Land, Infrastructure, Transport and Tourism.

We have many more construction/renovation projects lined up as part of our plans to reorganize corporate structure and update old buildings, all of which will include energy saving and ZEB measures.



Concept drawing for the administration/welfare wing in Mizuho (scheduled for completion in June 2019)

Global Warming Countermeasures Taken by Group Companies

NGK Stanger Pty. Ltd.

NGK Stanger collects and recycles gas-filled switches that are being disposed of by clients. These units contain sulfur hexafluoride (SF₆) for insulation purposes, and as it has a very high global warming potential, the company collects all SF₆ when disassembling the unit without allowing it to be released into the atmosphere. The total amount of SF₆ recovered in fiscal 2017 was approximately 340 kg, which is the equivalent of approximately 7,700 metric tons of CO₂.



NGK Insulators Tangshan Co., Ltd.

NGK Insulators Tangshan has introduced measures conducted at Japanese sites to reduce CO₂ 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 CO₂ emissions. To further improve our performance, we will introduce new measures, including technologies provided by the Nagoya Site.



NGK Metals Corporation

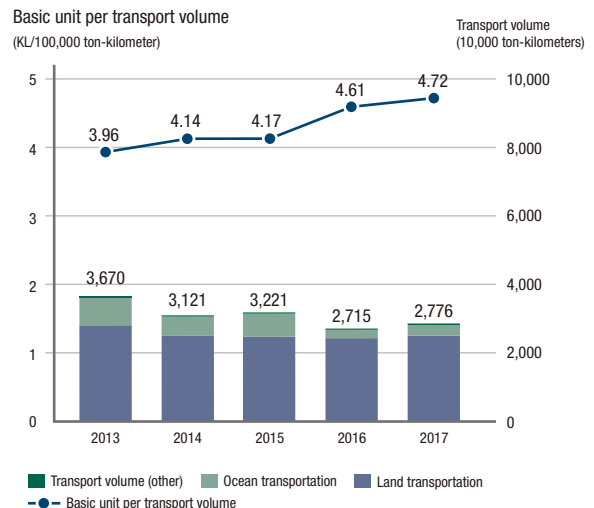
NGK Metals is reducing CO₂ emissions by updating control systems and improving the operation of production equipment. Among various efforts, a particularly distinctive effect resulted from automating the control units of the oil circulation system for rolling mills. The automation eliminated unnecessary 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 CO₂ emissions.



Reduction of CO₂ from Logistics

NGK has worked to reduce CO₂ 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 Conservation Act. To achieve this target, we have implemented a number of measures, including improving loading efficiency and promoting a modal shift. In recent years, the basic unit per transport volume has shown a tendency to deteriorate due to a decline in the volume of goods transported by sea on account of a change in the product mix. In fiscal 2017, the five-year average deteriorated by 4.5% year-on-year.

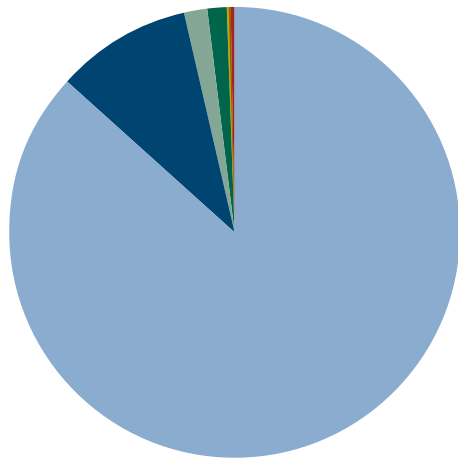
Transport volume / basic unit per transport volume



Reporting Scope 3 CO₂ Emissions

The NGK Group reports Scope 1 and 2 CO₂ emission data for the Group overall and for NGK independently in relation to logistics (for shipment from NGK). In addition to this, in recent years 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 supply chain CO₂ emissions levels.

In fiscal 2017, NGK established calculation methods for all categories involving only NGK logistics (upstream from NGK) and obtained a total. As a result, NGK confirmed that the total volume of CO₂ emission from NGK logistics was 877,000 metric tons, which was over six times more than the 138,000 metric tons of NGK in-house CO₂ emissions (sum of Scope 1 and 2), and that Category 1 (purchased goods and services) amounted to nearly 90% of total CO₂ emissions. NGK will continue to develop calculation methods that can ascertain CO₂ emission levels in relation to a greater range of items.



