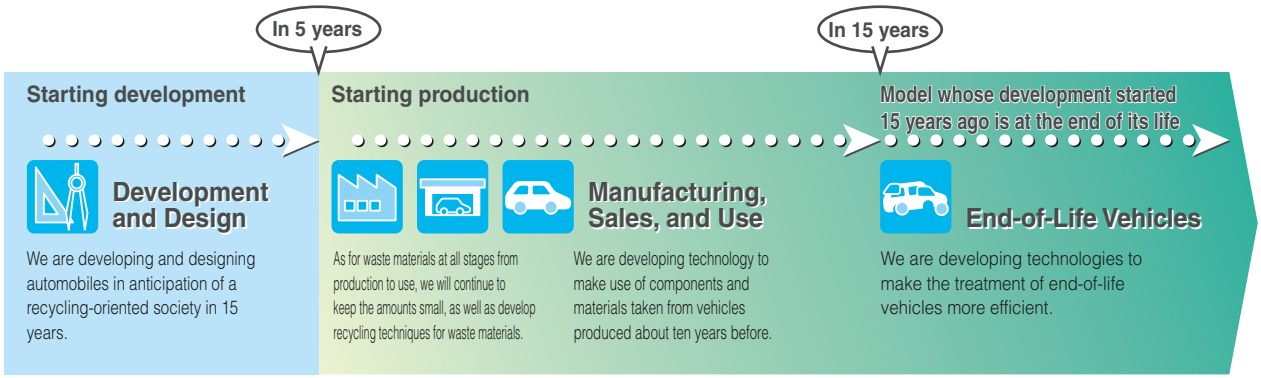
Recycling Activities

FHI has established the Automotive Recycle System of Subaru (ARSS*2), shown to the right, as part of active efforts to recycle and properly dispose of end-of-life vehicles (ELVs*1), according to the Japanese End-of-Life Vehicles Recycling Law (hereinafter referred to as the ELVs Recycling Law) which came into force on January 1, 2005. The recycling ratio of ASR*3 in fiscal 2005 was 70.0%, marking a top position among automobile manufacturers and satisfying the Japanese legal standard required for fiscal 2015. We will continue efforts to keep the recyclability of Subaru automobiles at a constantly high level, as well as aim at further efficiency improvements and low-cost recycling in order to minimize the recycling fee paid by our customers.

Out Future Efforts



Efforts in the Design Stage to make Recycling Easier

(1) Emphasis on Design Allows Easy Recycling

In order to utilize limited resources, Subaru has set up the Recycling Design Project Team. It researches easy-to-dismantle parts and vehicles and easily recycled parts structure and materials, gives feedback on the development and design of future vehicles, and makes efforts toward reducing the amount of ASR generated.

①Recycling Market Research

The team members continuously visit dismantlers, shredding companies, and waste disposers in various parts of Japan to exchange views on the current and future market trends for ELV treatment. The results are used to determine the principles for designing automobiles with due consideration for recycling and extract detailed subjects for future research.

②Efforts toward the Reduction of ASR

ASR includes a huge variety of materials and chemical substances used for manufacturing automobiles, and these materials consist of a complex mix.

Consequently, the team members completely dismantled, disassembled, and analyzed vehicles to identify the reasons ASR is generated, and then created the ASR Calculation Guideline for calculating the amount of ASR generated from a vehicle. Also the Recycling Design Guideline was reviewed and improved to prevent the generation of ASR. These guidelines are utilized for the development of Subaru automobiles.

③Efforts to Improve Recyclability

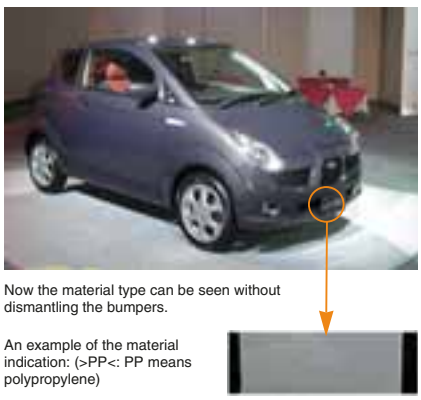
Advances in Wire Harness Dismantling (Picture 1)

Because a large amount of copper is used in a wire harness, if the wire harnesses can be removed before the ELVs are shredded, the collection and separation of iron and copper will be enhanced and their value in terms of resource recycling will increase. FHI is conducting studies for a harness layout and automobile structure that make it possible to effectively collect more iron and copper and in a shorter time.

