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Working Group on Waste Prevention and Recycling

HOW TO APPLY ENVIRONMENTALLY SOUND MANAGEMENT TO SMALL AND MEDIUM SIZE ENTERPRISES

Case Study: Dismantling of End-of-Life Vehicles in the Netherlands

3rd Workshop on Environmentally Sound Management (ESM) of wastes
Washington D.C., 20-22 March 2002

This paper was submitted to the Delegates of the Working Group on Waste Prevention and Recycling and participants to the third workshop on Environmentally Sound Management of Wastes for consideration in March 2002.

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FOREWORD

At the second Workshop on Environmentally Sound Management of Wastes (ESM) in September 2000 considerable interest was expressed in an OECD framework that would enhance industry progress toward sustainable practices by emphasising the use of existing Environmental Management Systems (EMS), such as ISO 14 000 series and the European Eco-management and Audit Scheme (EMAS). It was recognised that EMS could play a role in promoting the application in practice of ESM guidelines. However, it was emphasized that any ESM system making use of such EMS would also have to provide approaches that small and medium size enterprises (SMEs) could implement.

At the October 2001 meeting of the Working Group on Waste Prevention and Recycling an extended outline was provided concerning a study on "How to Apply ESM to small and medium size enterprises [ENV/EPOC/WGWPR/RD(2001)2]. The study is composed of three case studies and a synthesis report. Case studies look at car dismantling in the Netherlands, pre-treatment and recovery of electronics in Austria and dismantling of ships in Canada.

This case study on dismantling of end-of-life vehicles in the Netherlands has been prepared mainly by Mr. Kees Wielenga, FFact Management Consultants, Braine l'Alleud, Belgium. It provides an in-depth analysis on the possibilities of car dismantlers to implement the core performance elements of the ESM guidance developed for the OECD purposes. This version incorporates the comments from the Members of the ESM Steering Group.

Member countries recommended the declassification of this paper in December 2002. It is released on the responsibility of the Secretary General of the OECD.

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1. INTRODUCTION

The Organization for Economic Co-operation and Development (OECD) has made considerable efforts over the last 30 years in development and promulgation of international policies to promote Environmentally Sound Management (ESM) of wastes. In the OECD context ESM could be defined as: 'a concept for ensuring that wastes, and used and scrap materials are managed in a manner which will save natural resources and protect human health and the environment against adverse effects which may result from the management of such wastes and materials'.

Recently its Working Group on Waste Management Policy (WGWMP) has organized two workshops to discuss the scope and future promotion of ESM in particular for recoverable wastes. These workshops, held in October 1999 in Cancun, Mexico and in September 2000 in Vienna, Austria, focused on the different aspects related to ESM and in particular it was recognised that an important goal of an ESM program would be to:

1. develop high level guidelines/standards in order to foster sustainable development (in particular encouraging waste minimisation, including recovery) and
2. achieve a more level playing field for the environmentally sound management of wastes and used and scrap materials within the OECD countries.

Certainly, numerous questions regarding the scope and content of ESM still remain, however, progress was made in identifying a possible framework:

1. The principal focus of an OECD ESM programme should be on recovery. However, to maximise resource efficiency, recovery should not be addressed in isolation and there may be a need to touch upon some upstream or downstream issues because of their link to enhancing environmentally sound recovery.
2. An OECD ESM programme should be designed to be useful for both domestic and transboundary applications and it should address both the hazardous and non-hazardous wastes and used and scrap materials.
3. An OECD ESM framework should have at least two basic components.
 - One component would focus on enhancing industry progress toward sustainable practices by emphasising the use of existing Environmental Management Systems (EMS), such as ISO 14000 series and EMAS. However, any ESM system making use of such EMS would also have to provide approaches that small and medium enterprises could implement.
 - Another component would consist of ESM guidelines, including "core performance elements," to be used in conjunction with EMS, specifically relating to treatment and recovery activities. The core performance elements may be quite general in nature, pertaining to the management of many types of hazardous and non-hazardous wastes and materials, covering collection, re-use, recovery and disposal of residues. More specific guidelines may be necessary for certain problematic waste and material streams.

The concept of ESM should focus on treatment and recovery installations as a priority and on application of core performance elements by these installations to assure ESM of recoverable waste and materials.

Until now relatively little emphasis has been placed on the practical application of ESM by the treatment and recovery facilities. In this context it is important to bear in mind that most of these activities are performed by small and medium sized enterprises (SMEs), which would require specific support in relation to the knowledge of environmental requirements, training, investments in innovative technology and implementation of Environmental Management Systems. To shed more light into these questions a study will be carried out by a consultant to examine the applicability of ESM to SMEs.

On the basis of three case studies the mechanisms underlying the implementation of environmental requirements will be illustrated. These case studies cover the dismantling of end-of-life vehicles (ELVs) in the Netherlands, the pre-treatment and recycling of electrical and electronic equipment in Austria and dismantling of ships in Canada. This report describes the dismantling of ELVs in the Netherlands.

The conclusions from the case studies will feed in to a synthesis report that will give a more general overview of the factors that influence ESM implementation by the SMEs.

2. SCOPE AND OBJECTIVES

The case study will identify the factors that influence the possibilities of SMEs to implement ESM. There is no world-wide harmonised definition of SMEs. A recommendation from the Commission from 1996 the EU provides a definition based on number of employees, annual turnover or total balance sheet and independence. For these the following criteria are included.

Table 1: Definition of SMEs (recommended by the EU)

Definition of a small and medium-sized enterprise (SME)			
Criteria	Micro-enterprise	Small	Medium
Number of employees	< 10	<50	<250
Annual turnover or total balance sheet	---	< €7M < €5M	< €40M < €27M
		NO MORE THAN 25% OF THE CAPITAL OR VOTING RIGHTS ARE HELD BY ONE OR MORE ENTERPRISES WHICH ARE NOT THEMSELVES SMES	

As far as possible these definitions will be used in the report. However, this is not the only definition of SMEs. Others may use thresholds of companies with less than 100 or 500 employees to define SMEs.

