Environmental Performance

Basic Approach / Most Recent Results and Future Challenges

Basic Approach

Commercial vehicles are subject to various regulations concerning fuel consumption and exhaust emissions, including emissions of nitrogen oxide (NOx) and particulate matter (PM), and these regulations have been growing stricter with each year. Meeting these standards represents the bare minimum of its environmental obligations as a manufacturer of commercial trucks and buses.

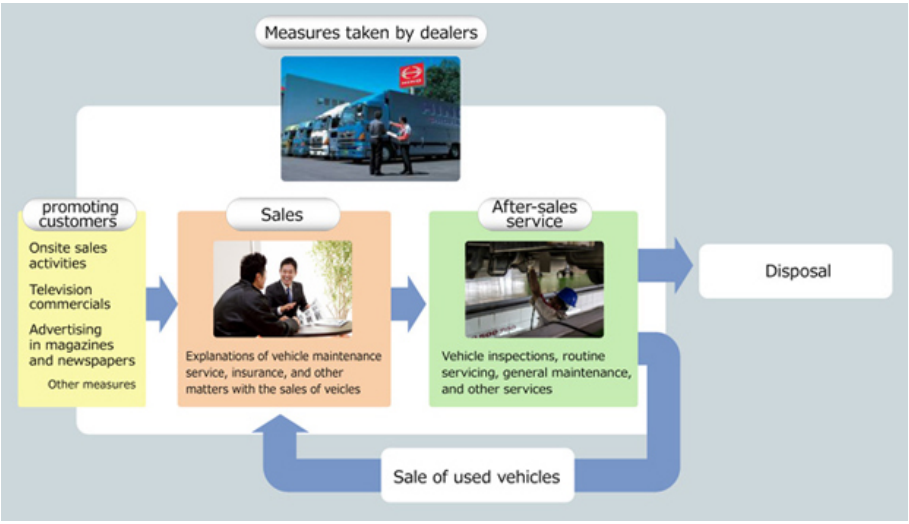
In recent years, consumers have come to place importance on the environmental performance of commercial trucks and buses in addition to their basic performance such as horsepower, load capacity, and drivability. Therefore, each company is developing new products by applying its expertise and latest technologies according to these expectations.

While promoting product development aiming for the industry's best environmental performance, Hino Motors is also focusing specifically on offering various benefits to customers throughout the entire product lifecycle, including servicing.

Accordingly, Hino Motors is striving to maintain the environmental performance of its vehicles by enhancing its "total support" so that customers can use the environmentally friendly trucks and buses it has developed in ways that are friendly to the environment, right through to the time of final disposal.

Going forward, Hino Motors will strive to enable its support system to respond to the needs and requests of every single customer, while always working to supply top-quality trucks and buses.

Total Support Process



Recent Results and Future Challenges

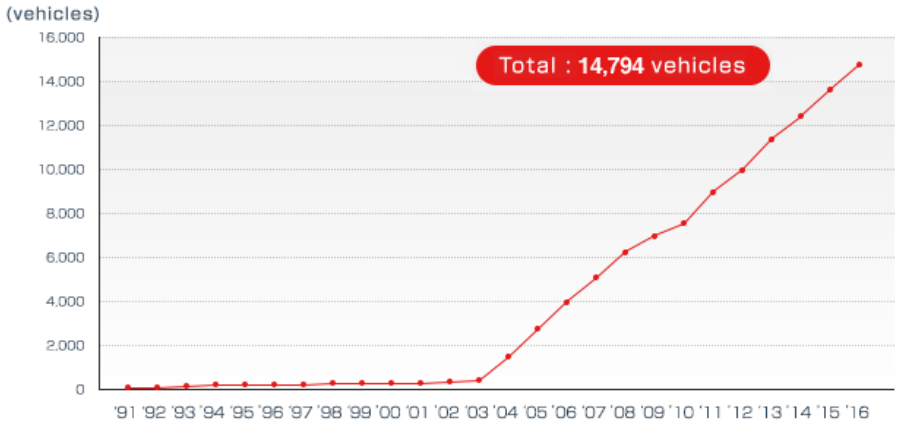
Ever since Hino Motors commercialized and sold the world's first hybrid bus in 1991, the Company has constantly led the industry in environmentally-friendly products.

