

Endeavor for Carbon Neutrality
by 2050

Resource Circulation

Basic Approach to Environmental Protection,
and Environmental Promotion Framework

Environmental Management

Initiatives for Reducing
Environmental Impact

Biodiversity Conservation

RESOURCE CIRCULATION

Mazda promotes initiatives for resource recycling based on the 3 Rs (reduce, reuse, and recycle) and the circular economy concept over a vehicle's entire life cycle. The Company implements thorough recycling and waste-reduction initiatives in order to ensure that limited resources are used effectively.

Efforts Regarding Product and Technology Development

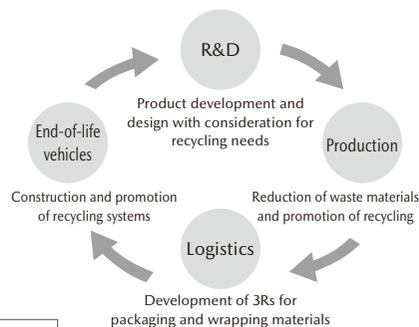
Product Development and Design with Consideration for Recycling Needs

Many limited resources are used to manufacture vehicles, such as steel, aluminum, plastics and rare metals. Mazda is incorporating 3 Rs design into all vehicles currently under development to increase the recyclability of its new vehicles.

<Specific Initiatives>

1. Research into vehicle design and dismantling technologies that simplify dismantling and separation, to make recyclable parts and materials easier to remove
2. Use of easily recyclable plastics, which constitute the majority of ASR*¹ by weight

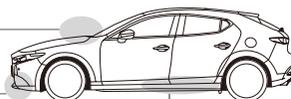
Resource recycling based on 3Rs



Instrument Panel
Instrument panel fasteners are constructed to disengage simply, so that they can be removed easily when pulled during dismantling

Bumpers
Thin-walled construction of bumper underneath fastenings makes the bumper easy to demount by pulling its opening.

Easily Dismantled Earth Terminals
Terminals are designed to break off when the harness is pulled out to prevent breakage of the harness



Expanded Adoption of Biomaterials

Mazda has been proactively developing plant-derived biomaterials which have the potential to help reduce environmental impact by curbing the use of fossil fuels and CO₂ emissions. In 2006, the Company became the first in the automotive sector to develop high heat-resistant, high-strength bioplastic for vehicle interior parts. In 2007, Mazda succeeded in the development of the world's first biofabric made with completely plant-derived fibers for vehicle seat covers. In 2014, bio-based engineering plastic,^{*2} suitable also for use in vehicle exterior parts, was developed by the Company, which is currently expanding the adoption of this material.

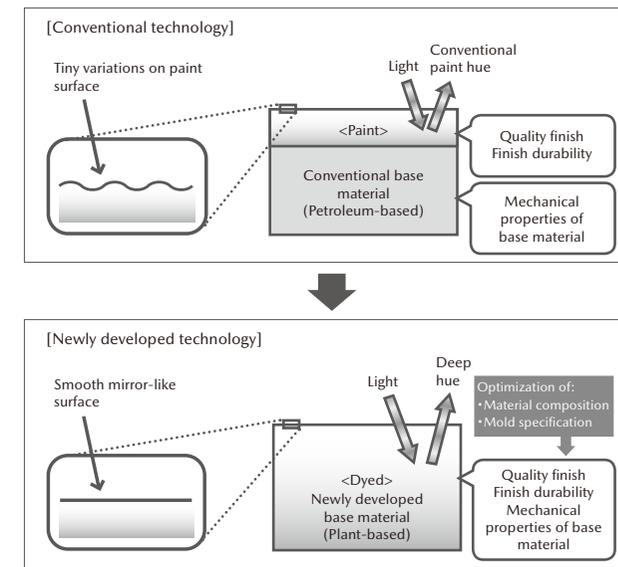
Technology development initiatives related to bio-based engineering plastics

2014: Mazda developed bio-based engineering plastic featuring a high-quality finish without painting. By developing paint-less technology for interior and exterior parts taking advantage of the characteristics of this material, the Company not only secured the excellent environmental performance of the material but also achieved a high-quality finish that could not be achieved with conventional paint, and contributed to environmental protection and production cost reduction by eliminating the painting process.

