

## Environmental Performance

### Basic Approach / Most Recent Results and Future Challenges

#### Approach

How to reduce the environmental impact of its commercial vehicle manufacturing operations and what manufacturing initiatives to pursue are important issues for Hino Motors. Accordingly, the Company recognizes that it has a mission to explore these issues.

In its Environmental Initiatives Plan covering the medium term, Hino Motors sets specific goals for reducing the environmental load resulting from its manufacturing operations. By carrying out a number of thorough measures, Hino Motors is working to reduce CO<sub>2</sub> emissions, save resources, and conserve water, among other initiatives.

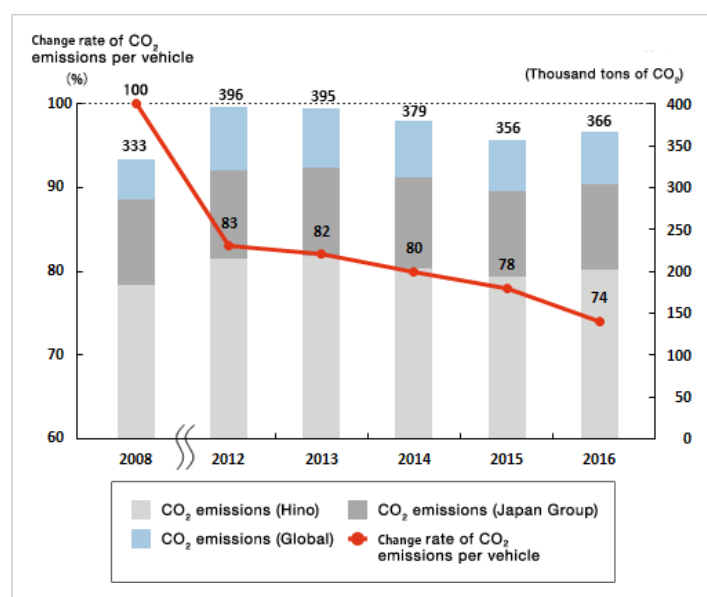
Having considered social trends in recent years, Hino Motors regards measures for reducing CO<sub>2</sub> emissions as an important challenge for management. Accordingly, it has switched to LED lighting at its factories, installed high-efficiency equipment, and taken related steps in order to lower emissions at each of its workplaces.

Under the slogan of "Make environmentally conscious vehicles in an eco-friendly manner," Hino Motors is aiming to be a leading company trusted by customers and local communities for its ongoing efforts to reduce its environmental impact.

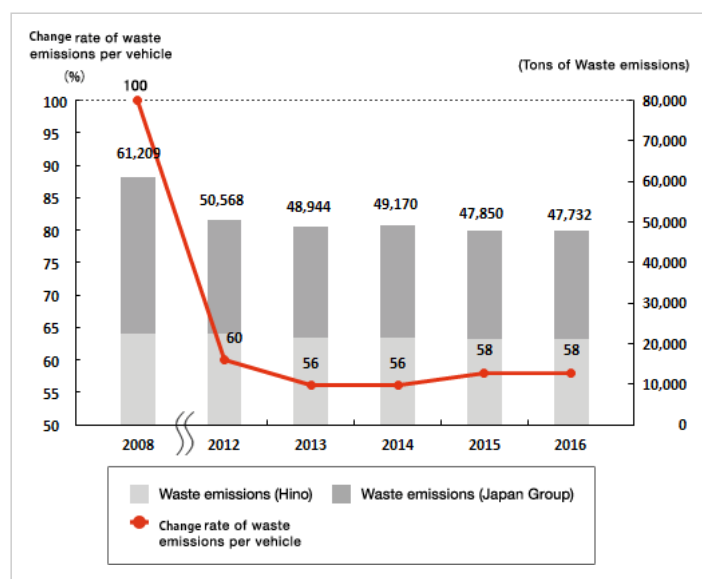
#### Most Recent Results and Future Challenges

In fiscal 2016, Hino Motors' environmental performance improved overall owing to steady efforts by all worksites to implement environmental measures, including reducing CO<sub>2</sub> emissions, saving resources and conserving water.