Most recently, the Company implemented model changes and launched sales of the heavy-duty Hino Profia and the medium-duty Hino Ranger trucks. The new models of these trucks were produced at the Koga Plant, which commenced full-scale operations in 2017.

Striving to make trucks that customers continue to want～The new Hino Profia and Hino Ranger～

Hino Motor’s environmentally-friendly products continue to be loved by customers around the world. Among these products, cumulative sales of hybrid vehicles surpassed 14,000 as of the end of fiscal 2016.

Cumulative number of Hino hybrid vehicles sold as of March 31, 2017: 14,794 vehicles



Hino Motors worked to enhance its total support in fiscal 2014 in order to maintain the environmental performance of its environmentally friendly trucks and buses.

In the last few years, in particular, the Company has modified the structure of its operations in a drive to proactively expand its service menu for customers worldwide, which includes Eco-Drive classes, routine vehicle diagnostics, and general maintenance.

As a result of these initiatives, the cumulative number of visitors to its customer centers has exceeded 50,000 people. Other customers also visit Hino Motors dealerships and workplaces for a variety of reasons.

In the future, Hino Motors will continue pursuing the goal of raising the level of its customer service even further.

Commercial vehicles are used to transport goods and people all over the world. Indeed, the market extends to almost every place in the world, so these vehicles have the potential to be used everywhere.

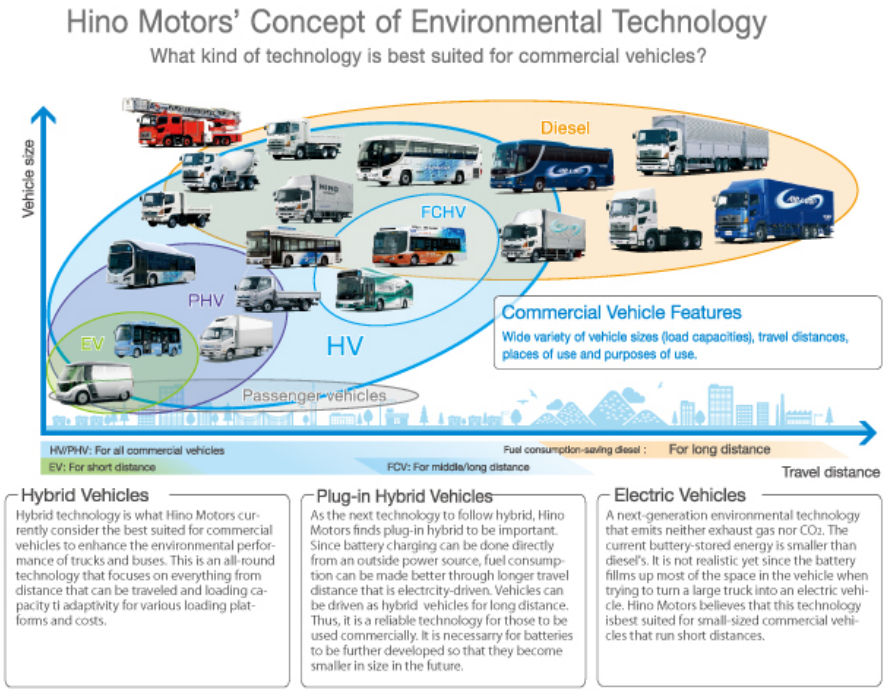
While aiming to offer the world’s best vehicle servicing, Hino Motors will strive to earn the trust of people worldwide by continuing to help customers use its trucks and buses in environmentally conscious ways.

Environmental Performance

Hino Motors' Environmental Technologies

Commercial vehicles are made to transport large numbers of people or goods over relatively long distances, and fuel and energy are needed to do that. This makes the emission of CO_2, a greenhouse gas, an unavoidable fact.