FY2017 Scope 3 Data
(NGK non-consolidated, upstream only)

Category	CO ₂ emissions (10,000 metric tons)
Category 1: Purchased goods and services*	76.2
Category 2: Capital goods	8.4
Category 3: Fuel- and energy-related activities	1.6
Category 4: Upstream transportation and distribution	1.1
Category 5: Waste generated in operations	0.1
Category 6: Business travel	0.1
Category 7: Employee commuting	0.2
Category 8: Upstream leased assets	0.0
Total	87.7

*Resale items are included in Category 1.

Please note that the calculation used for Scope 3 data was carried out in accordance with Basic Guidelines Regarding the Calculation of Greenhouse Gas Emissions through the Supply Chain (Ver. 2.2) (Ministry of the Environment; Ministry of Economy, Trade and Industry).

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 biomass-generated electricity 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 CO₂ emissions per year (based on fiscal 2017 results; CO₂ conversion factor: 0.532), or the annual amount of CO₂ absorbed by approximately 71,000 cedar trees.



Promoting Effective Use of Resources

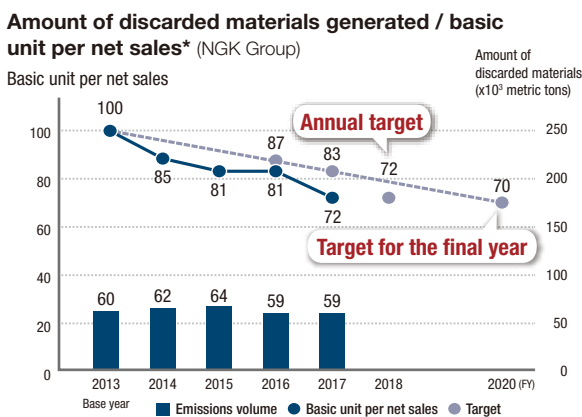
To boost yield from manufacturing process improvements, the NGK Group reuses in-process materials in an effort to curb discarded materials while also focusing efforts on recycling to reduce final disposal volumes to promote resource recycling.

Reducing Discarded Materials from Manufacturing Activities

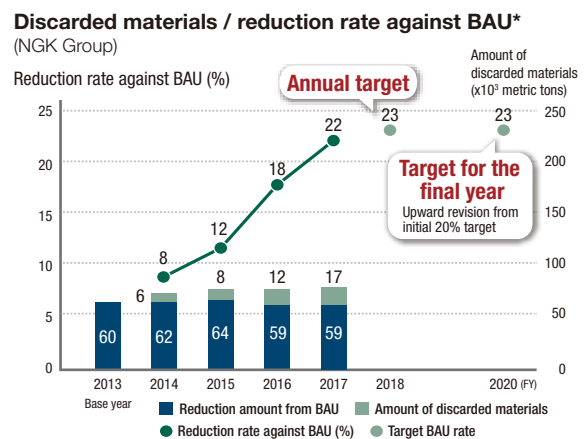
In the same way as for CO₂, the NGK Group works to suppress the generation of waste (discarded materials) by formulating and managing annual improvement plans with the aim of achieving the waste reduction targets contained in the Five-Year Plan.

Although in fiscal 2017 we once again faced the challenge of negative factors associated with the building of new factories overseas, in the same way as for CO₂, the basic unit per net sales showed a great improvement over the previous year, exceeding the annual target. This was thanks to the outstanding efforts of our manufacturing divisions that were directed at improving the material utilization rate, production yield, and recycling within each process, enabling them to achieve a drastic improvement in the basic unit per production volume over the previous year for many of our mainstay products. The reduction rate against BAU, which indicates the rate of improvement in the basic unit per production volume from the fiscal 2013 level, reached 22%, achieving the Five-Year Plan target ahead of schedule. We have therefore revised target values upward, aiming for a further improvement.

In fiscal 2018, we will continue with these improvement activities, as we work towards achieving the remaining targets contained in our Five-Year Plan.



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



*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.