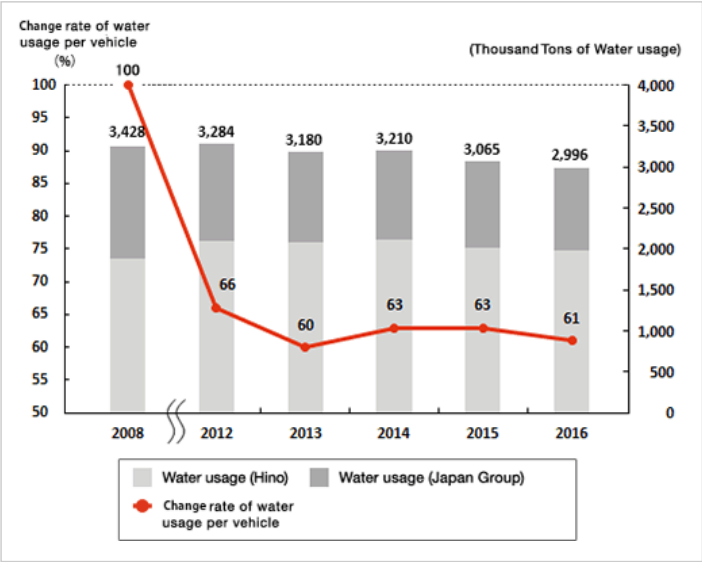
#### ■ Total CO<sub>2</sub> emitted



#### ■ Total waste matter generated



■ Total water consumed



In consideration of social trends in recent years, Hino Motors recognizes measures for combatting global warming as a key challenge for the future.

Energy consumption by corporations is subject to increasingly strict regulations in Japan, including the Tokyo metropolitan government's ordinance on environmental preservation as well as the national government's official medium- to long-term CO<sub>2</sub> reduction targets.

Recognizing the need for proactive initiatives going forward, the Company is in the process of transferring production lines from its aging Hino Plant to its new Koga Plant and carrying out a number of activities aimed at reducing CO<sub>2</sub> emissions.

As it steadily improves its environmental performance, Hino Motors is aiming to be a commercial vehicle manufacturer that can provide unique value to customers around the world.

## Environmental Performance

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

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Hino Motors recognizes that curbing global warming is an urgent issue facing humanity. In its continuing endeavors to reduce CO<sub>2</sub> emissions, the Company is carrying out regular activities, with the participation of all employees, to improve efficiency at every production plant and reduce wasted energy.

In fiscal 2015, Hino Motors reduced CO<sub>2</sub> emissions as a result of implementing a wide range of improvement activities ranging from everyday energy-saving practices to investments in equipment and facilities.

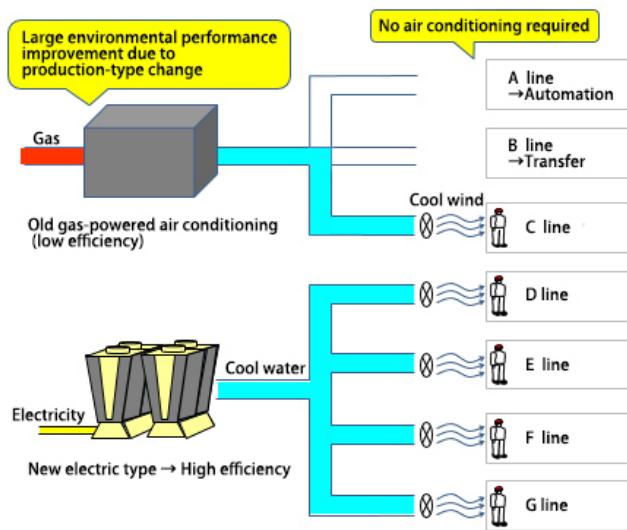
#### Primary examples of initiative

- Exchanged from the fluorescent lamp for work to LED
- Electric booster-pump-powered booster valve
- Electrification of trucks on plant grounds
- Introduced waste heat recovery compressors and promoted effective utilization of hot water (example shown below)
- Switched from an old gas-powered air conditioning system to a new electric heat-pump-powered steam system (example shown below)

