

# Contribution of Social Issues While Realizing NSK's Sustainable Growth –

## Special Feature 1. NSK's Environmental Contributions

Contributing to the environment is one reason why NSK exists. Formulating “help protect the global environment” in its Mission Statement, NSK's environmental policy states that our commitment to environmental management forms the basis of our existence and our pursuits. In addition, in 2019, we positioned the “environment” as one of NSK's core values, along with “safety,” “quality,” and “compliance” (common value standards given the highest priority in management decision-making and actions).

NSK will contribute to the development of environmentally friendly industries and the reduction of the environmental impact of society as a whole by using its environmentally friendly technologies to grasp the essence of the issues at hand, as well as by providing and widely disseminating solutions that can meet every requirement for function, energy conservation, and cost. We will also leverage these environmentally friendly technologies as our strength to create products and services that will be increasingly selected, and to increase our competitiveness in the market.

As a specific environmental goal, NSK targets a 60% reduction in CO<sub>2</sub>

**Collaborative Value with Stakeholders**

**Related SDGs**



emissions from its business operations in 2050 (compared with fiscal 2017, Scope 1 + 2). At present, we are vigorously pursuing these initiatives and looking into ways to further accelerate them.

As one milestone toward carbon neutrality, NSK has set the goal of effectively offsetting the CO<sub>2</sub> emissions from all its business operations (Scope 1 + 2 + 3) by fiscal 2026 by helping to reduce customer CO<sub>2</sub> emissions through its products. To this end, NSK is promoting the following two measures: **1** help customers reduce CO<sub>2</sub> emissions by using NSK products that help reduce CO<sub>2</sub> emissions and **2** reduce CO<sub>2</sub> emissions from NSK's business operations.

▶ Please see our website for information on the NSK Environmental Policy and Environmental Code of Conduct. <https://www.nsk.com/sustainability/environment/action01/index.html>

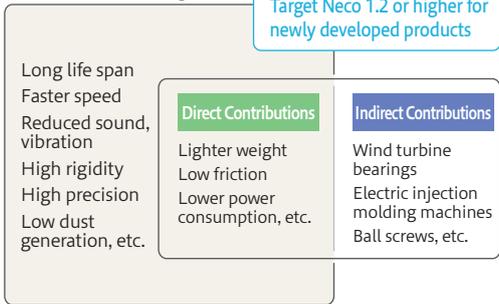
### Indicators for NSK Environmentally Friendly Products

NSK's products are installed into automobiles and industrial machinery to control friction and reduce energy consumption, thus all NSK products contribute to global environmental protection. To contribute further to the environment, NSK has established and currently uses the following two indicators to show the environmental contribution of its products: ① Neco and ② CO<sub>2</sub> emissions avoided.

#### ① Neco (NSK Eco-efficiency Indicators)

NSK's original indicators quantify the degree of environmental contribution of a product compared to conventional products based on factors such as life span, low torque, power consumption, and weight reduction. The higher the number, the higher the degree of contribution, and our goal is to achieve Neco 1.2 or higher for newly developed products.

Neco score of 1.0 or higher



Target Neco 1.2 or higher for newly developed products

#### ● NSK Eco-efficiency Indicators (Neco)

$$\text{Neco} = \frac{\text{Product value V}}{\text{Environmental impact E}}$$

Product value V: Degree of improvement in product value such as life span, performance, precision  
 Environmental impact E: Degree of reduction in environmental impact such as weight and friction loss

[Environmentally Friendly Products] Number of products developed in fiscal 2020: 6  
 Total number of products developed: 238