The case study will give answers on the following questions.

1. What mechanisms make that SMEs implement measures to comply with requirements of environmentally sound management?
2. What is the role of Environmental Management Systems in this context?

3. What are the most difficult elements to implement?
4. How can these difficulties be overcome?

Information will be gathered to describe how this sector managed to implement the environmental requirements and which activities from the sector itself as well as of other actors (authorities, professional organisations, market players) influenced this. To that end information will be gathered on aspects such as:

- Structure of the sector (number of enterprises, size, volume of the activities, economic key figures);
- Rate of organisation and role of professional organisations;
- General information on the technologies used;
- Environmental requirements and standards;
- Legal and policy framework;
- Enforcement activities;
- Dissemination of information and training activities;
- Financial instruments (taxes, levies and subsidies); and
- The use of Environmental Management Systems.
- Requirements for market players.
- Costs involved in the implementation of Environmental Management Systems

This information will be assessed in view of meeting the proposed ESM core performance elements according to the status per October 2001. These include the following:

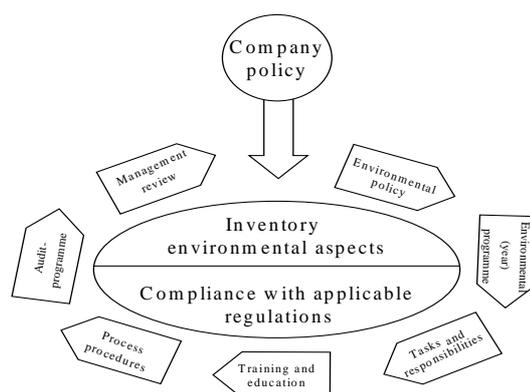
1. an adequate regulatory infrastructure and enforcement should exist to ensure compliance with applicable Regulations
2. the facility should be appropriately authorised/permited/licensed on adverse environmental effects
3. the facility should have taken appropriate measures to ensure that requirements for occupational health and safety are met
4. the facility should be appropriately certified under an applicable environmental management system (EMS)
5. the facility should have an operative monitoring and reporting programme
6. the facility should have an operative inspection and recording programme for all input and output materials

7. the facility should have appropriate house and record keeping
8. the facility should have an appropriate and verified emergency plan
9. the facility should have an appropriate and operative training programme for the personnel
10. the facility should have an adequate financial guarantee for emergency situations and closure
11. the facility should have a system in place for the exchange of information on quality requirements with waste producers.

Since October 2001 some modifications to these elements have been proposed. In the context of the case studies these modifications could not be included anymore. However, the abovementioned list contains the essential elements and these have been assessed.

For the analysis the following model will be used.

Figure 1: Analysis model



This model is derived from the implementation cycle of environmental management systems and contains the steps companies undertake to analyse their environmental performance and implement actions to ensure compliance with applicable regulations and improve their environmental performance.

The conclusions of this case study will feed into a synthesis report, together with the conclusions of the other case studies. This should provide the OECD with information on the practical implications of implementation of ESM by SMEs.

3. ECONOMIC KEY DATA

3.1 Economic Activities

The Netherlands is a densely populated country of 15 million inhabitants. The national GDP is 421 billion € in 2000 which makes it the 14th most important economy of the world (Worldbank). Over 70% of the GDP is generated by the services sector. The total number of enterprises in 2001 in the Netherlands is approximately 700.000 (CBS, kernstatistieken). CBS uses definitions that differ slightly from the EU definitions. It is clear, however that the vast majority of enterprises in the Netherlands are SMEs.

Table 2: Number of enterprises in the Netherlands according to size

Category	Number employees	Number of enterprises	Percentage of enterprises
Small	< 10	640.500	91%
Medium	10 – 100	54.600	8%
Large	> 100	6.600	1%
Total		701.700	

3.2 Waste Management Sector

Waste management activities include collection, pre-treatment and preparation for recycling as well as composting, incineration and landfilling. The generation of waste (from households and from business) was 56 Mton in 1998, of which 75% was recycled, 15% incinerated (with or without energy recovery) and 10% landfilled (Ministry of VROM). Table 3 gives some key figures for the waste management sector, of which the turn over represents approximately 1.5% of the total GDP of the Netherlands.

Table 3: Key data of the waste management sector in the Netherlands

	Total treatment	Pre-Preparation for recycling	Other waste, total	Of which	
				Other waste recovery	total
Number of companies	1300	283	600	145	1728
Number of employees	5200	2778	19491	3410	11388
Turnover M€	2450	620	3325		6395
Profitability %	<5	2.1	4	-1	< 5
% micro companies	90	49	57	61	84%
% small companies	10	49	39	25	15%
% medium sized companies	0.3	2	4	13	1%
% large companies (>200)	0	0	1	1	

Source: CBS: Statline 2001.

In this table pre-treatment includes activities such as sorting, dismantling, baling of recyclables. It therefore includes activities of the car dismantling sector. Preparation for recycling includes shredding, sorting of pre-treated fractions etc. Other waste recovery activities include composting, production of granulates from construction and demolition waste, production of Refuse Derived Fuel etc, but excluding collection, incineration and landfilling. These last three are included in the column other waste, total.

The turnover of the activities covered by the column 'other waste recovery' is not known.

Profitability for these sectors is based upon estimates in the sector and data on benefit before tax data from CBS. Profitability is defined as % of benefit before tax of the total turnover. To attract external investment typically a profitability of over 10% is required. Profitability of the activities is therefore generally low.

The data show that waste management are nearly exclusively SMEs. In these statistics CBS uses 200 employees as threshold between medium size and big enterprises. The other thresholds are in line with the EU definitions. However, CBS does not take into account that an enterprise may have more than 25% of their capital or voting rights held by a company that is not an SME.