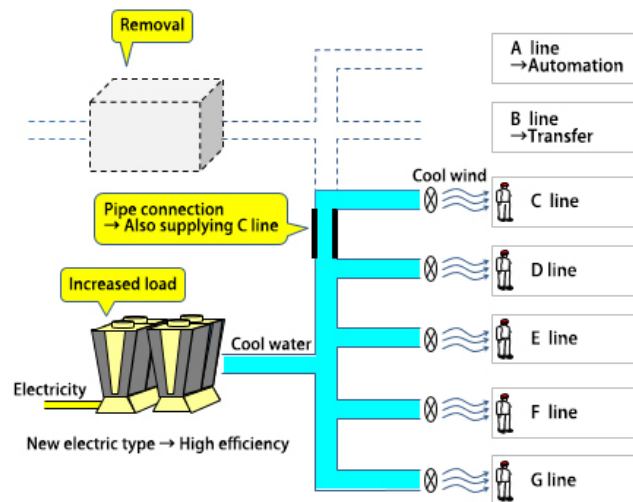
#### ■ Switching from an old gas-powered air conditioning system to a new electric heat-pump-powered steam system

Automation and relocation of certain production lines had resulted in reduced need for the old gas-powered air conditioning, which had low energy efficiency. Since the new electric air conditioning system had sufficient capacity, it was extended to cover the remaining needs and replace the old system

## Before improvements



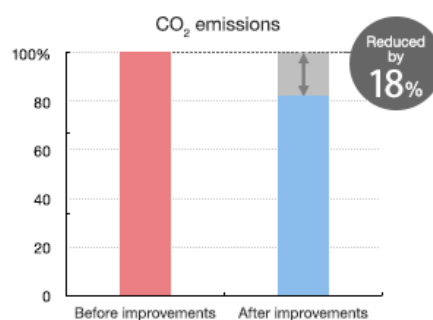
## After improvements



### Effect

Reduced energy consumption — butane for the old air conditioning and electricity for incidental equipment

Approximately 18% reduction in CO<sub>2</sub> emissions





## Environmental Performance

### Initiatives related to renewable energy

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Hino Motors is installing solar power equipment as an initiative to make use of renewable energy. Electricity generated by the equipment is used for lighting inside its factories and offices as well as outside lights on the premises. In the future, Hino Motors plans to pursue initiatives that not only save energy at its existing business facilities but also incorporate the broader perspective of combating climate change.



Solar panels installed at the Hino Plant  
1.5kw



Solar panels installed at the Nitta Plant  
2.7kw



Solar panels installed at  
the Koga Plant  
2.1kw



Solar panels installed at  
the Nitta Plant 4.1kW

## Environmental Performance

### CO<sub>2</sub> Emissions Reduction in Distribution Operations

#### Initiatives to reduce CO<sub>2</sub> emissions from distribution

Under the guidance of the Distribution Improvement Committee, Hino Motors is carrying out the following initiatives aimed at reducing CO<sub>2</sub> emissions from distribution-related operations:

1. Improving loading rates by integrating transportation routes and conducting joint shipments
2. Shortening transportation distances by packaging at the point of production to enable direct shipments
3. Increasing shipment volume using vehicles with higher tonnage (load volume) and utilizing different types of vehicles such as trailers
4. Promoting a modal shift toward ships and other forms of transportation

As it moves forward with these and other initiatives, Hino Motors intends to reduce CO<sub>2</sub> emissions at the distribution stage.

#### CO<sub>2</sub> Emissions Reductions in Distribution through Improved Loading Efficiency

**Objective** To realize CO<sub>2</sub> emissions reductions in distribution by improving loading efficiency through the use of full-sized trailers and better transport containers

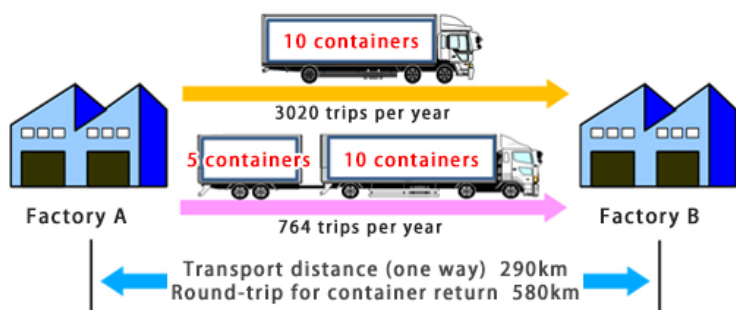
##### Before Initiative



##### Main problem

Insufficient production capacity at Factory B created parts shortages, which needed to be supplied by Factory A. However, due to the long distance between factories A and B, only eight containers of parts could be loaded into each 10-ton truck, due to the need to protect the quality of parts using the existing shipping containers.

