

Vehicle Recycling.

Focusing on Sustainability.



Sustainability is a key word at every point in the BMW Groups process chain, from the development of energy-saving alternative vehicle concepts and environmentally sound production processes to environmentally friendly recycling.

The BMW Group acknowledges that used cars are a particularly important source of secondary raw materials and by closing the gaps in the material cycle through recycling, we aim to make a meaningful contribution to the conservation of natural resources.

BMW Group



Longstanding Involvement in Environmental Protection. Sustainable Business.



The BMW Group has been actively involved in efficient recycling concepts for many years. The aim of our recycling process is to reclaim resources and materials contained in vehicles quickly and comprehensively in order to fill the gaps in material cycles and thus to use resources as sparingly and efficiently as possible.

Protecting the environment and natural resources.

At the beginning of the 1970's, the BMW Group anchored environmental protection policy within its organization. Sustainable business is a main principle in both the Group's corporate strategy and culture. Product responsibility also entails the environmentally compatible recovery of vehicles that have reached the end of their viability. The activities of the BMW Group to continuously optimize recycling are centred in BMW Groups own Recycling and Dismantling Centre (RDC). This is currently the world's leading facility of its kind and is an authorised treatment facility.

In addition, the RDC also provides important information for dismantling and drainage techniques, as well as creating recycling concepts for future vehicles. Whilst in the past the recycling focus lay on the environmentally responsible recovery of end-of-life vehicles, in recent years the increased scarcity of natural resources has lead to a change in focus.

Renewable raw materials.

As raw materials, natural fibres represent a high-grade alternative to synthetic fibres. They have good mechanical properties, are light in weight, yet strong and their use can relieve the environment. This is why the BMW Group uses natural fibres and other natural products whenever this makes technical, ecological and economic sense, for example the BMW Group uses natural fibres in door panels and sound-proofing.

Life cycle assessment.

The BMW Group aspires to take into account the ecological implications of vehicle components throughout the life cycle. In order to do this, the BMW Group applies an instrument known as Life Cycle Assessment (LCA).

This involves assessing alternative materials and component concepts from the start of the development process and throughout the entire product life cycle, from the retrieval of raw materials through the utilization phase to recovery. The environmental impact is analyzed on the basis of categories such as global warming potential or acidification potential.

Legal Framework.

Return Obligations, Recovery Targets, Use of Materials.



The EU directive concerning end-of-life vehicles (2000/53/EC) has been in force in all EU member states since 2000. Among other things, the directive specifies that the manufacturer must accept end of life vehicles (ELV) back from the last owner without charge. Car manufacturers are therefore obligated to carry all, or a significant part, of the costs associated with ELV recycling.

Redemption and recovery.

In the early 90s, long before statutory regulations, the BMW Group had already started to establish a widespread network of centres in the EU for the acceptance and recycling of vehicles. Every ELV that BMW Group customers return to these centres is processed by an authorised treatment facility. For the BMW Group, responsibility for the entire life cycle of their products also means taking care of used parts, operating fluids and sales packaging. These are collected by the national sales organizations according to country-specific programs in the relevant markets.

Definition according to EU directive for end-of-life vehicles 2000/53/EC.

Reuse means any operation by which components of end-of life vehicles are used for the same purpose for which they were conceived

Recycling means the reprocessing in a production process of the waste materials for the original purpose or for other purposes but excluding energy recovery.

Recovery means a suitable process for ensuring that waste is recovered without endangering human health and without the use of processes or methods likely to harm the environment. Regeneration of acids is an example of a recovery operation.

Use of materials and re-use rates.

As well as prohibiting certain materials such as Lead and Chromium (VI), the EU regulations also define in detail the secondary processing of certain vehicle components and resources. The directive (2005/64/EC) also requires that, from 2008 onwards, new vehicles should reach a recycling target level of 85 percent and a recovery target level of 95 percent by 2015. This is a prerequisite for the type-approval of all new vehicle types from the end of 2008 onwards.

Use of recycled materials.

As part of the BMW Groups target of closing the gaps in the material cycle, components produced from recycled materials are used in vehicles. This demonstrates the ecologically and economically rational use of secondary raw materials. Currently 15% of plastic parts approved for BMW Group production vehicles are made of recycled materials, for example recycled materials are used in underbody paneling, rear shelves, fuel tanks and wheel housings.