2017: Mazda developed materials suitable for making large, intricately shaped exterior parts, such as front grilles, and optimized the die specifications in order to substantially enhance the formability of these parts. In 2020, the Company received the Award for Science and Technology (Development Category) of the 2020 Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology for the development of the above-mentioned bio-based engineering plastic.

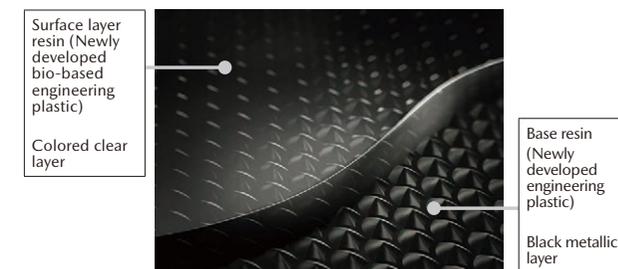
2018: Mazda developed a new technology for two-layer molding of pattern designed bio-based engineering plastic, which enables the molding of a transparent surface layer and a base layer with a pattern-engraved surface, both of which are made of environmentally friendly bio-based engineering plastic. The new technology reduces environmental impact while making it possible to provide elaborated, shaded patterns of deep color, which was previously impossible with conventional technology. In 2021, the Company received the Aoki Katashi Innovation Award from the Japan Society of Polymer Processing for the development of the above-mentioned new technology for two-layer molding of pattern designed bio-based engineering plastic.

2014: Development of paint-less technology for interior and exterior parts taking advantage of this material



2018: New technology for two-layer molding of pattern designed bio-based engineering plastic

New technology for two-layer molding of pattern designed bio-based engineering plastic: surface view



*¹ Automobile Shredder Residue

It refers to the residue remaining after the crushing/shredding of what is left of the vehicle body following the removal of batteries, tires, fluids, and other parts requiring appropriate processing; the removal of engines, bumpers, and other valuable parts; and the separation and recovery of metals.

*² Bio-based engineering plastic was developed by Mazda Motor Corporation in collaboration with Mitsubishi Chemical Corporation.

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Efforts Regarding Manufacturing and Logistics

Manufacturing Materials: Maintaining the Status of Zero Landfill Waste and Promoting the Reduction of Waste

To reduce landfill waste at its four principal domestic sites*¹ to zero, Mazda is promoting reductions in the volume of manufacturing by-products and waste, more rigorous sorting of waste, and recycling. As a result, the Company has achieved zero landfill waste, and has maintained this status from FY March 2009 to FY March 2022. The Company has also achieved material recycling, to ensure that packaging materials used in the vehicle assembly process can be reused as raw materials, by more strictly sorting these packaging materials by ingredient and quality. The amount of waste in FY March 2022 was reduced by 87% compared with FY March 1991 levels.

Mazda has been proactively using recycled materials for the plastic pallets used to transport parts overseas. Currently, the Company is planning to use plastic waste generated at its plants as a recycled material for the production of plastic pallets, working to further reduce the amount of waste generated.

 Amount of landfill waste, amount of recycled materials, recycling ratio (P115)