##### After Initiative



##### Improvements

- ① Improvement of the transport container has resulted in the ability to load 10 containers of parts into each 10-ton truck, while protecting quality.
- ② By adding full-sized trailers when necessary, the transport of 15 containers per trip has been enabled.

## Improvements

### ■CO<sub>2</sub>Emissions Reductions in Distribution through Improved Loading Efficiency

#### Before Initiative

8 containers per trip (10-ton truck)  
\* 5,209 trips were needed to transport the fiscal  
2016 container shipment volume

#### After Initiative

10-ton truck: 10 containers per trip x 3,020 trips  
Full-sized trailer: 15 containers per trip x 764  
trips  
Total: 3,784 trips to transport the fiscal 2016  
container shipment volume

CO<sub>2</sub> emissions reduction in distribution,  
compared to the previous method of always  
transporting 8 containers per trip in 10-ton  
trucks: ▲23.8%



## Environmental Performance

### Recycling Initiatives at Production Plants

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Hino Motors is promoting activities to reduce its waste using three approaches: 1) eliminating the unnecessary use of raw and auxiliary materials that could become a source of waste; 2) reducing material use itself and the subsequent waste generation; and 3) reducing disposal waste volume as much as possible.

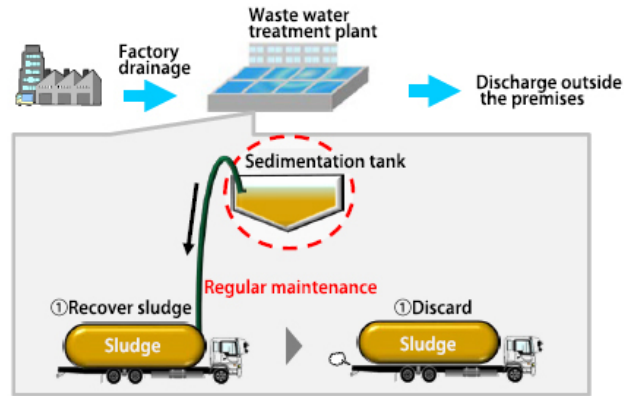
#### Main Activities

- Reducing casting sand waste by lowering the casting defect rate
- Extending effluent usage life by installing filters

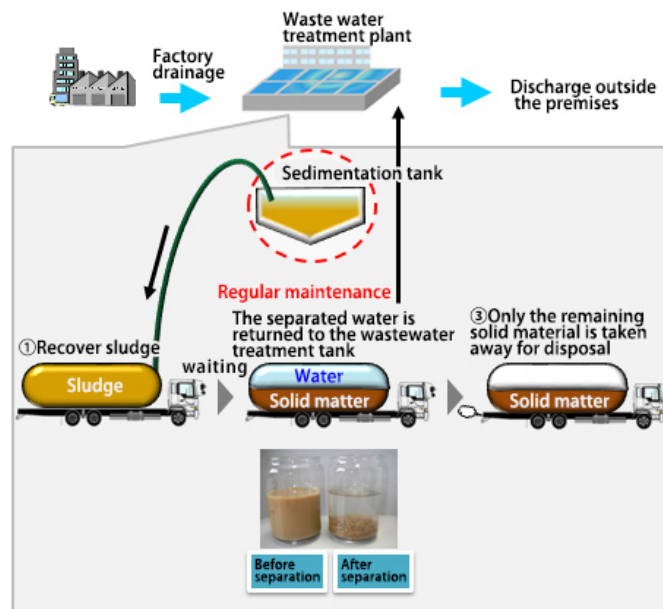
#### ■ Reduction of sludge disposal volume

Previously, to clean the sedimentation tank of the wastewater treatment plant, sludge was simply pumped into a tanker truck and taken away for disposal. However, by having the tanker truck wait for a while after filling, the solid matter can settle in the truck's tank, allowing the water in the upper portion of the tank to be pumped out. This reduces the volume of waste disposal.