A more detailed analysis of the main characteristics of the car dismantling is provided in the next chapter.

4. MAIN CHARACTERISTICS OF THE CAR DISMANTLERS

Dismantling of ELVs is an activity that has been taking place for a large number of years. Traditionally the sector was focussing on two types of activities:

- Trade of metals for recycling
- Dismantling of spare parts for re-use.

In recent years two new types of activities have become important as well:

- De-pollution: removal of liquids and components containing hazardous substances to reduce the environmental impact of dismantling and recycling.
- Selective dismantling of certain materials and components in view of enhancing the recycling rate of ELVs.

The activities of car dismantling involve a high input of labour. Most of the activities are done with relatively simple (hand)tools. De-pollution should take place on a part of the facility with liquid proof flooring and preferably inside a building. These are the main investments for car dismantling.

In particular de-pollution and dismantling for recycling have been developed over the last years due to the introduction of a voluntary system for extended producer responsibility, organised by the organisation Car Recycling Netherlands (ARN). The car dismantlers operating within this system will be called ARN-enterprises in this report.

4.1 Number and Size of the Enterprises

There are very little key figures available for the sector. The figures for 2000 as far as they are known indicate the following.

A recent survey of the European Ferrous Recovery and Recycling Federation (EFR) indicated that the total number of car dismantling facilities in the EU that have this activity as their main economic activity is approximately 8300 (excluding garages or petrol stations that occasionally handle ELVs). Some 5000 of these are considered to be 'recognised de-polluters', that is that these facilities remove hazardous substances from the ELVs apart from the normal activities such as removal of parts for re-use and trade of hulks. The number of facilities with dismantling as an auxiliary activity is much higher, but very little data are available on their activities.

For the car dismantling sector in the Netherlands ARN provides the following data.

Table 4: Number and size of car dismantling companies

	ARN enterprises	Other enterprises
Number of enterprises	267	± 550
Share of enterprises	30%	70%
Number of ELVs dismantled	287.000	39.000
Number of ELVs / enterprise	1075	62
Share of ELVs dismantled	88%	12%

(source ARN, 2001).

The total number of enterprises in the sector is around 800. This is the number of facilities that have a licence as dismantler of ELVs, completed with other enterprises in the database of the commercial register that indicate dismantling of ELVs as one of its economic activities. CBS also provides data on the number of car dismantling enterprises. In their statistics they use the number of 390 enterprises. This figure includes those companies that have dismantling of cars as their main activity, including all ARN-enterprises. A relatively large number of facilities with a licence do not dismantle any cars or dismantle only occasionally. The companies not included in the ARN system are either very specialised companies (e.g. only dismantling relatively new cars available after car accidents) or enterprises for which car dismantling is not the main economic activity.

There are very little data on number of employees in this sector. The data from CBS indicate that 99% of the enterprises in the sector have less than 10 employees and therefore should be considered as micro enterprises. Based upon a calculation related to the distribution of size classes of car dismantling companies provided by CBS using an average number of employees per size class¹, the total number of employees would be around 1060. This estimate does not taking into account e.g. temporary staff and members of the family of the owner working in the company. An estimate from EFR (personal communication) was that the average dismantling facility of 1000 ELVs would have 5 employees. Since the total number of dismantled ELVs was 326.000 in 2000 the number of employees would be around 1600. This is probably a better estimate than the CBS figure since it also takes into account facilities that dismantle cars as auxiliary activity. Using the EFR estimation for the EU, the sector would involve some 46.000 employees.

¹ Enterprises with no employees: 1 person, 1-5 employees: 3 persons, 5-10 employees 8 persons, 10 – 20 employees: 15 persons.

An average car dismantler in the Netherlands dismantles around 1000 ELVs per year. This is a similar size as e.g. in Germany, France and the UK. In Austria, Belgium, Ireland and Sweden an average car dismantler is smaller (round 500 ELVs per year) (EFR, 2001).

4.2 Turnover

Most of the economic key data such as turnover and number of employees are included in the statistics of broader categories of economic activity. The professional organisation of dismantlers of ELVs also has very little reliable data on these issues. There are therefore no published data on turnover of the sector. ARN estimates that the average profitability of the car dismantling sector is not better than for the recycling sector as a whole. Therefore a profitability of maximum 5% seems to be the best indication for an average car dismantling company.

4.3 Rate of Organisation

The professional organisation of the dismantlers of ELVs is called the STIBA. This organisation has 227 members. Of these STIBA members 179 are also working for ARN. The STIBA represents more than 80% of activities (in terms of dismantled ELVs) in the Netherlands.

4.4 Environmental Key Figures

On OECD level very little data are available on the total numbers of ELVs and the management of these. The total number of new cars put into circulation in 2000 in Europe is estimated to 14 million (source: BIR). The number of ELVs in 2000 is estimated to be at least 9.2 million (source: EFR). It is expected that the number of ELVs will rise to over 13 million in 2015.

The main environmental issues related to car dismantling are the rate of de-pollution, the circumstances under which this de-pollution takes place and the total rate of recycling of ELVs.

Under normal economic circumstances an ELV would be handed over to a dismantler or a collection yard. Some cars contain parts that are suitable for re-use and these are removed. The hulk is sold to a scrap trader or a shredder. The metals will be separated during the shredding process and will become available for recycling. Without any further regulation, only the metals would be recycled and no de-pollution would take place, since it involves costs but does not generate extra benefits.

There are no data on the rate of de-pollution of ELVs in the EU. In the Netherlands the rate of de-pollution is estimated to be over 95%. This includes all ARN enterprises and the bigger non ARN enterprises.

