

Car Recycling and Producer Responsibility in Sweden

Nils Hernborg

BIL Automobile Producer Responsibility Sweden

ABSTRACT

BIL Automobile Producer Responsibility Sweden (BPS) is the automobile industry's organisation for producer responsibility in Sweden. The company is wholly owned by Swedish automobile manufacturers and importers, organised under the name BIL Sweden. BPS was founded in May 1999 with the aim of supporting the members of BIL Sweden in producer responsibility and recycling issues. BPS works with companies, industries, universities and other skill centres in Sweden and abroad to find suitable processes and markets for recycled material from cars, and to develop tools and methods for rational handling. In this paper we wish to inform you about our experience so far.

INTRODUCTION

RECYCLING IS NATURAL

Recycling materials and components is nothing new in the automobile industry. Since huge amounts of raw materials are consumed during manufacturing, maintenance and repairs, recycling has long been a natural part of the process, for both financial and environmental reasons. Even at the drawing table and in choosing materials, today's manufacturers strive to design cars taking recyclability into consideration. In the long run, the entire chain from manufacturing to dismantling, scrapping and recycling will be less expensive and more environmentally conscious.

SOCIETY'S GOAL

Sweden's Eco-Cycle Bill of 1993 and the regulation on producer responsibility, that went into effect on 1 January 1998 clearly indicated society's desire for more restrictive use of resources. In autumn 2000 the EU approved a frame directive for end of life vehicles. The directive is to be implemented in the member countries' national laws no later than April 2002.

The Swedish regulation requires that as of 2002 up to 85% of a scrap car's weight must be recycled, and as of 2015 up to 95%.

Swedish legislation already meets most of the demands of the EU directive. The difference lies in the date by which the goals must be achieved and the distribution of financial responsibility.

ORDINANCE ON PRODUCER RESPONSIBILITY FOR VEHICLES

issued on 23 October 1997

The Government prescribes the following.

1 § The term vehicles according to this ordinance has the same significance as in the Vehicle Register Ordinance (1972:599), i.e. passenger car, bus or truck. However, a vehicle which has a gross vehicle weight in excess of 3500 kilograms or which is equipped with runners or tracks is not covered by this ordinance.

The term producer in this ordinance denotes anyone who commercially produces vehicles in Sweden or imports vehicles into Sweden.

2 § A producer is responsible for accepting for scrapping end-of-life vehicles that the producer has manufactured in or imported into Sweden if the vehicles are registered in accordance with the Vehicle Register Ordinance (1972:599).

A producer shall accept free of charge an end-of-life vehicle in accordance with the first paragraph if the vehicle has been registered for the first time in accordance with the Vehicle Register Ordinance (1972:599) after 31 December 1997. A producer may notwithstanding demand reimbursement if the vehicle

1. has economically valuable parts such as engine, gearbox or other comparable parts missing, or
2. has been equipped to a significant extent with parts from someone other than the producer, and these parts are difficult to re-use or recover.

3 § A producer shall facilitate for anyone who wishes to hand over vehicles to the producer in accordance with §2, and shall designate suitable places for the reception of such vehicles.

The producer shall provide the Swedish National Environment Protection Agency with information on these receiving places.

4 § A producer who has received a vehicle in accordance with §2 is responsible for ensuring that the vehicle will be handled for scrapping in accordance with the rules in the Vehicle Scrapping Act (1975:343) and regulations issued on the basis of the Act.

5 § In order to facilitate re-use and recycling, a producer shall provide information on the materials, components and chemical products included in the vehicles that the producer has manufactured in or imported into Sweden. The producer shall ensure that vehicle dismantlers in accordance with the Vehicle Scrapping Act (1975:343) have access on reasonable terms to instructions relating to dismantling and drainage.

6 § When vehicles are scrapped in accordance with the Vehicle Scrapping Act (1975:343), the producer who has manufactured or imported the vehicles into Sweden shall ensure that the materials and components from the vehicles are re-used, recovered or disposed of in some other environmentally acceptable manner.

The producer shall ensure that the materials and components shall primarily be re-used if this is justified from the environmental aspect. Material recovery shall otherwise be given precedence before energy recovery.

7 § A producer shall ensure that the following targets for re-use and recovery in accordance with §6 are achieved:

- at least 85% no later than up to and including the year 2002, and
- at least 95% no later than up to and including the year 2015.

The percentages specified in the first paragraph shall be calculated on the basis of the "tjänstevikt"¹ of the vehicle in accordance with the Vehicle Register Ordinance (1972:599) and shall represent an average per producer per year.

¹ Corresponding to "weight in running order" (note by the translator)

8 § A producer is responsible for supplying the Swedish National Environment Protection Agency with information on the way in which vehicles handed over to the producer, in accordance with §2, are disposed of in accordance with §6, and on other circumstances that the Swedish National Environment Protection Agency needs in order to check that the re-use and recovery levels specified in §7 are achieved.

The Swedish National Environment Protection Agency may issue additional regulations on this responsibility for submitting information.