Logistic Materials: Reducing Volume of Packaging and Wrapping Materials

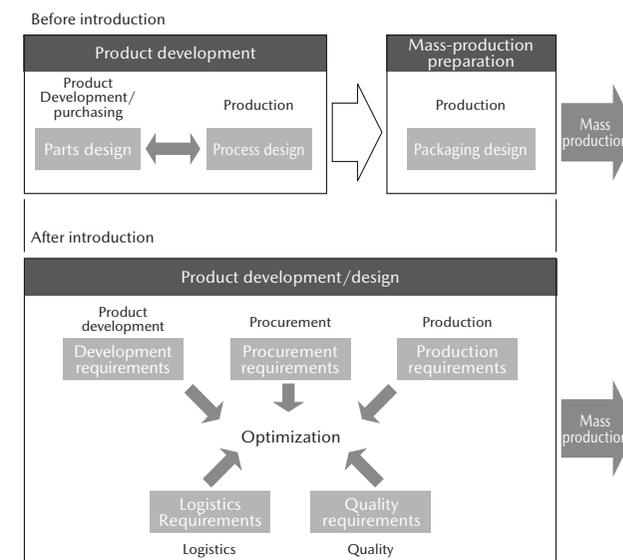
Mazda is moving forward with efforts centering on the “3 Rs of Mazda logistics” to cut down on resources used for packaging and wrapping. In FY March 2022, the use of packaging and wrapping materials was reduced by 27% compared with FY March 2020 levels. In FY March 2017, departments in the five areas—development, production, procurement (purchasing), logistics and quality—closely worked together to achieve the optimization of parts procurement and vehicle manufacturing, from the stage of product development, and to establish strong cooperation with the supply chain. These efforts resulted in reduced volumes of packaging and wrapping materials, and an increased packaging filling rate. In FY March 2022 as well, these departments worked in close collaboration to improve the packaging filling rate for some parts, and to reduce the volumes of their packaging and wrapping materials. Mazda will continue promoting and expanding these activities that involve efforts in different areas, so as to reduce the consumption of materials. In the area of repair parts for overseas, the Company continues to expand the application of large-size returnable containers, aiming at increasing the container filling rate. By utilizing these containers, Mazda succeeded in reducing the use of packaging and wrapping materials by about 1,900 tons in FY March 2021 and by about 2,100 tons in FY March 2022.

For the parts exported to overseas assembly plants, the Company is now introducing new standard contains for parts to be transported in containers from Japan. This makes it possible to eliminate the empty space inside the containers. By improving filling rate inside the container from 70% to 90%, the Company could reduce the number of containers and the number of transportation truck services, thus contributing not only to the reduction of the use of packaging and wrapping materials, but also to the reduction of CO₂ emissions.

The Company also developed these activities at Mazda Toyota Manufacturing (MTM) that started operation in January 2022. By introducing new standard containers, in FY March 2021, the Company succeeded in reducing the number of containers about 50 vessels, and the use of packaging and wrapping materials by around 2,800 tons respectively. The Company is planning to introduce the new standard containers for the other parts to achieve further reduction.

 Consumption of wrapping and packaging materials (p115)

Activities Image



Introduction of Returnable Containers



*1 Head office (Hiroshima); Miyoshi Plant; Hofu Plant, Nishinoura District; Hofu Plant, Nakanoseki District (including non-manufacturing areas such as product development)

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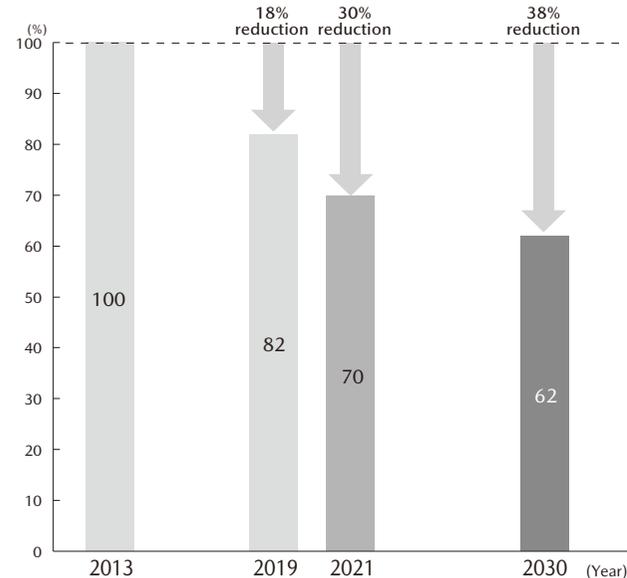
Biodiversity Conservation

Water Resource Conservation Target

Mazda Group promotes activities to eliminate wasteful water use and circulate water resources by treating used water so that it is the same quality as it was taken from nature. In order to implement its initiative of water resource reuse and recycling at a domestic model plant, the Company has set a target of reducing the water intake by the entire Mazda Group companies in Japan*1 by 38% in 2030 compared with 2013 levels. In order to achieve this target, the Company is planning to reduce the annual water use by 2%. In addition, the Company promotes the further use of rainwater and recycled water.