This means that more than 95% of the ELVs are handed over to a dismantler that effectively removes the liquids and other hazardous components on a liquid proof flooring and with adequate storage of the removed pollutants. Of the remaining ELVs it is not certain that adequate de-pollution takes place.

On the basis of the average weight of an ELV is 900 kg² this implies that the ELVs currently account for 8.3 Mton of material. Approximately 75% of this weight consists of metals, which are

² In the Netherlands the average weight of these ELVs was 879 kg in 1997, 887 kg in 1998 and 896 kg in 1999. (ARN, 2000). It is assumed that this is more or less representative for Europe.

generally recycled by the metal industry. It is therefore estimated that the recycling rate of ELVs in Europe is approximately 75% and that 25%, or a little over 2 Mton of shredding residues are landfilled (EC). There are no EU wide data to support this estimate. Data from Austria, which are represented in Table 5, go into the same direction.

Table 5: Development of the recycling of ELVs in Austria.

Recycling of ELVs	1993	1994	1995	1996	1997	1998
Number of ELVs	90.000	103.000	115.000	105.000	91.000	96.000
Estimated weight (tons)	81.000	93.000	104.000	95.000	82.000	86.000
Shredder residues (tons)	16.000	20.000	23.000	25.000	23.000	25.000
Recycling rate (%)	80	78	80	74	72	71

(Source: WKÖ)

These figures also indicate that the recycling rate seems to have a tendency of going down. This is due to the change in composition of the cars, with a reduction of the share of metal and an increase in the share of plastics.

In the Netherlands the rate of recycling increased over the last years, even though also here the share of metals was decreasing. This was due to the introduction of the ARN system requiring selective dismantling of certain non-metallic components for recycling. Details of this system are provided in chapter 5. Since 1999 the total recycling rate of ELVs in the Netherlands is 86%.

The EU adopted a directive (2000/53/EC of 18 September 2000) requiring 85% recovery (of which at least 80% recycling) of ELVs by the year 2006. For the year 2015 95% recovery (of which at least 85% recycling) should be achieved. To achieve these targets recycling of non-metal components of ELVs and recovery of shredding residues will be necessary. The system in the Netherlands already meets the recovery and recycling targets for 2006 and also meets the recycling target for 2015.

4.5 Use of Environmental Management Systems

None of the enterprises in the sector of dismantling of ELVs in the Netherlands are certified with ISO 14.000 or EMAS for their dismantling activities. A limited number of companies have ISO 9002 certification for their activities related to the sales of spare parts, for which a separate certification system is operational.

However, the use of environmental management systems is very widespread in the sector. These systems are set up by the sector itself, including all main elements of ISO 14.000 and EMAS.

The most important system is developed by ARN and dismantlers who want to join ARN and to get paid via the ARN premium system are required to have a certificate according to this system. This is issued by an independent accredited certification body. All 267 enterprises working for ARN have obtained this certificate. Details of this environmental management system are included in appendix I.

Another system was set up by the STIBA in the beginning of the 90's. However, this system is not widely used anymore, since most enterprises using this system are now working for ARN and had to implement the EMS system required by ARN.

It can be concluded that approximately 90% of the ELVs are dismantled in the Netherlands by enterprises that have an operative environmental management system certified by an independent accredited certification body.

The ARN system includes elements from ISO and EMAS such as the environmental programme, attribution of tasks and responsibilities, training and awareness raising, provisions for corrective action and compliance with applicable legislation. The main difference is that the focus of the EMS developed by ARN is on practical measures to be taken in the facility. There is less emphasis on some of the more procedural aspects of EMS and on parts of EMS such as formulation of an environmental policy and the management review. Due to the small size of the dismantling enterprises there is less need to do so. Direct instructions are more effective than requiring implementation of certain procedures in these types of enterprises.

Also in other EU countries certification is a well established practise within the car dismantling sector. EFR estimated in a recent overview that more than 5000 companies can be considered as certified dismantlers. However, only a limited number of companies is registered as having ISO or EMAS certification. The criteria for qualification as certified company are not harmonised.

5. IMPLEMENTING OF ENVIRONMENTAL REQUIREMENTS BY THE SECTOR

The car dismantling sector had developed over a long period of time without implementing requirements to protect the environment. E.g. liquids were removed from the ELVs only when these could be sold. Apart from the metals that were recycled, most other materials ended up in landfills. Most of the activities took place in the open air and without measures to protect the soil and water against pollution.

Traditionally the activities were located at the borders of larger cities, which were in a large number of cases not suitable for industrial activities. E.g. they were located in areas destined for the extraction of drinking water or in places of natural interest.

The number of enterprises with the required permits was limited. Even when there was a permit, the requirements in the permit were hardly ever enforced.

A number of enterprises developed in the context of what could be called the informal economy, without any normal business administration and workers with no or very low qualifications.

At the beginning of the 80's the Netherlands identified this as a problem. It took, however nearly ten years to set up a programme and start tackling the problem. This involved a complete restructuring of the sector. Two phases can be distinguished in this process.

In the period 1989 – 1995 the so-called wreck policy programme was implemented. As a result of this programme the enterprises in the sector got the necessary licenses and a large number of enterprises disappeared.

In the period from 1995 onwards a system of extended producer responsibility was implemented by the industrial body ARN (Car Recycling Netherlands).

The main objective was implementation of environmental requirements. The enterprises in the sector are all micro-enterprises or small enterprises. Therefore specific emphasis was put on mechanisms that would allow the sector to comply with these changing requirements. In this chapter the main characteristics of the two phases in the process of change will be described.

5.1 The Wreck Policy Programme (1989 – 1995)

To tackle the problem of uncontrolled activities with ELVs the ministry for the Environment started its wreck policy programme in 1989. Until 1989 the local government was responsible for issuing permit and enforcement of environmental requirements. Since 1981 the provinces had the obligation to prepare a specific waste management plan for dismantling of ELVs, but this planning obligation was a failure due to lack of political interest, and lack of staff and money. Also the fact that the local government used the sector in its policy for employment of socially weak groups was hampering an effective implementation of environmental requirements. The local governments were too closely involved with the enterprises to tackle the problem and the provinces did not have the means or the interest to intervene.