Unique aspects of commercial vehicles include their comparatively large size and loading capacities, the long distances they travel, and their wide array of uses and places where they are used. Taking into account these varying conditions, Hino Motors considers what types of environmental technologies are most suitable. By providing users with optimally equipped vehicles, the Company hopes to help contribute to curbing global warming.



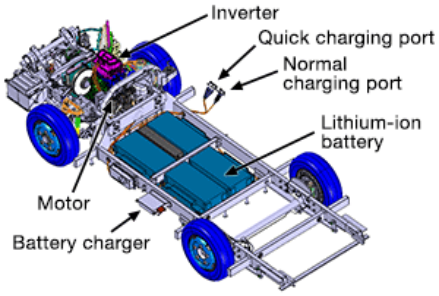
Hino Motors' Highly Promising Technologies

EV

Electric Light-Duty Trucks

Hino Motors has collaborated with Japanese delivery companies Seino Transportation Co., Ltd. and Yamato Transport Co., Ltd. to commence trial operations of its electric light-duty trucks. Since the trucks are powered by an electric motor, no exhaust gases are emitted while running and noise levels are very low, making them optimal vehicles for pick-up and delivery duties during late night or early morning hours.

Development of Environmentally Friendly and Commercial Electric Vehicles (Part 2) (CSR Reporting 2013)



Small Electric Buses

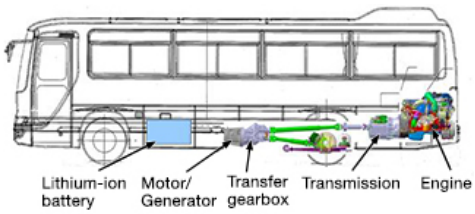
Hino Motors' small-sized electric buses have begun service on fixed routes as community buses in Tokyo's Sumida Ward, the city of Hamura in the Tokyo Metropolitan area, and the city of Komatsu in Ishikawa Prefecture. Hino Motors made the batteries as small as possible and extended the battery life. As a result, the feasibility of operating the buses on fixed routes has been verified.

Development of Environmentally Friendly and Commercial Electric Vehicles (CSR Reporting 2012)

PHV

Hino Melpha Plug-In Hybrid Bus

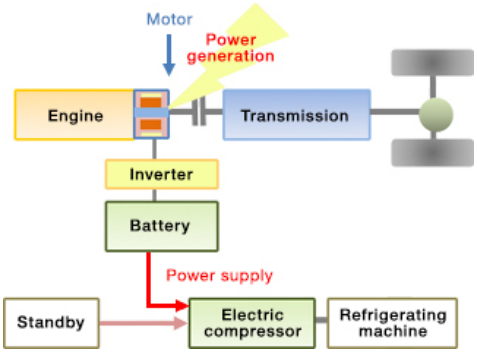
The Hino Melpha Plug-In Hybrid Bus can run as an electric or hybrid vehicle and supply electricity externally for relatively long periods of time from power generated by its diesel engine, making it useful for supplying electricity to evacuation centers and other facilities in times of disaster. Hino Motors made this possible by combining its many years of expertise developing hybrid systems with high-capacity lithium-ion batteries.



HV

Hino Profia Electric Refrigeration Truck

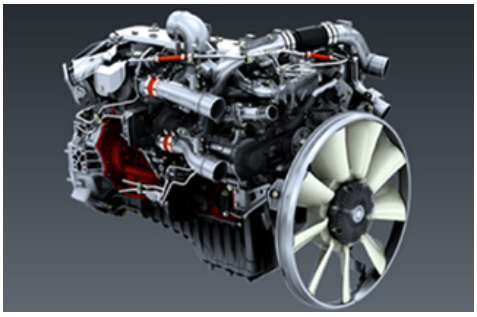
By combining its hybrid system technologies with Denso Corporation's automotive-use electric refrigeration system technologies, Hino Motors has developed a refrigeration truck that offers a complete lineup of benefits for customers, including economical operations, excellent refrigeration performance, superior quality, and extremely quiet running.