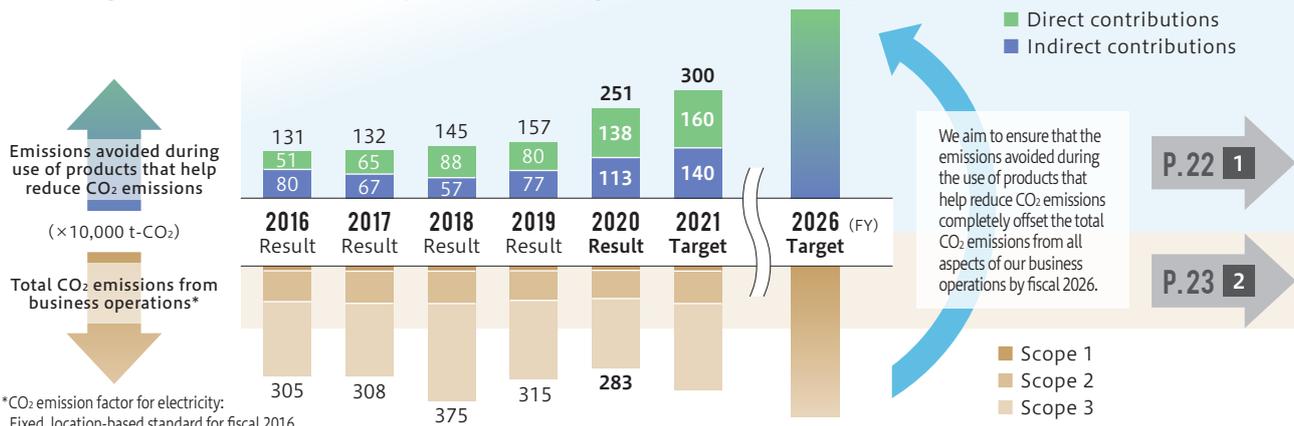
▶ Please see our website for information on products developed in fiscal 2020. <https://www.nsk.com/sustainability/environment/action02/index.html>

#### ② CO<sub>2</sub> Emissions Avoided

We designate as “products that help reduce CO<sub>2</sub> emissions” those items that achieve this at the customer-use stage in such areas as weight, friction, and power consumption reduction as well as the amounts of these reductions are expressed as CO<sub>2</sub> emissions avoided.

Direct Contributions	NSK product performance directly contributes to the reduction of CO <sub>2</sub> emissions
Indirect Contributions	NSK product applications indirectly contribute to the reduction of CO <sub>2</sub> emissions

#### ■ Offsetting CO<sub>2</sub> Emissions from Business Operations by Reducing Product Environmental Impact



## Collaborative Value Creation and Beyond

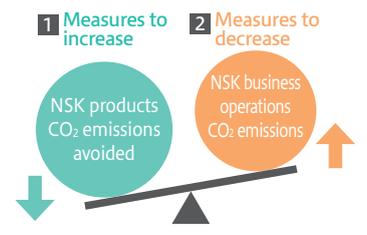
– Contributing to the Resolution of Social Issues While Realizing NSK’s Sustainable Growth –

### Special Feature 1. NSK’s Environmental Contributions

#### 1 Help customers reduce CO<sub>2</sub> emissions by using NSK products that help reduce CO<sub>2</sub> emissions

As to reducing CO<sub>2</sub> emissions at the product-use stage, we are promoting initiatives in two categories: **A direct contributions** and **B indirect contributions**. To maximize the contribution, we are not only improving the performance of individual products but also collaborating with the development, design, production, and sales departments.

The total contribution to CO<sub>2</sub> emissions avoided in both categories was 2.51 million tons in fiscal 2020. Some typical examples in each category are as follows.



■ Concepts for Products Helping to Avoid CO<sub>2</sub> Emissions During Use

Category	Examples of Contributions to CO <sub>2</sub> Reduction
<b>A Direct contributions</b>	<ul style="list-style-type: none"> <li>Reducing friction loss</li> <li>Downsizing through longer life</li> <li>Smaller size and less weight</li> </ul>
<b>B Indirect contributions</b>	<ul style="list-style-type: none"> <li>Responding to the shift from hydraulics to electrification</li> <li>Responding to the spread of renewable energies</li> <li>Developing new environmentally friendly products</li> </ul>

#### A Direct Contributions Direct contributions to CO<sub>2</sub> emissions reduction through individual NSK product performance

**Contribution calculation formula:** CO<sub>2</sub> emissions avoided by a single NSK product × sales volume × years of operation