This changed in 1989 with an amendment of the Waste Management Act when the provinces became responsible for permitting and enforcement of the environmental aspects of the sector. At the same time the ministry of the environment started a financing programme in which the provinces could get financial support for the implementation of the so-called wreck policy programme. This programme had both environmental and economic objectives. These were to obtain an economically strong and fully licensed sector that would be able to dismantle all ELVs in an environmentally sound manner. These objectives should be reached within a period of 10 years.

The environmental focus of the programme included implementing measures for the protection of soil and groundwater, the sound management of environmentally hazardous substances from ELVs and the management of other wastes.

The economic objective aimed at ensuring that the enterprises would have sufficient size and expertise to provide for an economic basis for the environmentally sound dismantling. In the beginning of the programme it was estimated that on the long term only 400 – 500 bigger and well equipped facilities would remain.

On the basis of an agreed plan of action provinces could get support for the following type of measures:

- Set-up and running of provincial and local collection points for ELVs
- Giving a financial premium for dismantlers that would on a voluntary basis stop their activities or re-allocate their activities to an appropriate site.
- Cover the costs of provinces they could not recuperate from enterprises that they would need to force to stop business.
- Support to employ on a temporary basis additional staff in the provinces for the execution of the programme.

In 1996 the results of the programme were evaluated (IME,1996). At the beginning of the programme it was estimated that there were 2100 active facilities. After a better inventory in the first years it was concluded that this number in reality was a little over 1700. Only 60 of them had a permit. Table 4

gives an overview of the development of the number of facilities in the Netherlands and the number of facilities with a permit as a result of the wreck policy programme.

By the end of the programme, at the beginning of 1996, the total number of facilities was 812 of whom 756 had a permit.

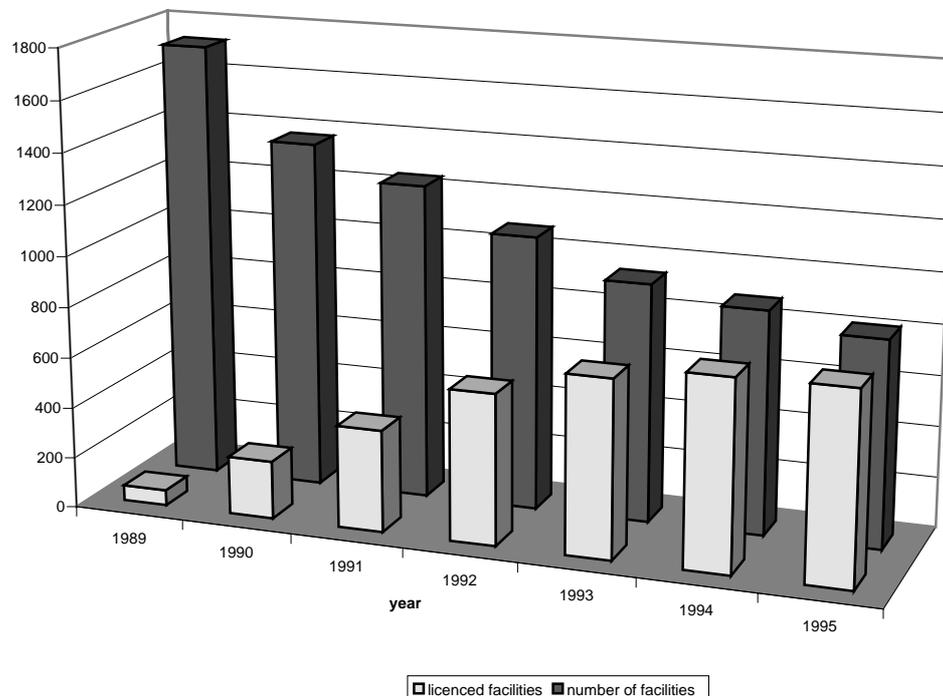
During the programme an indicative survey of soil pollution on 1.000 locations and 9.000 visits of facilities by permitting authorities and enforcement agents had taken place.

The licensed facilities were required to remove hazardous liquids and components from ELVs and had implemented measures for safe handling of hazardous substances had invested in measures for soil and groundwater protection. However, not all the facilities were required to clean-up historical soil pollution. This was only required in cases where the pollution was important in size and where pollution of the groundwater was to be expected.

For the envisaged 10 year period the ministry had put in place a programme of €65 million. When the programme ended after 6 years approximately €24 million was spent.

The biggest part of the money used in the programme (55%) went to premiums for voluntary termination of activities, involving 795 facilities. The average premium was in the order of €16.000. Only in 32 cases facilities had to be closed by legal action. The non recoverable costs for the provinces of these operations amounted to an average of €25.000 per facility.

Figure 2: Development of the number of facilities and the number of licensed facilities.



The results of the wreck policy programme largely contributed to easing the path for the implementation of the targets for the improvement of the recycling performance of the sector and therefore were an important factor for success for the scheme for extended producer responsibility.

5.2 The ARN System: Dismantling of ELVs for Recycling (from 1995 onwards)

The wreck policy programme focussed on getting the environmental performance of dismantling of ELVs into grip. At the beginning of the 90's the government also initiated its priority waste programme. This aimed at defining, in a dialogue with all stakeholders, targets and implementing measures to improve prevention and recycling of waste. The whole programme consisted of projects for 31 priority waste streams, one of them being end-of-life vehicles. As a first step an information document was made in which the facts and figures regarding the problem were determined. The second step consisted of a strategy document indicating the objectives and possible ways of tackling the problem. The third step was the adoption of an implementation plan identifying the activities needed to achieve these objectives and indicating whom would be responsible for action. Also the monitoring of implementation was addressed in these implementation plans. All three steps were aiming at getting consensus with all stakeholders.