 Water withdrawal and wastewater amount (P116)

Water withdrawal amount by Mazda Group companies in Japan



To Achieve Water Resource Conservation Target

By clarifying input, process, and output of water resource in its business activities, Mazda is promoting initiatives to efficiently use the valuable water (i.e., utilizing water resources without wasteful use), minimizing the water usage, and circulating water resources by treating used water so that it is the same quality as it was taken from nature. For the progress of these initiatives, Water Resource Group was established consisting of members in charge of water resource conservation. Under two teams, the Group works for six major themes of “eliminating wasteful use,” “reduction,” “reuse,” “recycling,” “utilization of rainwater, water sludge and waste fluid” as well as “building communities and systems and developing human resources” by analyzing the current conditions and find out the solution based on the analysis. Water Resource Group also started sharing information on initiatives at domestic plant with overseas plant, as well as supporting the overseas plants address the issues.

- Recycling/Circulation Team: review models in the field of wastewater treatment, review models and implement trials in the field of water intake
- Use Reduction Team: Introduce models and trial results reviewed by Recycling/Circulation Team to plants

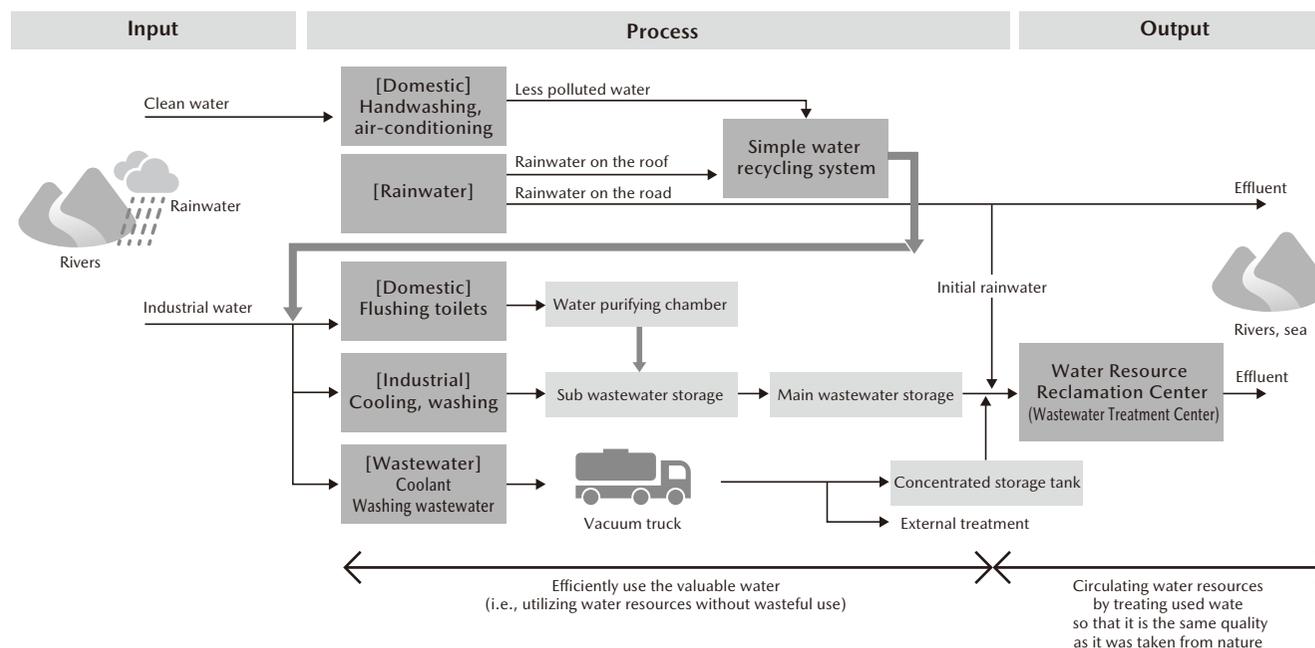
<Examples of Efficient Use of Water Resources>