9 § Anyone who deliberately or negligently fails to comply with §2, §4 or the first paragraph of §8 will be fined.

Anyone who has contravened a fine penalty or an injunction under penalty of a fine in accordance with the Public Cleansing Act (1979:596) will not be charged with having contravened this ordinance for an act covered by the penalty or prohibition.

10 § §24a of the Public Cleansing Act (1979:596) includes provisions governing the liability of anyone submitting incorrect information on circumstances that are of importance.

11 § Provisions concerning supervision of compliance with this ordinance are given in §21 - 23 of the Public Cleansing Act (1979:596).

12 § The Swedish National Environment Protection Agency may issue any further regulations necessary for the implementation of this ordinance.

This ordinance comes into force on 1 January 1998

NETWORK OF COLLECTION STATIONS

To ensure environmentally sound processing of scrap cars, Swedish manufacturers and importers have built up a network of reception sites throughout the country. They are modern dismantling facilities that guarantee dedicated quality and environmental work. The dismantling stations must be authorised by the county administration board council and follow applicable laws and regulations. In addition, they must meet special demands from the automobile industry, which assure a collaboration that benefits the manufacturers, the dismantlers and other affected industries and customers. The requirements touch on areas such as the organisation, interior and ambient

environment, testing and quality assurance, storage, sales and availability of the dismantling stations.

ENVIRONMENTAL TREATMENT

Dismantling starts with draining all the fluids from the car – oil, wiper fluid, brake fluid, glycol and coolant. Then the battery, balance weights and components containing mercury and lead are removed. Batteries and lead are recycled, while components containing mercury are sent for destruction or controlled disposal. Fluids that cannot be reused, primarily motor oil are sent for energy recovery at specially licensed companies.

REUSE

An important part of recycling is reuse – repairing cars with second-hand and renovated parts. An economical way to save both energy and raw materials. The parts that are replaced are sent for recycling or renovation.

DISMANTLING

Next, the catalytic converter, tyres and other reusable components are removed. Undamaged parts are placed in a warehouse for eventual resale. The warehouse is usually computerised, with specification on the age and origin of each component so the customer gets the exact right item. Special rules apply for safety-related components.

SHREDDING

What remains after draining and dismantling is compressed and sent to be shredded. Magnets, air blowers, water and manual sorting are used to separate the materials and sort out non-recyclables from the metals. After this, the metals are sent to melting furnaces to be returned to raw-material form, and the cycle is complete.

ENERGY RECOVERY

Stena Gotthard Fragmentering together with Volvo, will demonstrate a solution to recycle shredder residue from all complex end-of-life products involving

1. the implementation of a quality assurance system for supply of complex scrap supplied from car dismantlers, scrap yards and the communities by eliminating hazardous and other disturbing materials at the source.

2. the recovery of more metals from the shredder waste by combining existing and new technologies for the metal separation
3. the elaboration of a well specified energy fraction from about half of the waste based upon the experience and with support of the Inst. of Environmental Chemistry at Umeå University.

The results so far in the area of energy recovery have been largely fulfilled as well as the overall objective

- by converting part of the shredder waste into a fuel fraction specified within limits and keeping especially the hazardous substances at low levels to comply with new EWC-class for light shredder fluff 191003
- by reducing the rest fraction going to land fill from 25% to about 15%.

The analysis of the fuel fraction respectively fines fraction will most likely meet with the new EU-requirements for non hazardous light shredder fluff.

CAR RECYCLING MONITORING SYSTEM

BACKGROUND/PURPOSE

Monitoring of vehicle recycling, reuse and recovery is important to governments, vehicle manufacturers, suppliers, recyclers, dismantlers and shredders. It's important because it serves to verify materials diverted from landfill, recycling rates of a high volume, consumer product and can be used to ensure compliance with regulatory requirements. Monitoring of car recycling can be used to calculate market based recycling rates, the percent of materials sent to landfill, or it can be useful in identifying materials or processes, which need improvement or additional research.

CORE COMMON CONCEPT FOR MONITORING

We use a concept of common monitoring elements, which includes reporting from manufacturers, Swedish National Road Association, dismantlers and shredders. These reports are gathered by BPS for consolidating and summarizing to prepare a monitoring report for submission to the authorities and use by manufacturers and dismantlers.

The terms that need to be in the defining equation are as follows:

Parts reused + Materials recycled + Energy recovered + Landfill = 100%

BPS QUALITY AND ENVIRONMENTAL MANAGEMENT SYSTEM

The BPS Quality and Environmental Management System is intended to serve as an aid for a car dismantler to introduce a quality and environmental management system in his company, without the need for major input from consultants.

The system is adapted to suit car dismantlers and corresponds to the requirements for agreements to be concluded with the automotive industry for the reception of cars at the end of their life cycle. The company can be certified as conforming to the provisions of ISO 9001:2000, ISO 14001 and the working environment legislation.