Promoting Resource Recycling

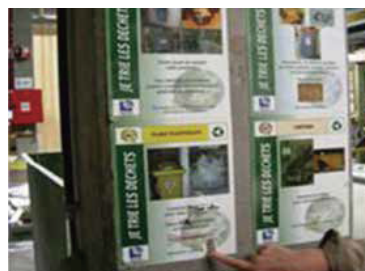
At the NGK Group, we promote resource recycling initiatives, pursuing rigorous sorting and separating practices and seeking out new methods of recycling.

In fiscal 2017, we started sharing information with our production sites in Japan regarding waste recycling methods and companies that can process such waste. This initiative led to a thorough review of waste processing for the Group as a whole within Japan, resulting in improved recycling efficiency. Through such ongoing efforts, we have managed to sustain a domestic recycling rate of 99% or higher since fiscal 2013, which is the target set under the Five-Year Plan.

Meanwhile, at our Group companies overseas, where the situation varies according to country and region, suitable targets are set taking into account circumstances specific to each location. The recycling rate for our 16 manufacturing Group companies overseas has remained at around 90%, based on calculations that exclude three companies that generate non-recyclable waste.

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 of our production facilities within Japan and overseas, we perform a simplified internal survey to assess water shortage risks based on the water supply capacity of rivers in the respective regions. For production facilities located in areas where there is a risk of water shortages, we commission a third party to conduct a comprehensive survey. As part of that survey, in addition to the water supply capacity of rivers, factors such as groundwater, seasonal fluctuations in water supply capacity, and the holding capacity of dams are evaluated and used to create water supply/demand forecasts. The risk of water-related disasters (flooding, landslides) and water quality deterioration (public health, ecosystem) is also analyzed as part of a comprehensive risk assessment.

Although no serious water-related risks have been identified to date at any of our facilities, we will continue to monitor the situation and stay abreast of regulatory trends to ensure stable operations in the future.

In the future, we will conduct detailed analyses at all overseas bases so that we can identify water risks.

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 resource-related risk management and efficient water usage in accordance with the CSR Procurement Guidelines. In fiscal 2017, a total of 750 companies, accounting for 99.9% of NGK's domestic supply chain, agreed to our request.

Protecting Biodiversity

In the NGK Group, we view the challenge of protecting biodiversity as an integral part of achieving a sustainable society, and towards that end we are undertaking the following activities.

Activities for Achieving the Aichi Targets

The NGK Group has been pushing forward with activities pursuant to the Aichi Targets (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 2017, we did another biodiversity survey of a company-owned site and began promoting participation in the “My Action Declaration” initiative.

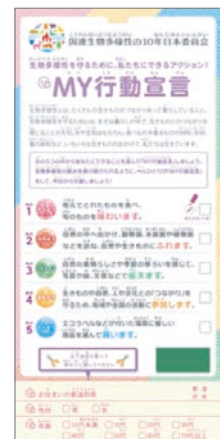
NGK activities commenced in fiscal 2016 are in red.

Aichi Targets		NGK Activities
Target 1 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, promoting participation in My Action Declaration initiative , encouraging employees to participate in volunteer activities
Target 4 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 ₂ reduction, effective use of resources, cooperation with suppliers
Target 5 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 site
Target 8 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
Target 9 Alien species	Invasive alien species are controlled or eradicated.	Biodiversity survey/appropriate control of company-owned site
Target 11 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
Target 14 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 site

Promoting Participation in the “My Action Declaration” Initiative

In fiscal 2017, as a way of raising awareness among employees, we began promoting participation in the “My Action Declaration” initiative led by the Japan Business Federation and the Ministry of the Environment. This project aims to have by 2020 a million people make a declaration to take action to conserve biodiversity.

Declarations were received from around 4,300 employees (97% of all NGK employees) who promised to take a personal interest in and work to protect the biodiversity around them. We are continuing to promote this initiative and working to ensure its horizontal expansion throughout NGK Group companies in Japan.



My Action Declaration card

Cooperation with Suppliers

We have added to the CSR Procurement Guidelines items pertaining to water resource-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 Site

Continuing on from the winter survey that we carried out in fiscal 2016, we carried out a summer survey in fiscal 2017 and confirmed the existence of 20 species of birds, 141 species of plants, and 98 species of insects, which are the same levels as detected in the previous survey. Among these species, no alien species that required urgent action was found, meaning that biodiversity was being adequately maintained. We are planning to conduct surveys every two to three years from now on. The results of previous surveys are collated and displayed at a welfare facility on the survey site for the perusal of the general public and to help raise awareness regarding biodiversity.