For end-of-life vehicles the growing amount of waste going to landfill was identified as the main problem. At the beginning of the 90's the recycling rate was estimated at 75%, mainly recycling of the metal. Due to the change of composition of the ELVs this percentage was expected to go down over time.

Moreover, due to the fluctuations in the price of scrap metal and the increasingly tight environmental requirements as regard de-pollution of the wrecks, protection of soil and management of hazardous substances and wastes, it could no longer be guaranteed that end-of-life vehicles could be handed over without cost for the last owner. This could lead to situations where the last owner would be tempted to abandon his car in nature in stead of bringing it to a dismantling facility.

The implementation plan, agreed upon by all stakeholders, fixed a target of 86% recycling to be reached in 2001. It also aimed at setting up a structure by which the industry would take care of dismantling all end-of-life vehicles without cost for the last owner. This scheme of extended producer responsibility was organised by ARN (Car Recycling Netherlands) on the basis of a voluntary agreement between industry and the authorities.

5.3 Organisation and Financing Scheme

ARN was founded by five organisations representing the industry: BOVAG (dealers), FOCWA (maintenance and repair), RAI (producers and importers), STIBA (dismantlers) and SVN (shredders), all having members in the board of ARN. The representative of the shredding enterprises (SVN) is no longer member of the board, but still intensive contacts between ARN and the shredding enterprises exist. ARN is a not for profit organisation (a foundation) in which the founding organisation decide on the policy. The operational tasks of ARN are executed by a limited company working under the supervision of the foundation.

ARN decided to make use of on the existing market structure and therefore started from the existing role of all parties involved. ARN focused on the coordination of the activities of the different actors needed to achieve the objectives. A system of registration, financing and control was developed to support these activities.

The parties involved in ARN decided to set up one collective system for all ELVs regardless age or brand. The main reasons for this were:

- Only one organisation needed to organise the system and the system only has to be invented once.

- Only one financing scheme is necessary.
- Economy of scale in negotiations with recycling partners, research for new technologies and promotion and information campaigns.
- Transparency to consumers who are not confronted with different systems of which they cannot understand the differences in environmental performance.

They also decided to use the existing infrastructure of dismantling and shredding. This had the following advantages:

- From the beginning ARN could cover all parts of the country and all end-of-life vehicles.
- It provided a fair basis for development of the dismantling sector.
- It provided the possibility to implement stringent quality requirements for the enterprises participating in the system.
- A uniform dismantling premium could be determined on the basis of verifiable cost estimations.

ARN finances dismantling activities and recycling activities in order to meet the environmental objectives. In order to be able to guarantee the free take back of all ELVs ARN needed a financing scheme. The income for this scheme is generated by a disposal fee, which is paid at the moment a car is put into circulation in the Netherlands. Cars can only obtain a registration plate if they are registered in a national registration system. This system makes it possible to control all cars entering the Dutch market. The parties involved in ARN can impose payment of the disposal fee for those cars that enter the system via their members. This is the case for more than 90% of all cars put into circulation.

However, nearly 10% of the cars are registered by individual persons. Without accompanying measures these would probably not contribute to the financing scheme and act as 'free riders'. Therefore the Minister for the Environment issued a legal obligation of the payment of the fee for all cars to be registered. This Ministerial Declaration of General Applicability is issued for a maximum period of three years and is renewable. The height of the fee is part of this Declaration and is determined by the parties involved in ARN on the basis of a calculation of the financial needs for the period of the fee. For the period 1995 – 1997 the fee was established at €115 per car. This was changed to €70 for the period 1998 – 2000. From 2001-2003 the fee is €45.

The last owner of the car is stimulated to hand over his car to a registered dismantler because only those can issue a certificate of destruction. Such a certificate is required to be able to deregister the car and to stop payments of ownership tax and car insurance. All enterprises within the ARN system have obtained the right to issue such a certificate.

5.4 Requirements for Dismantling and Results

The dismantling enterprises sign a contract with ARN to dismantle a certain number of materials (table 6). The dismantling of these materials is necessary to reach the objective of 86% recycling and to ensure removal of hazardous liquids and component. These activities are not profitable under normal economic conditions. Therefore ARN pays a premium for these activities on the basis of documented proof

that the activity has been done according to the specifications laid down by ARN. This ensures that these activities will take place and are done in a manner that meets the quality requirements.

Table 6: ARN materials and their recovery routes

Materials	Recovery route
De-pollution	
Coolant	Reclamation of glycol for use as coolant or solvent
Used oil	Substitute fuel
Brake fluid	Regeneration for use as brake fluid
Batteries	Acid: re-refining for use in metal electrolysis Lead: use in metal industry Plastics: use in battery cases
Fuel	Partly used by dismantling firms, partly used as fuel
LPG ³ -tanks	Use in metal industry
Dismantling for recycling	
Glass	Use as packaging or in glass-fibre reinforced plastics
Tyres	Re-treading or recycling as granulate
Inner tubes	Recycling of rubber
PU foam seats	Use in furniture or insulation material
Materials	Recovery route
Rubber strips	Thermal processing
Plastic bumpers	Use in plastics industry
Safety belts	Use as insulation materials or geo-textiles
Coconut fibre seats	Long fibers: used in mattresses and car seats Short fibers: use as insulation material
Windscreen washer fluid ⁴	Glycol: reclamation and use as solvent Alcohol: reclamation and use in industry
Radiator grilles	Selective dissolution and use in plastics industry
Indicators and rear lights	Selective dissolution and use in plastics industry
Hubcaps	Removal of metal and recycling of metal and plastics (pilot)

ARN has contracts with collection firms and recycling firms that ensure recovery according to high environmental standards. The contracts with ARN are established via a tendering procedure.