[Appropriate use / reuse]

- Appropriate drainage of cooling towers
Prevention of overflows caused by excessive water supply, and reuse of less polluted water in circulation without draining in accordance with internal standards
- Reducing toilet washing water:
Put a sensor on each toilet that allows flushing only when the sensor senses the existence of the user
- Effective use of electrodeposition paint cooling drainage:
Water used to cool paint is reused in other processes

[Recycling of drain water / utilization of rainwater]

- Less polluted water, such as hand washing water and air-conditioning drainage, is recaptured and recycled with simple recycling system and used together with stored rainwater for flushing toilets, etc.



Initiatives for Collection and Recycling of End-of-Life Vehicles (ELVs) and Used Parts

Around 80% of a vehicle can be recycled. Implementing thorough recycling and waste reduction initiatives to ensure that limited resources are used effectively, Mazda promotes efforts to establish a recycling-oriented society.

Measures in Response to End-of-Life Vehicle Recycling Law in Japan

Mazda properly processes and recycles three designated items (fluorocarbons, airbags, and automobile shredder residue [ASR]^{*1}) pursuant to the End-of-Life Vehicle Recycling Law in Japan. In addition, the Company is creating unique technologies and measures to move this recycling program forward. In the case of ASR, Mazda is working through ART,^{*2} a consortium of 13 key companies including Mazda, Nissan Motor Co., Ltd., and Mitsubishi Motors Corporation, to comply with the law and achieve progress in the reuse of resources.

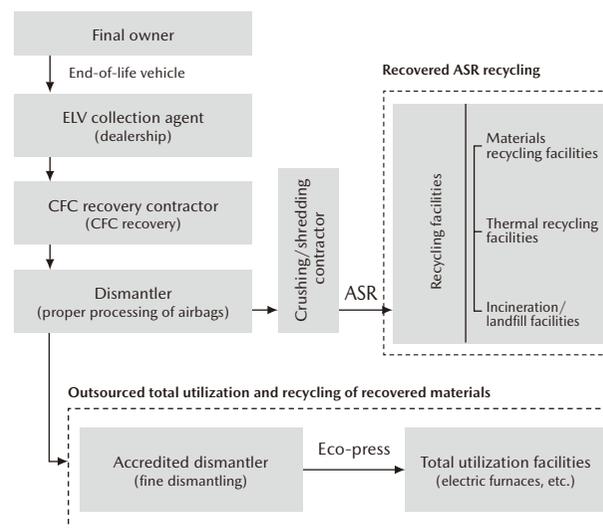
The Company appropriately executes recycling at dealerships. Dealerships collect vehicle recycling fees at the time of sale and receive the ELVs from their final owners in order to transfer them to the disposal processing companies. As for recycling fees, the Company reviewed its fee calculation standard in sequence for new models launched in 2012. The new fee standard is applicable to the Company's new models released after that. While forecasting a future recycling situation, the Company will continue to push forward with its recycling business in such a way to ensure a balance between revenue and expenditures in the medium and long term.

The End-of-Life Vehicle Recycling Law was revised in February 2012, and newly designated lithium-ion batteries and nickel-metal hydride batteries as items for advance collection before dismantling of end-of-life vehicles. Mazda is committed to collecting lithium-ion batteries installed in vehicles launched in and after October 2012 through the LiB Joint Collection System of Japan Auto Recycling Partnership, Ltd. The Company also independently collects nickel-metal hydride batteries installed in the Axela (Mazda3 overseas) Hybrid (launched in November 2013).