## Before improvements



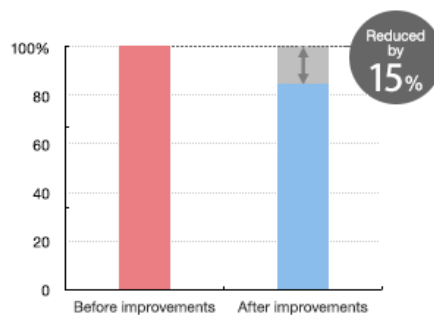
## After improvements



### Effect

Reduced the volume of sludge disposal at the time of sedimentation tank cleaning

⇒ Approximately 15% reduction in waste emissions



## Environmental Performance

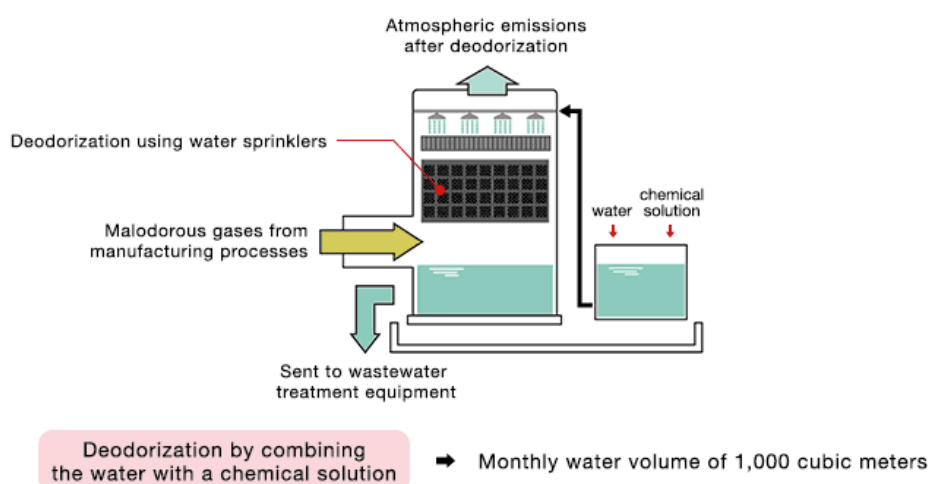
### Initiatives for Conserving Water at Factories

For vehicle manufacturing operations, water is essential. Therefore, Hino Motors makes sure to utilize this valuable resource as effectively as possible while striving to reduce the amount of water it uses on a daily basis.

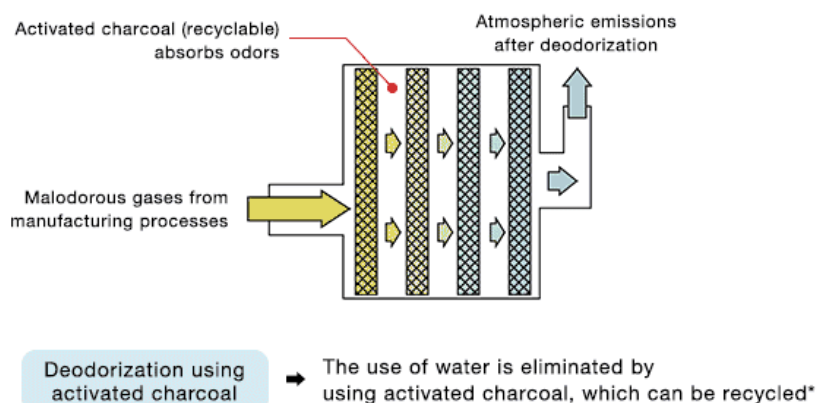
#### ■ Reducing water usage by phasing out chemical solution-based deodorization equipment

At its metal casting production facilities, Hino Motors had been eliminating odors contained in malodorous gases from manufacturing processes by using a method of combining water and a chemical solution. As a new initiative, the Company reduced the amount of water and chemicals its uses by switching to a deodorization method using activated charcoal, which can be recycled.