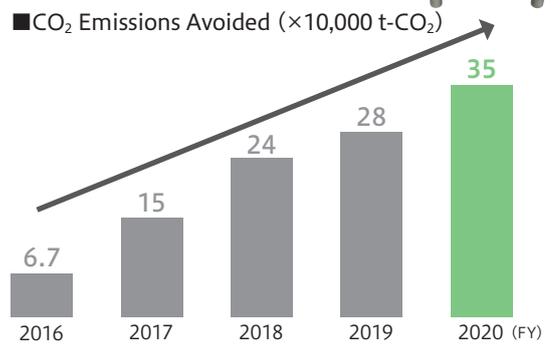
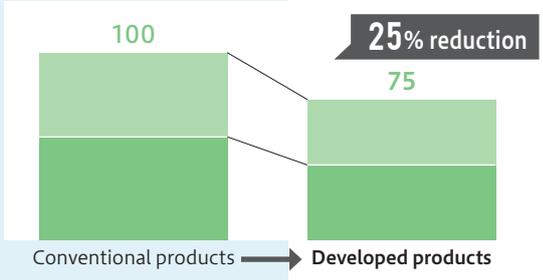
Lower friction of bearings → Reduced energy loss → Direct contribution to avoid CO<sub>2</sub> emissions

##### Example Low-friction hub unit bearings

Realizing low friction while maintaining high reliability in the market



- Friction Ratio
  - Feature① Low-friction seal development
  - Feature② Bearing interior friction reduction



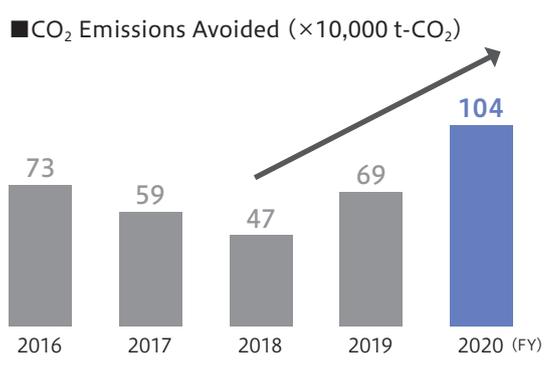
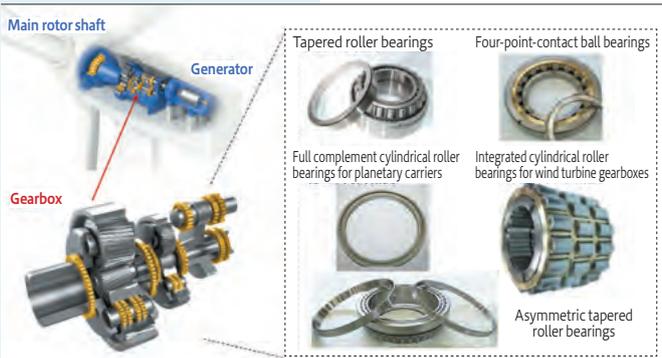
#### B Indirect Contributions Indirect contributions through CO<sub>2</sub> emissions avoided by installing NSK products into customer equipment and facilities

**Contribution calculation formula:** CO<sub>2</sub> emissions avoided per unit × rate of contribution of NSK products × sales volume × years of operation

CO<sub>2</sub> emissions avoided by equipment (e.g., wind turbines) → NSK product contributions → Indirect contribution to avoid CO<sub>2</sub> emissions

##### Example Wind turbine bearings

Substantial CO<sub>2</sub> emissions avoided by replacing conventional thermal power generation with wind power



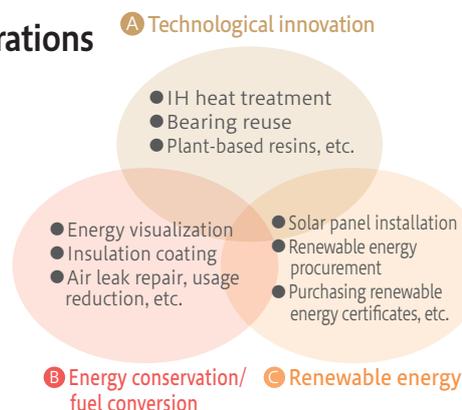
Wind turbines are used in harsh environments, operating for about 20 years at 100 meters above the ground, so high reliability is required.

## 2 Reducing CO<sub>2</sub> emissions from NSK business operations

In June 2021, NSK established the Carbon Neutrality Department directly under the president to reduce CO<sub>2</sub> emissions from its business operations in the following three categories: **A technological innovation**, **B energy conservation/fuel conversion**, and **C renewable energy**. This department will further accelerate these initiatives by organically collaborating with related departments from companywide and mid- to long-term perspectives.