The amounts of the different materials removed and recovered were as given in table 7. These amounts of material would have entered the shredders and apart from some lead in the batteries have been disposed of with the shredder residue. Moreover, the environmental hazards of this residue would have been increased due to the presence of hazardous materials.

The average weight of ELVs was 906 kg in the year 2000. The average percentage of metal in the same year was 75%. As indicated in table 7 an additional 105 kg of material was removed per ELV. Approximately 100 kg of this material was recycled adding another 11% of recycling on top of the metal that was recycled via the shredders. Therefore the total recycling rate of ELVs was 86%.

³ Liquid Petroleum Gas

⁴ Depending on the composition, windscreen washer fluid may be a hazardous waste.

Table 7: Amounts of material recovered via the ARN scheme

Material	Amount per ELV	Amounts dismantled (tons)		
	Norm 2000	1998	1999	2000
Hazardous materials				
Coolant	3.6 kg	631	646	874
Used oil	4.9 kg	1064	1104	1267
Batteries	13.6 kg	2909	2947	3619
Brake fluid	0.3 kg	42	131	44
Fuel	5.0 kg	0	23	67
LPG-tanks	0.06 pieces	0	8	1
Non hazardous materials				
Glass	25.4 kg	5260	5835	6314
Tyres	27.3 kg	6746	6741	7962
Inner tubes	0.2 kg	103	94	45
PU foam seats	6.5 kg	1594	1548	1736
Rubber strips	7.7 kg	1655	1853	1980
Plastic bumpers	5.2 kg	878	1027	1319
Safety belts	0.4 kg	67	63	85
Coconut fibre seats	0.9 kg	124	95	83
Windscreen washer fluid ⁵	0.9 kg	169	148	166
Radiator grilles	0.8 kg	123	114	119
Indicators and rear lights	1.4 kg	237	263	303
Hubcaps	0.7 kg	60	140	161
Total	105 kg	23.660	24.779	28.145

ARN environmental report 2000

5.5 Costs of Dismantling

The costs of car dismantling are difficult to assess. The main costs are labour costs, since car dismantling is to a very large extent done without extensive mechanisation. There is also the need to have outdoor space for storage of hulks, an indoor facility for de-pollution and dismantling as well as covered storage of spare parts. The area where de-pollution takes place should have fluid-proof flooring. Some investment in equipment is required. The whole area should have a fence.

⁵ Depending on the composition, windscreen washer fluid may be a hazardous waste.

The removal of some of the hazardous materials from de-pollution may involve costs. Most of the other materials such as the removed spare parts, the hulk, and most of the materials removed for recycling would under normal economic circumstances have a positive value.

For a professional facility that has an adequate licence and is already equipped to de-pollute and dismantle spare parts ARN estimates that the additional investment to become an ARN facility would be around €35.000 per facility. This investment includes additional equipment for dismantling materials for recycling and investment in computer equipment and specialised software for the administration and control of dismantled materials.

For installations that still would have to invest in fluid-proof flooring and indoor dismantling the investment would be typically around €100.000.

Costs for the certification according to the ARN certification standard are difficult to assess, since it depends on the level of organisation already present in the facility. One of the elements of the ARN standard is the annual audit by a third party. On the basis of this audit the company may get its certificate. The costs for this audit and the certificate are €750 per company per year.

Removal and sales of spare parts and trade of the hulk are profitable and are therefore not supported financially by ARN. The de-pollution activities and dismantling of materials listed in table 6 are not profitable under normal economic circumstances and are therefore supported financially by ARN. Under the agreement with the government the industry had taken up the obligation to assure these activities as well as the free take back of ELVs. Without this financial support these activities would not take place or the dismantling facility would be obliged to require payment from the last owner upon acceptance of the ELV.

ARN did not opt for the possibility to finance the de-pollution and dismantling for recycling from the profits of trade in spare parts and the hulk, because there would be no incentives for the dismantler to do the activities and this would lead to problems with the enforcement.

Dismantlers can get payment on the basis of administrative proof of the dismantling activities. The control system put in place by ARN is based upon the number of ELVs dismantled, the norm amounts of the materials as mentioned in table 7 and the data from the input and output of materials in the (computerised) materials administration of the dismantler. For the year 2001 the average maximum fee for a dismantler was €90 per ELV if he handed over all the materials to a collector assigned by ARN. This amount includes the pure cost of dismantling of an efficiently working facility of average size including a small margin for depreciation of the investment in ARN equipment. On average 90% of this amount is paid, because some of the materials may be traded as spare parts (e.g. some tyres from ELVs may still be suitable for re-use, fuel may be used by the facility etc.).

The dismantling fees are evaluated on a three monthly basis though measurements at dismantling facilities and are adjusted if necessary.

The financing mechanism stimulates continuous improvement of efficiency of the dismantling process, because more efficient facilities will have less cost but still get the norm fee. Due to the adjustment mechanism fees tend to go down if the average dismantler becomes more efficient. On the basis of the latest survey the maximum dismantling fee for the year 2002 is established at €86.

ARN also assures the collection and recovery of all materials. This is done on the basis of a tendering procedure for the collection and recovery activities.

The wreck policy program, establishing the legal framework and enforcement, and the voluntary system set up by the industry via ARN resulted in a complete restructuring of the car dismantling sector in the Netherlands. Within a period of 10 years this sector developed from a situation where most of the activities took place in an uncontrolled manner generating considerable environmental problems into a sector that significantly contributes to the controlled management of ELVs in an environmentally sound manner.

6. FACTORS INFLUENCING SUCCESS

6.1 Factors that Influenced the Success of the Wreck Programme

Several factors influenced the success of the programme.

- The role of the professional organisation of dismantlers of ELVs.