Diesel

Hino Profia Heavy-Duty Trucks

Through downsizing, the new A09C engine offers high levels of both power and fuel economy. The new 9-liter engine installed in a ProShift-equipped vehicle has achieved performance that is 10% above heavy-duty vehicle fuel efficiency standards.



Hino Ranger Medium-Duty Truck

Through downsizing, the new A05C engine offers high levels of both torque and fuel efficiency. By combining this engine with an advanced transmission, Hino provides a broad range of vehicle types with performance that is 5% above heavy-duty vehicle fuel-efficiency standards.

Environmental Performance

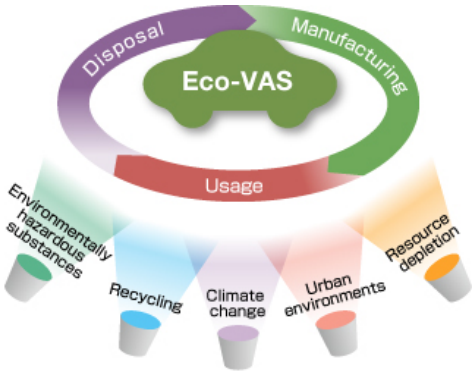
Environmental Load Reduction Activities Based on Life Cycle Assessment (LCA)

Eco-VAS Initiative

Factors such as measures for new regulations, vehicle performance enhancement efforts, and others can increase environmental burden during the process of manufacturing.

Hino Motors is aiming to further reduce its environmental load by employing the Eco-Vehicle Assessment System, an environmental product management system that incorporates a lifecycle approach during product development.

*Eco-VAS is a framework for setting targets to reduce the environmental burden from the products from the early vehicle development stage and for making steady reduction of environmental burden based on LCA methods.

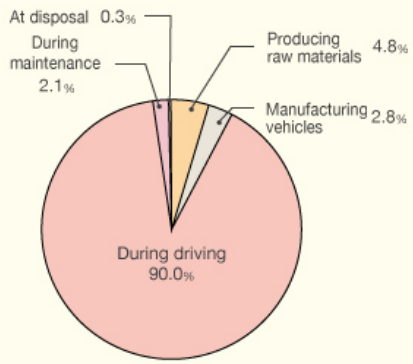


LCA Initiative

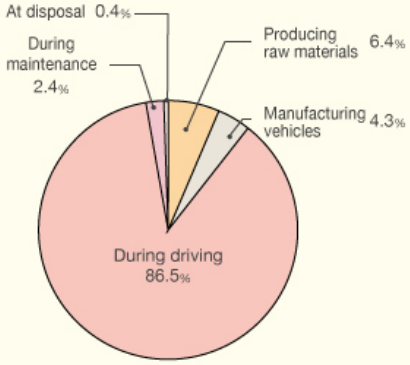
LCA is an analysis method used to quantitatively measure environmental burden throughout the life cycle of such products as trucks and other vehicles, from manufacturing to use and eventual disposal. Hino Motors has been employing LCA since 2008 aiming to recognize CO_2 emissions over the life cycle of its truck and bus models. The results for each type of vehicle are shown in the charts below.