In addition to these initiatives, we are considering the implementation of internal carbon pricing\* to visualize the value of CO<sub>2</sub> emission reductions.

\*Internal carbon pricing: a mechanism for companies to independently assign prices to their CO<sub>2</sub> emissions and use it to make investment decisions.



### A Technological Innovation

#### Development of the World's First Biomass Plastic Heat-Resistant Resin Cage

NSK has a long history of developing environmentally friendly materials and products, including the development of biodegradable plastics in 2008 and food-derived grease in 2013. In 2021, NSK created the world's first biomass plastic heat-resistant resin cage for rolling bearings made mainly from plant-based biomass materials. We will continue to accelerate R&D focused on practical applications for biomass plastics by making full use of NSK's material, analysis, molding, and evaluation technologies.

##### Developed cage features ①

They exhibit the same strength and heat resistance as conventional polyamide 66 (66 nylon) cages made from fossil resources.

##### Developed cage features ②

Plants are biomass resources that grow by absorbing CO<sub>2</sub> from the atmosphere, therefore incinerating biomass plastics does not increase the amount of CO<sub>2</sub> in the atmosphere. As a result, a 91%\* reduction in CO<sub>2</sub> emissions is expected over the entire cage life cycle by switching from a conventional cage.

\*Material manufacturer estimates

### B Energy Conservation/Fuel Conversion

#### Visualization and Reduction of CO<sub>2</sub> Emissions at Production Plants

In fiscal 2020, we introduced a system at NSK's Saitama Plant that enables us to visualize CO<sub>2</sub> emissions at each bearing production process and the operational status of production lines. Using this system, we can detect unnecessary CO<sub>2</sub> emissions and pursue efficient improvement activities. Currently, we are working to improve the efficiency of heat treatment furnaces and reduce compressed air consumption in production facilities. We will expand these activities to other plants while continuing to make improvements at the Saitama Plant.

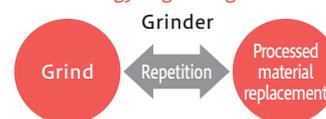


Visualization of CO<sub>2</sub> emissions by production process

#### Reduction of CO<sub>2</sub> Emissions from Bearing Production Grinding Machines

NSK plants consume a large amount of electricity to power facilities during production, and we are working to reduce CO<sub>2</sub> emissions under the following two themes: "improving productivity" and "reducing facility power consumption." First, "improving productivity" is an initiative to reduce the energy required to produce a single product by increasing processing capacity and operating rates. In the second theme, "reducing facility power consumption," we are lowering the power consumed at the facilities themselves by using power control innovations and new technologies. An example of this is introducing inverter technology to reduce power consumption without lowering the rotation speed of grinding wheel motors for bearing-production grinding machines. While grinders repeatedly grind and replace workpieces, we have been able to reduce the amount of power wasted during the short time it takes to replace the workpiece by instantly reducing the power consumption of grinding wheel motors. We will continue such activities to reduce environmental impact through the focused application of NSK technologies.

##### Introduce energy-saving inverter technology to grinding machines



Reduces power waste in the short time it takes for replacement

### C Renewable Energy

#### Accelerate Introduction of Renewable Energy

NSK is actively promoting the installation of solar and wind power generation equipment and switching to electricity derived from renewable energy sources. In fiscal 2020, 9.6% of all electricity consumption was provided by renewable energy sources. This corresponds to an increase of about three times compared with the previous year.

##### Install solar and wind power generation equipment at business sites

Currently, this equipment is installed at 23 business sites globally, generating a total of around 7,000 MWh of electricity annually and reducing CO<sub>2</sub> emissions by approximately 3,900 tons per year. In fiscal 2020, we newly installed the system in three plants outside Japan (Mexico, China, and Indonesia).

##### Expand use of green electricity

To date, we have switched to green electricity at our factories in Japan, Germany, Poland, and China, currently using about 120 GWh of green electricity per year and reducing CO<sub>2</sub> emissions by about 95,000 tons per year. In Germany and the Netherlands, we have switched power supply for offices. Going forward, we will plan and implement more conversions in Europe.

▶ Please see our website for more information. <https://www.nsk.com/sustainability/environment/action03/index.html>