Picture 1 : Wire harness dismantling experiment

Easier Material Identification (Picture 2)

It is most important that the material of each part can be recognized easily when we recycle. FHI started to identify the type of material on plastic parts in 1973 even before guidelines for the industry were established. Material identifications had been attached on the rear side of each part before, but the position was changed as we believed we could avoid such wasteful actions as “dismantling a part only to realize it was the wrong one” if we could confirm the material type without having to actually dismantle the part. FHI has changed the identification positions on all car models, including the Legacy, R2 and R1.



Picture 2 : Example of easier material identification (an example of Subaru R1)

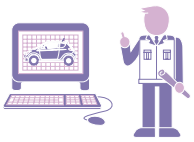
*1 : ELV: End of Life Vehicles
*2 : ARSS: Automotive Recycle System of SUBARU
*3 : ASR: Automobile Shredder Residue : Residue after scrapped metals for recycling removed from shredded car body

Subaru's Automotive Recycling System

The Process from New Product Development to Distribution

Subaru Group

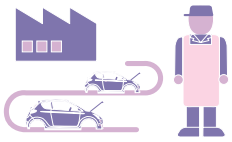
Development
- Design that allows easy recycling
- Reduction of substances with environmental impact



Research Experiments/Servicing

Proper disposal of airbags
- Study of workability
- Measurement of man-hours

Production
- Recycling of waste generated from plants
- Utilization of waste material from other industries



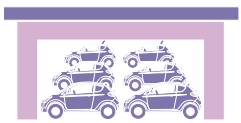
Information on vehicle equipment and outfitting

Information on proper disposal of airbags

Distribution/ Subaru Customer Service Center

Vehicle delivery information

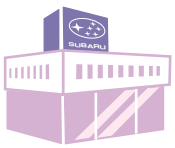
Delivery
- Reduction of substances with environmental impact on delivery



ARSS
(Automotive Recycle System of Subaru)
- Settlement of recycling charges/Information management of recycling charges
- Information management of vehicle equipment and outfitting
- Information management of proper disposal
- Information management of delivery data
- Information management of money on deposit
- Information management of income and expenditures

Information about the recycling charge deposit

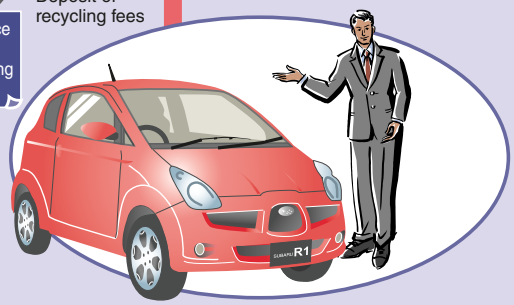
Distribution
- Handling of recycled and used parts
- Collection of the scrapped bumpers



Money on deposit for recycling

Deposit of recycling fees

Issuance of Recycling Ticket



Information of vehicle maintenance, deliveryt, and charges

Money on deposit for recycling

Japan Automobile Recycling Promotion Center

Japan Auto Recycling Partnership

Automobile shredder residue Recycling promotion Team (ART)

Dismantling ELVs

Companies that accept ELVs
- Check information on vehicle equipment and outfitting

Collection report Delivery report

Delivery of ELVs

Companies to collect fluorocarbons
- Collection of Fluorocarbons
- Delivery to Fluorocarbon Destruction Operator

Collection report Delivery report

Payment for dismantling

Delivery of ELVs

Dismantlers
- Proper disposal of Airbags

Collection report Delivery report

Payment for dismantling

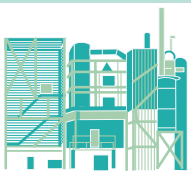
Delivery of dismantled ELVs

Crushing companies
- Separation of shredder dust and metals

Collection report Delivery report

Delivery of shredder dust

Recycling companies
- Recycling of ASR



Payment of dismantling fee

Flow of information | Flow of money | Flow of material

④Efforts to Improve Proper Disposal

ELVs Recycling Law also regulates the proper disposal of substances with environmental impact, particularly fluorocarbons (refrigerants for air conditioners) and airbags. Concerning future vehicle development, FHI recognizes the essential need to produce vehicles that can be disposed of more easily.

Reduction of Fluorocarbons Used in Air Conditioners

FHI uses a substitute fluorocarbon, HFC134a, for refrigerants in air conditioners, which does no harm to the ozone layer, but which is still believed to accelerate global warming. Active countermeasures include reducing the amount of HFC134a, and minimizing leakage of HFC134a, which can occur while air conditioners are in use. We are also conducting research into substitute refrigerants other than fluorocarbons.