In order that the related supplier safely recycle vehicles installed with lithium-ion batteries and nickel-metal hydrate batteries as well as deceleration energy regeneration system capacitor, Mazda published the disposal work procedure on its website and promotes appropriate disposal.

[▶ Reference website \(Japanese only\) for Mazda's efforts with regard to the End-of-Life Vehicle Recycling Law](#)

End-of-Life Vehicle Recycling Process



Resource Recycling Results in FY March 2022

Number of vehicles from which ASR is collected	129,770 units	
Number of vehicles from which airbags are collected	118,837 units	
Number of vehicles from which fluorocarbon is collected	118,939 units	
Recycling ratio	ASR	96.5%
	Airbags	95.2%
Recycling ratio for ELVs*	More than 99%	
Total contracting deposits received	1,556,426,986 yen	
Total expenses for recycling	1,482,568,896 yen	

(Includes separate cost required at Mazda)

* Recycling ratio for ELVs is the recycling ratio in dismantling/shredder processes of around 83% (cited from the May 2003 joint council data), plus the remaining ASR ratio of 17% multiplied by the ASR recycling rate of 96.5%.

[▶ Status of resource recycling initiatives \(Japanese only\)](#)

ASR and the End-of-Life Vehicle Recycling Law in Japan

Disposed vehicles consist of about 80% useful metal and about 20% automotive shredder residue (ASR) that includes resin.

Useful metal is recycled in cooperation with metal recycling-related companies such as dismantlers, crushing/shredding contractors, and steel manufacturers. With regard to ASR, which used to be disposed by landfill, is now subject to the End-of-Life Vehicle Recycling Law, which was enforced in January 2005.

This is due to the rise in the risk of illegal dumping of end-of-life vehicles on the back of a surge in disposal costs due to overstrained final landfill sites and weakness in iron scrap prices. After the enforcement of this law, car manufacturers are required to recycle ASR, chlorofluorocarbons—which lead to global warming and ozone depletion—and airbags—which require specialist knowledge for disposal—under their responsibility, using recycling fees deposited by final owners of the ELVs.

*1 Automobile Shredder Residue

It refers to the residue remaining after the crushing/shredding of what is left of the vehicle body following the removal of batteries, tires, fluids, and other parts requiring appropriate processing; the removal of engines, bumpers, and other valuable parts; and the separation and recovery of metals.

*2 ART: Automobile shredder residue Recycling promotion Team

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Promoting Recycling of End-of-Life Vehicles Overseas

Mazda is committed to the recycling of end-of-life vehicles overseas in accordance with the laws in each country and region, under the initiative of the local distributors. As for countries in which recycling-related laws are planned to be established, Mazda is preparing to respond in cooperation with the distributors in such countries.

As well as vehicles for domestic use, in order that the related supplier safely recycle vehicles installed with lithium-ion batteries and capacitors, the Company published the disposal work procedure on its website and promotes appropriate disposal.

[▶ Reference website for Mazda's efforts with regard to recycling of end-of-life vehicles overseas](#)

Europe

Based on the EU Directive, Mazda Motor Europe provides a dismantling manual to recycling contractors when introducing a new model and has established a network to collect used vehicles from their final owners free of charge, in cooperation with the distributors in each country.

China

A law was enforced in January 2015, in accordance with which local manufacturers are managing substances with environmental impact and developing dismantling manuals.

Promoting the Collection and Recycling of Used Parts in Japan

Mazda is continuously engaged in the recycling of damaged bumpers replaced for repairs as plastic materials for new vehicle bumpers, etc.

- Recycling of damaged bumpers: Mazda collects bumpers removed for repairs at dealerships throughout Japan, and recycles them for reuse as plastic parts (new vehicle bumpers, undercovers, etc.). In FY March 2022, the Company collected 47,939 bumpers, which were utilized as recycled materials.

 Amount of recycled parts (P115)