Life Cycle CO_2 Emissions of each Type of Vehicle

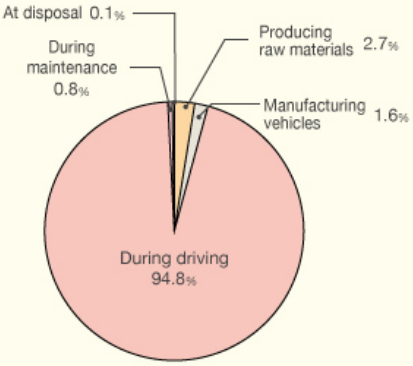
Light-Duty Trucks



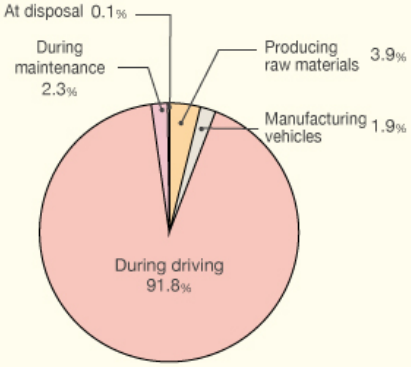
Light-Duty Hybrid Trucks



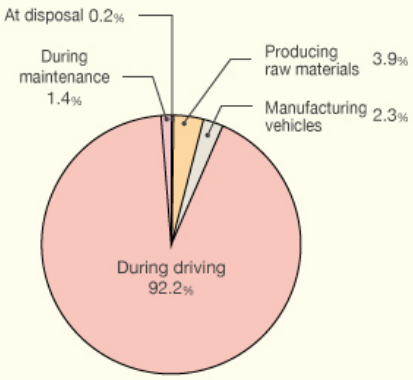
Medium-Duty Trucks



Heavy-Duty Trucks



Large-sized Buses



Large-sized Hybrid Buses

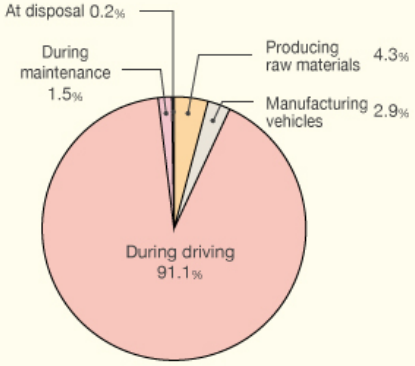


Chart data is based on certain calculation methods and conditions self-determined by the Company. Fuel consumption was calculated using values from a heavy vehicle fuel efficiency model. The assessment results cover the entire life cycle for each type of vehicle shown.

Environmental Performance

Eco-Driving Support

Hino Motors holds "Eco-driving" classes in Japan and overseas as a part of its endeavors to contribute to the environment and customers. In fiscal 2016, a total of 17,656 people in and outside Japan attended the classes, which have earned reputation for teaching driving skills that consider the environment and contribute to the profitability of customers' businesses. Hino Motors intends to continue encouraging fuel-efficient driving with the aim to be a company that earns the trust of customers around the world.

Number of Participants in Eco-Driving Support in Fiscal 2016

	In Japan	Outside Japan	Total
Number	1,744	21,892	23,636

A class in process

Hino Eco Tree Report

In order to provide eco-driving support to customers, Hino Motors products feature an “Eco Tree” display function.
A tree icon grows more leaves as the level of eco-driving increases.

Furthermore, by providing complementary Eco Tree reports that contain automated analysis of each individual customer’s driving status and serve as a useful source of information for eco-driving and drive management, Hino Motors aims to support customers in terms of environmental awareness and safety.

Eco Tree

Eco Tree Report

Key Information Displayed in Eco Tree Report

1. Driver conditions

- Pressure on accelerator
- Engine idling
- Average speed / Top speed
- Engine revs at upward / downward gear changes, etc.

2. Hints for preventive maintenance

- Strength of brake operation
- Range of engine revs, etc.

Sales staff explains points to improve driving techniques

Environmental Performance

Design with Recycling in Mind

Since 1990, Hino Motors has been involved in product development and design initiatives with recycling in mind.The Voluntary Action Plan was established in 1998, listing specific values for recycling rates with the goal of enhancing recycling activities.In recent years we have also engaged in efforts to comply with regulations on environmentally hazardous substances by reducing them at an early stage.

Use of recycled materials

Using recycled materials in some products such as recycled felt, waste wood (hardboard), and recycled resin bumpers contributes to the effective use of materials.

Use of recycled resin bumpers for battery cover

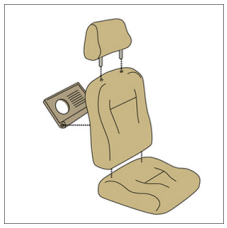
Use of materials with recycling in mind

Hino is incorporating easily recycled materials at the product development stage, such as materials integrated in the resin parts, and uncoated, high-gloss resin for the instrument panel and bumper grille.