FUNCTION OF THE SYSTEM

The company management is responsible for planning the work, providing resources, introducing ways of working that conform to the law, regulations and agreements with customers, and following up to determine whether the system performs as intended and, if necessary, ensure that the operations are improved. The handbook is the tool in which the organization, way of working and following-up are described, and in which all important documents are stored.

The BPS system describes the way of working needed to achieve systematic improvement. By introducing and maintaining the way of working of the system, the company receives continual information concerning present and new laws and customer requirements, and implements these in its own operations.

The BPS system ensures that the company receives continual knowledge on the requirements of customers, new legislation, the employees and the surroundings, and that the requirements are processed by the company management, which ensures that the requirements will be introduced in the operations of the company.

BPS SYSTEM DOCUMENTATION

The system documentation contains descriptions of the company, its business mission, organization, undertakings, responsibilities, rights, personnel resources, policy, objectives and plans. The company's processes are described in the form of quality plans that comprise what needs to be ensured,

who is responsible and the documents used, and where and for how long these are kept.

Quality plans are established for the following areas: Laws and updating, management work, improvement work, document control, outdoor environment and safety, working environment, and for the auditing of quality and environmental management.

STANDARDS

The BPS system and associated work methodology contain all activities necessary for conforming to the provisions of ISO 9001:2000 and 14001, as well as national working environment requirements.

BENEFITS OF THE BPS SYSTEM

The descriptions and method of implementation are matched to the car dismantling industry and are based on process-oriented quality plans for the various fields of activity, and also careful follow-up and improvement of the competence of all employees. This eliminates the need for routine descriptions and the extent of the associated documentation so that it will be clearly arranged, and simple to learn and to maintain. The experience gained so far shows that the project time for a small company can be shortened to less than half the usual time, i.e. from about 24 to 12 months, and that the work of maintaining the documentation can easily be carried out within the existing administration.

The need for consultant assistance and the company's own work during the build-up phase are also less than half the usual time for certified quality and environmental management systems.

Most of the work input can thus be concentrated to training the car dismantler employees and to understanding the way of working, quality work and environmental work.

While carrying out the work, the company employees undertake environmental investigation, environmental risk analysis, examination of their own working environment, customer investigations, studies of what should be ensured in the company, how this is to be done, by what laws and regulations the company is affected and how these are complied with, and they also receive instruction on how the company's operations are related to the immediately surrounding and global environments.

TECHNICAL DEVELOPMENT

The way of describing systems and operations and the implementation method can easily be transferred to other neighbouring operations, such as car workshops. The BPS system supports the company's quality and environmental work, so that the operations are systematically improved and reduce their environmental loading by putting to use improvement opportunities offered by employees, customers, own mistakes, new laws, and the requirements and ideas received from car manufacturers.

FINDING A MARKET IS CRUCIAL

The difficulty is that recycled material is generally more expensive than the original raw material. Refining or converting it into new products can create new markets, but the key is finding a market for the end product that is financially profitable for the companies involved in the process.

Glass is an example of material that has minor market possibilities in Sweden, while Italy, with its huge wine exports, uses recycled glass to manufacture wine bottles.

Trials are also underway to produce fuel of materials that are not practical or economical to recycle as material, such as plastic, rubber and textiles. If the fuel is clean enough, it could be used as a replacement for other fossil fuels.

According to the EU directive, 85% of the car's weight must be recovered by 2006 and 95% by 2015. Energy recovery must not exceed 5 and 10% respectively.

Finally, the rest must be disposed of or destroyed under controlled conditions. All players are working to make this part as small as possible.

CONCLUSION

After one year of operation we have developed the organization as an estimated resource for the Swedish car Manufacturers and Importers. Important elements in this development have been:

- the development of a network of approved car dismantlers fulfilling the special demands from the automobile industry as well as the demands in applicable laws and regulations
- the development of a national reporting system accepted and appreciated by all concerned bodies

- the development of a fruitful co-operation with all concerned industries and authorities
- the development of the forms of co-operation with a Competence Centre to find suitable processes and markets for recycled material from cars, and to develop tools and methods for rational dismantling and handling
- the development of a cost efficient Quality- and Environmental Management System tailored for the dismantling Industry in Sweden, a system that can lead to certification according to international quality- and environmental management standards.

Our aim is to contribute to ensuring a high international Standard in the Swedish system for handling scrap cars.

We are now following and taking an active part, as a reference group, in the implementation of the ELV-Directive in the Swedish laws and regulations.

We are also working in some different projects, together with the Competence Centre and other concerned industries, to find cost efficient systems and methods with good working environment for the employees, to reach the stipulated recycling targets.

ACKNOWLEDGMENT

The author thanks the members of the project team recommending BIL automobile Producer responsibility (BPS) as a separate organization. Special thanks also to Hannelore Grill, working as assistant in the BPS organization, for her support in the work of formulating this paper.

REFERENCES

1. ECRIS- A research project in environmental car recycling 1994-1998. Report No. 98:17.
2. Environmentally Compatible Car Recycling with Producer Responsibility in Practice. (A Paper prepared for the total Life Cycle Conference, April 1997)