Advances in Airbag Disposal

Airbags and pretensioner belts contribute significantly to reducing the shock to drivers and passengers in automobile accidents. On the other hand, the vast majority of automobiles are put out of service with unused airbags. Because automobile manufacturers are asked to dispose of airbags and similar products under the ELVs Recycling Law, we are conducting research into the optimal structure for airbags, including related components, that will make it safer and easier to activate them in automobiles and subsequently dispose of them.

(2) Reducing Substances with Environmental Impact

We are committed to curtailing our use of substances with environmental impact at an early date, not only to reduce the damage to the global environment, but also to remove the need for complicated recycling equipment and operations for ELV treatment. We think it is necessary to reduce substances with environmental impact; consequently, we are making efforts to promote the recycling of parts and materials.

①Introduction of IMDS*1

IMDS (International Material Data System) is an environmental information database system developed by German Automobile Industry Association and other related parties to manage substances with environmental impact and to calculate recyclable ratio. After introducing IMDS in fiscal 2003, Subaru started to research part of Subaru models and in 2005 all models became the subject of research. We will continuously strive to ensure that we will be successful in meeting the requirements on December 2008, when the recyclable ratio becomes a legal requirement in Europe.

②Reduction in Use of Lead

For compact cars, the amount of lead has already been reduced to less than one-tenth of the 1996 industry average. We will continue these efforts in respect of all our car models.

③Response to the Voluntary Activity Plan of the Japan Automobile Manufacturers Association, Inc.(JAMA)

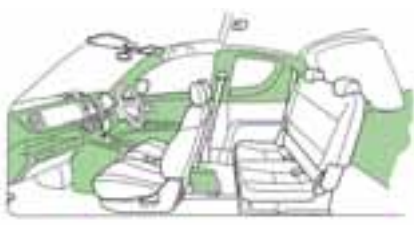
We have been promoting the reduction of mercury, cadmium, and hexavalent chromium in accordance with the "Substances with an Environmental Impact - Voluntary-activity by the Japan Automobile Manufacturers Association, Inc." (issued by JAMA in December 2002). As a result, we have successfully eliminated the use of mercury (excluding exempted items) and cadmium in all our car models. As for hexavalent chromium, we will continue our efforts towards its "complete elimination", scheduled for December 2007.

Efforts in the production stage

(1) System for Grade Integration of PP Plastic

Previously, a great deal of waste was generated in our materials manufacturing, compounding, and parts mold-processing procedures since we had different grade mixes of PP materials depending upon the parts. In order to keep such waste to a minimum, we promoted the integration of PP grades. Each integrated material for bumpers and interior parts has been applied to most vehicle parts. We are going to further improve efficiency for making plastic materials easier to recycle.

■How Integrated Materials for Interior Parts are Used (R1)

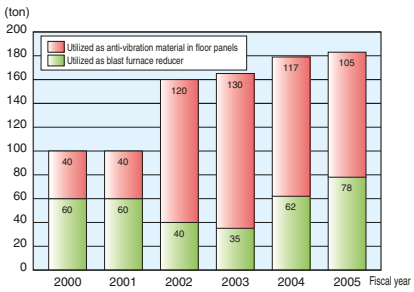


Green parts: Integrated materials are used in these parts.

(2) Recycling Waste Materials (Paint Sludge)

We found a way to recycle paint sludge from the paint factory. We are recycling paint sludge as anti-vibration materials for vehicle floor panels and as blast furnace reducer. We are also considering recycling it for other uses. As for recycling of paint sludge, our 2002 Environment Report, "Paint Sludge Recycling Plant" (see p.30) explains the process in detail.

■Amount of Paint Sludge Recycled



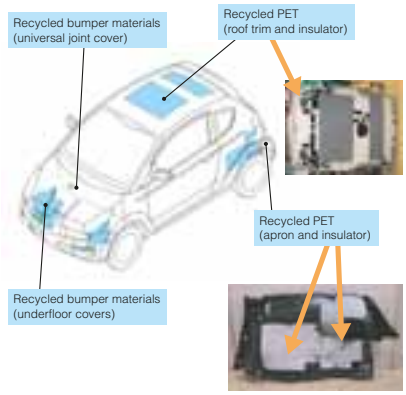
Paint sludge: Waste produced during the surfacer and the top coat in the car painting process. (Paint that did not adhere to the vehicle body)

(3) Utilizing Other Industrial Wastes

Continuous efforts

FHI will actively utilize recycled materials generated by industries other than the automobile industry. For waste materials generated in manufacturing plants, we are also promoting development of technology so that we can recycle and utilize the waste materials from vehicle manufacturing.