Biodiversity survey

Environmental Education and Communication

In accordance with the Guidelines for Environmental Action under NGK's Core Policy on the Environment, we conduct ongoing environmental education and awareness 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 conduct environmental events and provide information to a wide range of stakeholders, including on-site classes at elementary schools, 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 lectures and workshops for young people that are hosted each year by EPOC (Environmental Partnership Organizing Club)*. In fiscal 2017, the program was held at Einan Children's Center in Yatomi, Aichi Prefecture, where our instructors offered a class on water resources and usage, in which children could experience how soil can purify water.

So far, a cumulative total of 2,200 people have participated in environmental education programs with which NGK is affiliated.



Employee Volunteers Teaching Parent-Child Insect Classes

Every summer at Tsuruma Park in Nagoya's Showa Ward, NGK employees and Executive Vice President Kanie teach Summer Break Insect Observation classes for children and their parents (hosted by the Nagoya City Greenery Association), explaining the various names and ecosystems of insects living in the park.

This annual event has been attended by a cumulative total of 600 people since 2007.



Sharing Information with Other Companies

The EPOC* subcommittee chaired by NGK organizes seminars and field trips several times a year under the theme of corporate environmental management (low carbon, resource recycling, biodiversity, water resources, environment-related laws, etc.) and sends out information to members.

*EPOC (Environmental Partnership Organizing Club): A voluntary organization consisting mainly of companies in the Chubu region of Japan, which was established in 2000. Its purpose is to spread information regarding the environment with the aim of building a recycling-oriented sustainable society. NGK has been involved in the planning and management of this organization since its establishment. EPOC currently has approximately 270 members.



Raising Environmental Awareness

Environmental Education inside the Company

We conduct position-based training related to environmental management systems to familiarize employees with the aims and content of NGK's environmental policies. We also provide specialized environmental training courses for personnel who will be directly involved in environmental management, as well as special environmental training for the entire workforce.

For our special environmental training in fiscal 2017, we invited Mr. Itaru Yasui, former vice president of the United Nations University, to teach us the significance of the Paris Agreement and the UN's Sustainable Development Goals (SDGs) and how this relates to companies.

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. We provide support in each department for the acquisition of environment-related legal qualifications targeting managers engaged in pollution prevention required for the management of each site.

We systematically educate Qualified Energy Managers in the Engineering Department, and 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, 2018 (NGK)

Pollution Control Managers			Qualified Energy Managers	Special Controlled Industrial Waste Managers	Waste Disposal Facility Technical Managers
Air	Water	Noise/Vibration			
75	93	27	22	16	4

Support for Acquisition of Eco Test Certification

With the aim of ensuring that each employee acquires a strong environmental awareness and a wide range of knowledge with respect to the environment, NGK encourages employees sitting the Eco Test* by lending them reference materials and subsidizing test-related expenses.

To date, a total of 719 people—more than 18% of all NGK employees—have passed the test. In fiscal 2017 alone, 125 employees 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.

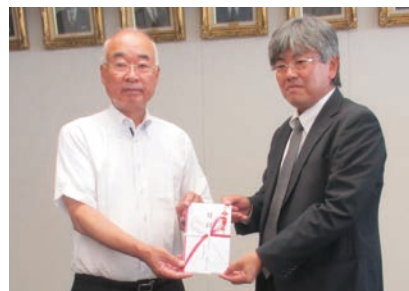
NGK Eco Point System

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.

Donation of NGK Eco Points

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, employees 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.

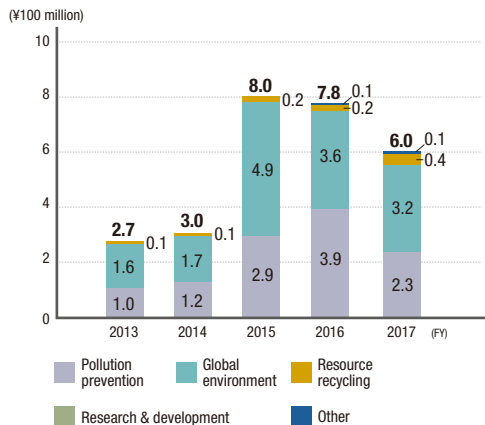


Mr. Kazunari Nakaguchi (right), Environmental Management Supervisor at our Chita Site (Metal Product Dept.) presenting Eco Points to Handa City Mayor Sumio Sakakibara, on behalf of all NGK Eco Points participants in the Chita area.