#### Before Initiative



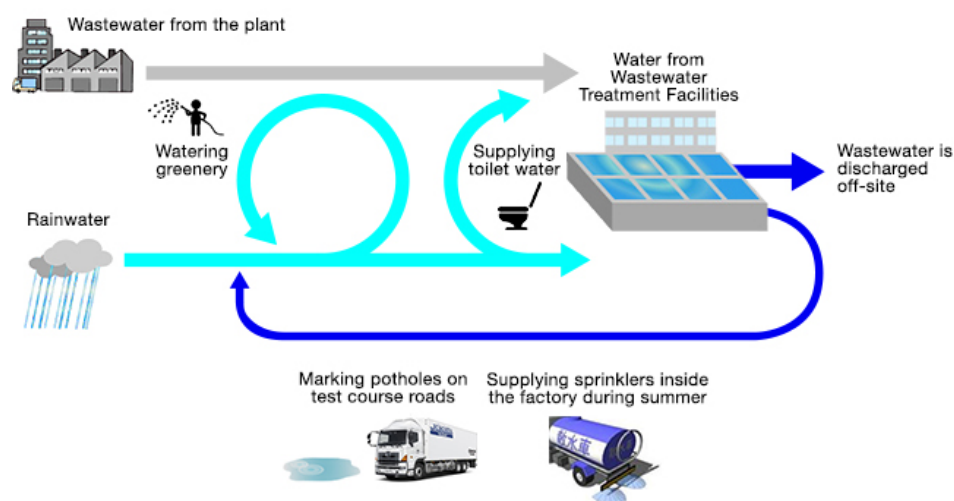
#### After Initiative



\*Additional benefits include reductions in both chemical waste matter and wastewater treatment costs

## ■ Making Effective Use of Rainwater and Water from Wastewater Treatment Facilities

In one initiative at its manufacturing plants, the Company collects and stores rainwater in tanks and uses it to water lawns onsite and to supply toilet water. In addition, Hino Motors uses wastewater after it has been treated by water treatment facilities to make wet surface on its test course roads, and to sprinkle water on vehicle areas inside its plants to reduce summer heat.



## Environmental Performance

### Considerations toward Biodiversity

Hino Motors has endorsed the Japan Business Federation's Declaration on Biodiversity, and after having also incorporated individual targets into the Company's five-year Environment Initiative Plan, in fiscal 2015 the Hino Motors Biodiversity Guidelines were formulated and the direction for Company activities and specific initiatives on biodiversity were set out and are now being advanced.

Going forward, the Company will promote various initiatives in consideration of biodiversity in accordance with the Biodiversity Guidelines in order to ensure coexistence with the ecosystems around Hino Motors and to continue to grow as a company.

At the same time, Hino Motors plans to actively incorporate participation-based activities for employees as a means of tackling the issue of raising awareness and environmental consciousness among employees.

#### Concept on Biodiversity

In every aspect of the product life cycle, from procurement through to vehicle disposal, Hino Motors engages in business activities in a way that draws various benefits from biodiversity and in return also has various effects on biodiversity.

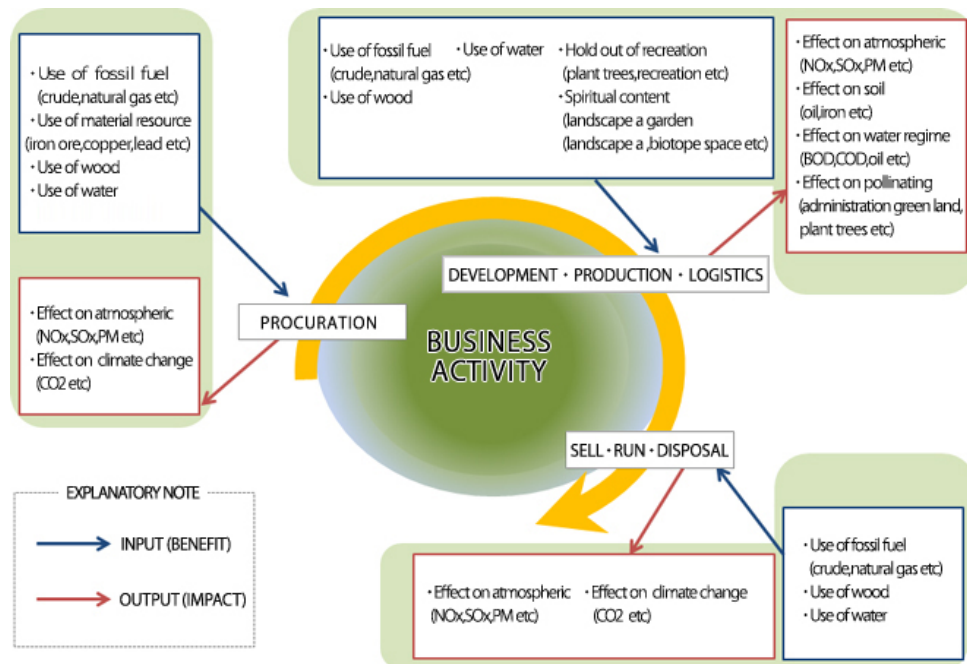
Below are the Biodiversity Initiatives that are included in Hino Motors Biodiversity Guidelines.