Recovery of BMW Group End-of-Life Vehicles. Process Overview.

Vehicle Acceptance.



- Vehicle Assessment

Vehicle Identification.



- Collation of documents to accompany vehicle
- Determining extent of dismantling work
- Recording into Software
- Issue of certificate of destruction

Removal of Core Scrap.



- Engine, transmission, possibly axles

Dismantling.



- Marketable used parts
- Marketable materials

Compacting.



Transfer to Shredder

Neutralization of Pyro-technic Devices.



- Airbags, Seat belt tensioners, etc.

Removal of Hazardous Materials.



- Substances according to Dir 2000/53/EC Appendix I
- Removal of battery, halogen bulbs, etc.

Removal of Vehicle Fluids.



- Removal of all operating fluids
- Ensuring there are no drips

Shredding Process.

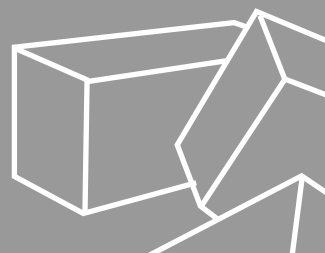


- Grinding
- Sorting
- Classification

Post-Schredder Technologies (PST).



- Preparation of individual materials like aluminum, copper and plastics



Large-Scale Industrial Trial by BMW Group.

Recovery Target 95 Percent.



In a large-scale trial in 2007/2008 involving 501 current pre-series vehicles, the BMW Group proved that it already meets the high future standards defined for reusability, recyclability and recoverability.

Pre-treatment .

The pre-treatment of the 501 pre-series vehicles took place in a certified BMW Group facility - the Recycling and Dismantling Center (RDC). The legal basis for this process is found in EU directive 2005/64/EG (type approval). The legal requirements are the neutralisation of all pyrotechnical components, such as airbags and seat belt tensioners, the individual removal of each operating fluid (oils and fuels) and the separation of hazardous materials (e.g. batteries and xenon headlights). In the large scale trial only components with a demand in the market place were dismantled. Examples of these are, depending on their condition, the wheels or front and rear lights.

Shredding process.

After the remains of the body shell were compacted in the RDC, the resulting bailed scrap metal was transported to a shredder for further processing. This shredder was used to grind the scrap, after which the shredded material was classified and sorted. Large-scale industrial techniques are available for this, such as magnetic separators and cyclones. This means that the metal components in the remaining body shell are almost completely separated.

Preparing the shredder residue.

Post-shredder technologies (PST), such as flotation separation, eddy currents, multi-level classification and screening are used to retrieve more materials. This ensures correct separation and consistent quality, while also permitting use as a secondary raw material.

Result.

In this large-scale industrial trial the BMW Group has shown that their products are already prepared for future challenges in terms of sustainable business in the automotive industry.

Conservation of Resources.

The Contribution of Development and Design.



During the vehicle development and design process, the BMW Group implements a variety of measures aimed at the efficient and ecologically sound recovery of products that have reached the end of their life cycle.

Designing towards the future.

The BMW Groups “Design for Recycling” is a compilation of vehicle- and component-specific concepts for the reclamation processing of vehicles at the end of their life. For example, all fluid-carrying components in the vehicles are designed to enable quick and easy removal of all operating fluids, such as oil, fuel, brake fluid and coolant.

Pyrotechnical components (airbags, belt tensioners, etc.) are designed so that they can be triggered in a controlled way, using the onboard diagnostic interface as per ISO standard 26021. This considerably simplifies and shortens the dismantling and recovery process. The corresponding directives for engineers are set down in a BMW Group internal standard.

Closing the gaps in the material cycle.

Separation and the possibility of producing secondary raw materials of a consistently high quality are prerequisites for all material re-use. The post shredder technology (PST) enables these requirements to be met. Thus, most metals and plastics can after subsequent processing, be re-used as a secondary raw material.

Future challenges.

In the future, there will always be new demands for further action. Thus, innovations in terms of alternative drive concepts, such as electric engines and the use of hydrogen, will need to be evaluated and appropriate recycling processes and technologies need to be developed for them.

Information on the Internet:

BMW Group
www.bmwgroup.com

Sustainability
[www.bmwgroup.com/
responsibility](http://www.bmwgroup.com/responsibility)

Publications of the BMW Group

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