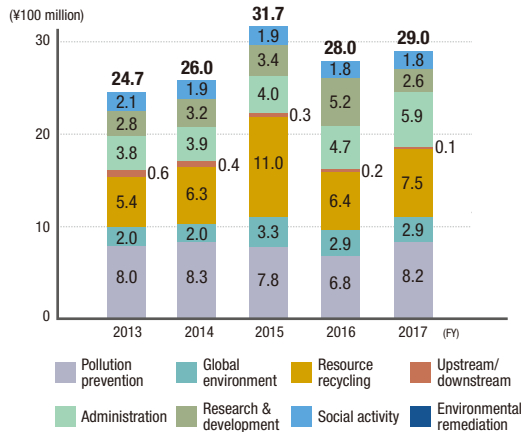
Environmental Accounting

As an important index of environmental management, NGK conducts environmental accounting and announces the results. In addition to announcing environmental conservation costs (capital investment, expenses), economic benefits, and cost effectiveness, information on the environmental efficiency of CO₂ and discarded materials has been added since fiscal 2007.

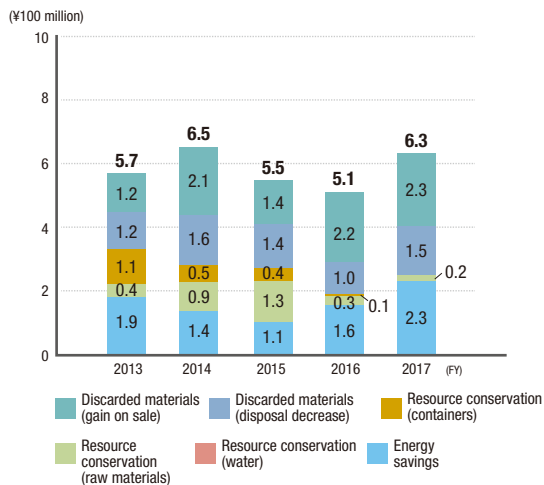
Capital investment (NGK and domestic Group companies)



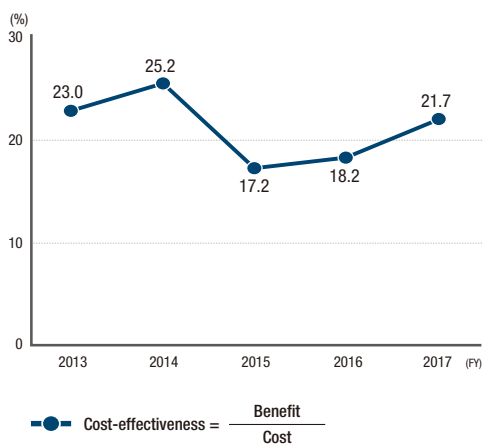
Expenditures (NGK and domestic Group companies)



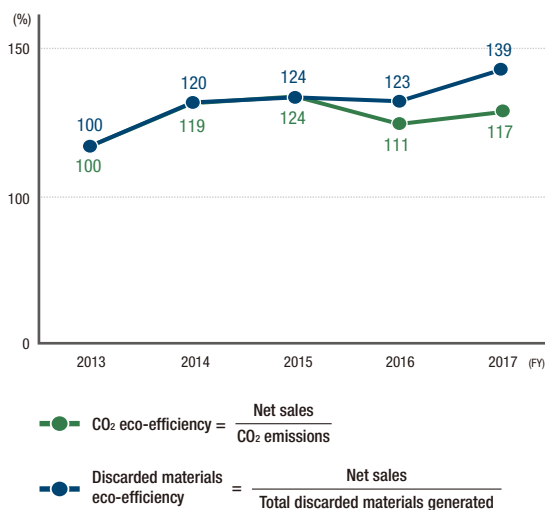
Economic benefits (NGK and domestic Group companies)



Cost-effectiveness (NGK and domestic Group companies)



Environmental efficiency (consolidated)



Note: The above charts do not include data for NGK Electronics Devices, Inc. and other manufacturing subsidiaries from fiscal 2013 to fiscal 2015.