#### Biodiversity Initiatives

- ◇ Further pursuit of environmental technologies in products
- ◇ Consideration for regional water resources
- ◇ Contribution to biodiversity through steady promotion of environmental initiatives (CO<sub>2</sub> reduction, resource conservation, etc.)
- ◇ Collaboration and cooperation with communities
- ◇ Active information disclosure

#### Categorizing the Interrelationship of Business Activities and Biodiversity

Referring to the Business & Biodiversity Interrelationship Map devised by the Japan Business Initiative for Biodiversity (JBIB), Hino Motors has categorized benefits and impacts at each stage of the product life cycle. In this way, in the course of its business activities, Hino Motors simultaneously benefits from and impacts nature in the product life cycle as a whole.



Business & Biodiversity Interrelationship Map

Reducing the environmental impact on biodiversity even slightly through these means, thereby not harming the surrounding ecosystem in the course of business, is a key point for initiatives.

Below is a diagram that summarizes the key points that Hino Motors will concentrate its efforts on, including the details of other major initiatives.



## Examples of Initiatives

#### ◆ Plant and animal surveys at all business sites

In order to understand the ecosystems around the business sites, Hino Motors has implemented surveys into the habitats of plants and animals, predominantly in the green spaces and rivers in and around the business sites. These surveys have shown the presence of many rare species that are on the International Union for Conservation of Nature (IUCN) Red List, including the soft-shelled turtle and White's thrush.

Aiming to ensure coexistence in harmony with abundant nature, Hino Motors will promote various initiatives concurrently and also continue to implement regular plant and animal surveys.



Plant and animal surveys being implemented.



Soft-shelled turtle



White's thrush

#### ◆ The "Hinodai no Mori" Garden at the Company's Head Office

The "Hinodai no Mori" is a garden of approximately 6,000 square meters located at Hino Motors' head office. This garden was first cultivated in 1970, coinciding with the completion of the head office building. Beginning with the 13 cedar trees that were planted at the time of Hino Motors' foundation, the garden is today a lush growth of natural vegetation that harmoniously blends the spontaneity and strength of nature with abundant freshwater. Cultivated as an oasis of nature in the Musashino area, the garden is home to a wide variety of insects including cicadas, grasshoppers and water striders as well as such small birds as egrets. Looking ahead, Hino Motors will continue to maintain and protect this natural treasure.



#### ◆ Surveying the Ecosystem at a River Near the Koga Plant

An event organized to learn about aquatic organisms was held on the grounds of the Koga Plant at a retention basin that is directly connected to a nearby river. Local elementary school students and their parents participated in this event.

The participants identified many different native aquatic species in the basin, confirming that a rich ecosystem exists there.

[Click here for "Special Feature: Initiatives for Preserving the Ecosystem at a River Near the Koga Plant"](#)



The survey in process



The existence of killifish was confirmed





### ◆ Weed Clearing with Goats

The Koga Plant use goats to clear weeds on their premises. This leads to lower costs for weed clearing work and also reduces the amount of waste disposal resulting from this work.



Goats living at the Koga Plant



## Environmental Performance

### Preserving Forests through Tree-Planting Events

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In countries all over the world, Hino Motors and its group companies manage forests on their work sites and in surrounding areas by organizing tree-planting events.

These efforts to plant trees not only help to prevent landslides in the forest, but they also serve to educate participants about the rich biodiversity in the surrounding area. By bringing together employees, their family members, and organizations associated with Hino Motors, the event succeeded in raising awareness about protecting biodiversity and conserving the local environment.

Hino Motors intends to continue organizing this tree-planting event in the future with the goal of realizing harmony with nature through its business activities.

Group companies that have held tree-planting events and their locations



Hino Motors workplace in the city of Ome, Japan



J-BUS Ltd.in the city of Komatsu,Japan



Hinopak Motors, Ltd., in Pakistan



GAC Hino Motors Co., Ltd.(China)



Hino Motors Manufacturing Columbia, S.A.  
(Columbia)



Hino Motors Manufacturing Ltd.(Thailand)



P.T. Hino Motors Manufacturing  
Indonesia(Indonesia)



Hino Motors Manufacturing Malaysia(Malaysia)



Hino Motors Philippines Corporation(Philippines)

Brush-clearing event in the city of Ome

In 2015, Hino Motors held a brush-clearing event in Ome, Japan, at a forest specially designated to commemorate the 70th anniversary of the Company's founding. During the event, participants cared for trees by tending to the areas surrounding saplings that have already been planted.