■An example of Utilizing Recycled Materials in Model R1 Mini car

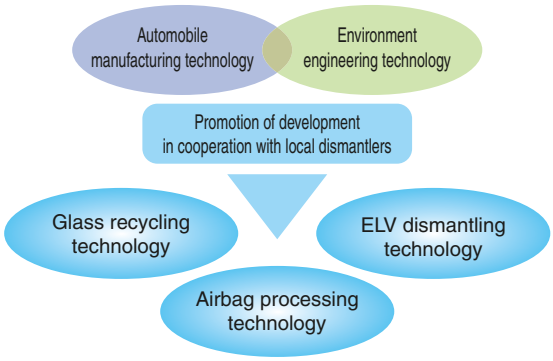


*1 : IMDS stands for 'International Material Data System', and is a system that meets global standards for measuring substances contained in parts, etc., that have an environmental impact.

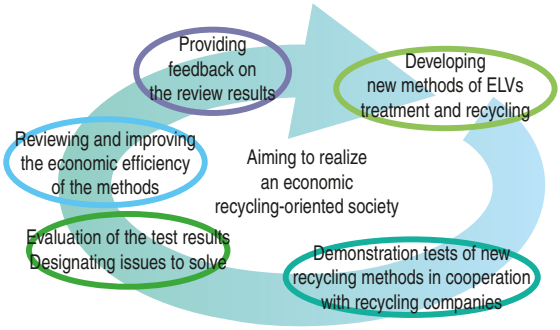
Disposal of End-of Life Vehicles (ELVs)

FHI is conducting research and development for the improvement of the recycling processes cooperating with companies that process ELVs. The results of joint development are made public in order to contribute to the realization of a recycling-oriented society.

We are contributing to the coming recycling-oriented society by taking advantage of our technology.



In order to avoid complacency, we aim to achieve the best recycling methods by making evaluations in cooperation with other recycling companies.



Developing Automobile Window Glass Recycling Technology

Most of the automobile shredder residue from ELVs is landfilled, but FHI believes that collecting and recycling window glass of automobiles, which currently accounts for approximately 20% of the shredder residue, will contribute significantly to waste reduction and bring certain advantages.

[Advantages of glass recycling]

◆ASR generation can be reduced
⇒Of the 3Rs (reduce, reuse, and recycle) of ASR, reduce, which contributes most to decrease waste, is achieved.

◆Recovery rate of ELVs can be increased
⇒Promote improvement of the recovery rate (more than 95% in 2015)

◆Recyclers' burden can be mitigated
⇒By removing glass from ELVs, the press, shearing, and crushing machines used for ELVs recycling will wear less, thereby reducing maintenance costs

FHI started studying a method for recycling side-door glass into glass wool in January 2000, and developed devices for glass collection, windshield crushing, and inner-film separation, thus establishing collection and reuse technologies for these types of glass into automobile window glass. We worked with 12 dismantlers and three flat glass manufacturers in 2003, and then in 2004 started the cost reduction and infrastructure maintenance required to incorporate collection, recycling and reuse jobs into monthly routines. We will make efforts in the future to organize infrastructures that expand and institutionalize the collection and recycling of glass within the entire automobile industry.

■Tool Manufacturers

Company Name	Location
Makita Corporation	Anjo City, Aichi
Lobtex Co., Ltd.	Higashi-Osaka City, Osaka

■Dismantlers

Company Name	Location
Car Steel Co., Ltd	Maebashi City, Gunma
Nagano Automobile Recycling Center Co-op	Tobu Town, Nagano
Ibajihan Recycling Center Co., Ltd.	Minori Town, Ibaraki
Tsuruoka Co., Ltd.	Oyama City, Tochigi
Metal Recycling Co., Ltd.	Kawashima Town, Saitama
Showa Metal	Koshigaya City, Saitama
Keiaisha Co., Ltd.	Yokohama City, Kanagawa
Renaissance Co., Ltd.	Kimitsu City, Chiba
Nippon Auto Recycle Co., Ltd.	Toyama City, Toyama
Sanomaruka Co.	Fujinomiya City, Shizuoka
Shinsei Co., Ltd.	Mihara Town, Osaka
Mitsui Bussan Raw Materials Development Co.	Sakai City, Osaka

■Windshield Collection Method

Glass is cut with a circular saw and collected.

Tool durability has been improved by adopting a sawtooth tool with a carbide tip and changing the physical-safety cover part into a bearing.

■Side-door Glass Collection Method

Glass is crushed with a hammer and dropped into a dish underneath.

Foreign material mixing prevention is improved.