Uncoated, high-gloss resin bumper grille

Enhanced parts disassembly

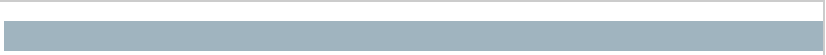
With the idea of making product parts easier to disassemble, resin locking clips are used, and the number of screw points was reduced.



Reduced number of screw points

Current recycling design track record

Recycling design	Application	2000	2005	2010
Use of recycled materials				
• Recycled felt	• Floor mats			
• Recycled urethane	• Seat cushions			
• Waste wood	• Interior trim			
• Kenaf	• Tilted rack plate			
	• Interior trim			

Recycling design	Application	2000 2005 2010
• Recycled resin bumpers	• Recycled resin bumpers	
Use of materials with recycling in mind		
• Integrated materials for resin parts	• Battery cover	
	• Door trim	
• High-gloss resin	• Door garnish	
	• Bumper grille	
Enhanced parts disassembly		
• Switch to resin locking clips	• Instrument panel	
• Reduced number of screw points	• Wheel house locking clips	

Environmental Performance

Environmental Activities at the Recycling Stage

Automobile Recycling Initiatives

Vehicle recycling methods

To comply with the Automobile Recycling Law, which came into effect in Japan in 2005, Hino Motors has implemented a process of recovery, processing, and recycling of three materials designated by the law from end-of-life vehicles, namely automobile shredder residue (ASR), airbags, and chlorofluorocarbons (CFCs), with the help of a great many related businesses.

Each year, Hino Motors continues to improve the ASR recycling ratio of its products in Japan. In fiscal 2016, this ratio stood at 98%, achieving well in advance the legal standard of 70% set for 2015. In addition, Hino Motors strives to promote eco-friendly manufacturing as early as the development stage by using recyclable materials and, where possible, easy-to-disassemble vehicle designs, thereby pursuing the effective utilization of resources and contributing the development of a recycling society.

Voluntary initiatives

Rare metals and rare earths are used in the batteries of hybrid vehicles. As a voluntary initiative, Hino Motors collects hybrid vehicle batteries to recycle these materials in cooperation with a collection and recycling program implemented by Toyota Motor Corporation. By making effective use of the raw materials contained in these batteries, Hino Motors is striving to reduce waste and contribute to the promotion of a recycling-oriented society.

Environmental Performance

Helping Improve Air Quality with Technologies for Reducing Vehicle Exhaust Emissions

Hino Motors has always taken the lead in the industry as a pioneer of environmental technologies for diesel trucks and buses.

In 2017, new medium-sized diesel models were launched equipped with the A05C engine. This is a downsized version of the A09C engine, which offers fuel economy while complying with strict exhaust emission regulations for large diesel vehicles.
By improving the Diesel Particulate active Reduction system (DPR), Hino Motors has made exhaust emissions cleaner while enhancing fuel economy, reducing CO_2 emissions, and meeting 2016 emissions regulation standards. As result, the Hino Profia and Ranger offer fuel efficiency 10% and 5% above the 2015 vehicle fuel efficiency standards, respectively.

Hino Motors will continue to develop new technologies and help to improve the earth's atmosphere by enhancing the fuel economy of engines and reducing CO_2 and other harmful emissions.

The A09C engine

The A05C engine

Environmental Performance

Chemical Substance Management

Hino Motors employs Material Safety Data Sheets (MSDS) to collect data and maintains a database for all paint and related materials used in-house. Information is accessible by employees via PCs, enabling them to identify chemical substances contained in the materials and undertake environmental and safety measures when required.

With the growing adoption of regulations for environmentally hazardous substances around the world, Hino Motors is enhancing the chemical substance management of raw materials used in its products, supplementary materials in manufacturing equipment, and packaging materials. Through these efforts, the Company is reducing the amount of environmentally hazardous substances used in its operations.