Looking ahead, Hino Motors intends to carefully manage the forest so that the planted trees can grow into a thriving forest and provide a habitat for abundant plants and animals.



All participants helped clear brush



Managing a thriving forest

■ Activities each year (including planned activities)

Years	Activity	Type of activity
1 to 2 years	Planting trees	Planting trees
3 to 7 years	Clearing brush	Caring for trees
From 8 years	Minimum level of care	Monitoring forests

## Environmental Performance

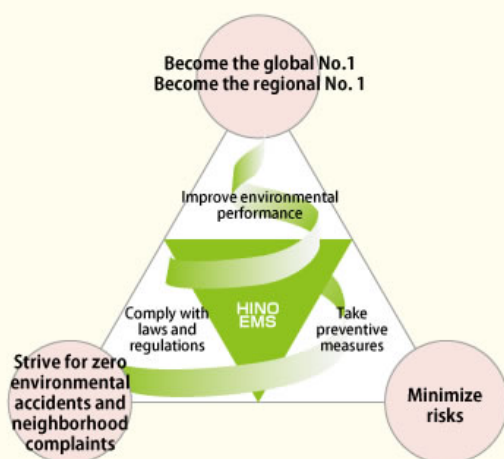
### Applying The Eco-Factory Concept

When newly building or upgrading plants, Hino Motors applies its eco-factory concept to incorporate environmental measures at each stage, from planning and design through to operations, based on three main goals: strict adherence to all relevant laws and regulations, implementation of thoroughgoing preventive measures, and enhancement of environmental performance.

When establishing new factories and expanding existing facilities, Hino Motors and its group companies in Japan and around the world took advantage of these opportunities by implementing eco-factory initiatives and incorporating related environmental measures.

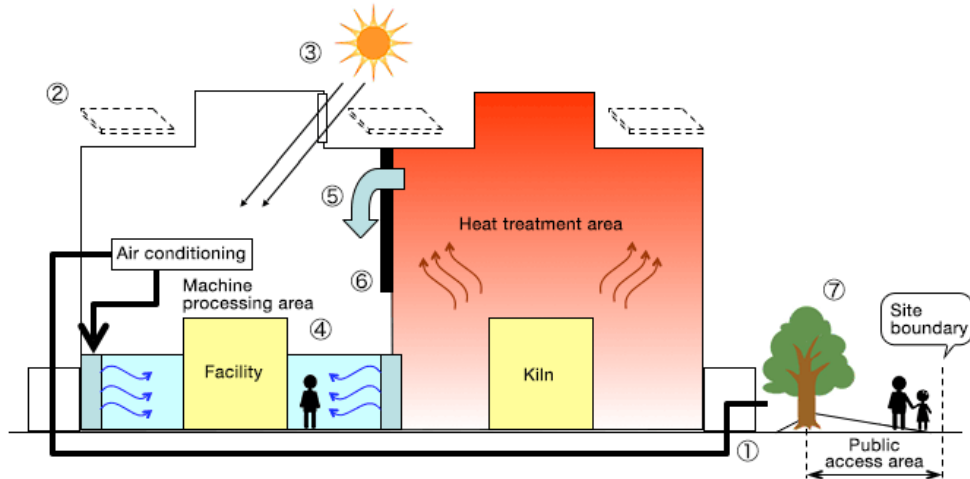
#### ■ Ongoing Eco-Factory Concept

Company name, factory name	Inter-organizational
Koga plant	Newly built factory
Nitta plant	Expanded factory



## Successful initiatives at the Nitta Plant

The Nitta Plant has incorporated the latest advanced technologies in its efforts to reduce environmental load. By making the most of the unique aspects of the surrounding environment, the plant has worked to reduce energy consumption through the following initiatives.



- ① Reduced energy for air conditioning by installing heat tubes for utilizing underground heat
- ② Designed rooftops to facilitate installation of solar panels in Gunma Prefecture, taking advantage of its relatively abundant sunlight (ranked fourth among prefectures in Japan for annual sunlight hours)
- ③ Installed skylights to utilize natural lighting in buildings
- ④ Designed layered air conditioners to reduce energy used for air conditioning and improve the workplace environment
- ⑤ Reused to heating of the exhaust at heat treatment area
- ⑥ Insulated buildings by installing area isolation suspended walls
- ⑦ Planted local species of trees and greenery along the boundaries of factory sites and opened some areas to the public