In 1985 the STIBA was founded. This was the first professional organisation of dismantling enterprises. Until 1985 the sector consisted mainly of individual enterprises with a great deal of mistrust towards the authorities. Their interests were not represented and there was no co-operation possible between the sector and the authorities.

The enterprises gathered in the STIBA gave the sector a voice and due to its policy of co-operation played a key role in getting the acceptance by the sector of the changes.

- Enterprises took the opportunity to step out voluntarily.

A large number of enterprises were faced with a situation where there was no economic basis for the implementation of the necessary environmental requirements. They did not comply with the requirements of a new permit and could not invest in measures necessary to copy. Instead of trying to stay in the business until they were forced to stop they stepped out quicker. This had the advantage for the authorities that it was cheaper. At the same time the economic basis of the enterprises that remained was stronger.

- The authority that had to implement the measures got adequate means to do so.

The provinces got financial support for the activities that had to be carried out. This made it easy to overcome the problem of lack of political interest, which hampered the starting of the programme.

6.2 Factors that Influenced the Success of the ARN System

- The system was based upon consensus of all parties involved

The whole chain of industrial participants and the authorities agreed on the targets, the means and the responsibilities of the proposed solution of a scheme of extended producer responsibility supported by accompanying measures by the authorities.

- The use of the existing infrastructure was possible

The dismantling sector had already been restructured. A sufficiently large part of the enterprises did have the necessary licenses. Their level of implementation of measures to protect the environment was

adequate. The sector had the necessary level of professional skills to take up the new challenge of dismantling for recycling. This allowed the implementation of a system covering the whole of the territory, capable of handling in principle all ELVs under relatively high standards of operation within less than 2 years.

- The system is based upon an organisational structure and financing scheme where all participants have an economic incentive to participate

The last owner is stimulated to hand over ELVs to a certified dismantler, because this is without cost and allows him to stop payment of tax and insurance. The dismantler is stimulated to de-pollute and dismantle for recycling because a fee compensates these activities. Several control steps are included against fraud and to minimise cost.

7. HOW TO APPLY THE PROPOSED CORE PERFORMANCE ELEMENTS TO SMEs

The core performance elements are the main building blocks of the system proposed by the OECD of safeguarding ESM for waste recovery. On the basis of the information gathered on the sector of the case study the applicability of these elements will be assessed. The elements are those as formulated in October 2001.

1. An adequate regulatory infrastructure and enforcement should exist to ensure compliance with applicable Regulations

This element is very important for promoting the creation of a 'level playing field' among recovery facilities. It is also very important to ensure the effective implementation of some of the other core performance elements and for the implementation of measures to protect the environment. It is therefore essential for successful implementation of ESM.

For the car dismantling sector in the Netherlands the introduction of this infrastructure was one of the main factors that influenced the success of the wreck policy programme and of the ARN system that could build upon this. It also assures that the 'free-rider' problem is taken care of. If competing companies are allowed to operate under less stringent environmental conditions implementation of measures to protect the environment may become a competitive disadvantage. This is however an element that can not be influenced by SMEs. Its application is mainly the responsibility of the authorities.

2. The facility should be appropriately authorised/permited/licensed on adverse environmental effects

In OECD countries recovery facilities must apply for government authorisation. One of the main objectives of this authorisation is to assure that impacts on the environment and issues related to health and safety are adequately addressed. In combination with the regulatory framework and enforcement the authorisation and the requirements linked to this authorisation promote the implementation of ESM. It is therefore an important element to ensure the effective implementation of a number of the other core performance elements.

The application of this element is mainly the responsibility of the authorities.

There are no particular problems for car dismantlers to meet this requirement if the authorities put sufficient emphasis on issuing such authorisation and have an adequate program of enforcement activities.

3. **The facility should have taken appropriate measures to ensure that requirements for occupational health and safety are met**

These type of measures are important for the health and safety of the workers at the facility. They are also important for the people living and/or working near the facility. Typically these issues are covered by existing regulatory measures if a recovery activity involves specific health and safety risks (e.g. in the case where the facility handles asbestos or flammable substances). If there are no specific risks this may not be the case (e.g. for certain recovery activities with non-hazardous waste). Also the EMS normally would address concerns regarding occupational health and safety.

The licences of car dismantlers include some aspects addressing health and safety issues. Moreover, requirements on occupational health and safety are specified in the ARN certification system and are part of the certification scheme. Due to the fact that these measures are tailor made for the sector most dismantlers do not have particular problems in respecting these. For SMEs that do not get guidance the main barrier for meeting this requirement is lack of knowledge.

3. **The facility should be appropriately certified under an applicable environmental management system (EMS)**

An EMS helps companies to systematically address environmental issues in the day to day work as well as in the policy of the company. A number of the core performance elements are typically addressed in an EMS, such as the regulatory requirements and provisions of the licence and compliance, monitoring, recording and reporting and training and awareness raising. Having an EMS in place therefore reinforces the compliance with some of the other the core performance elements. If the implementation of the EMS is audited and certified by an accredited third party the implementation becomes verifiable.

All car dismantlers operating under the ARN scheme have implemented an environmental management system included the main characteristics of systems like ISO 14000 or EMAS. The system is tailor made for the sector and provides for concrete measures to be taken regarding environmental protection, occupational health and safety and organisational aspects. The system includes third party certification. However, the elements of a corporate environmental policy, environmental program and a training and education program are relatively weak in this system, due to the fact that such requirements are heavy for the sector consisting solely of micro enterprises with less than 10 employees. For car dismantlers the main barrier for implementation of EMS such as ISO 14000 or EMAS is the fact that certain procedural aspects of EMS do not fit well with the characteristics of the sector. These companies are characterised by direct communication and supervision and simple working procedures. Typically the managers are still directly involved in the dismantling process. In those cases the (internal) costs of maintaining systems like ISO 14000 or EMAS that heavily rely on procedural arrangements becomes a barrier because it involves considerable cost and little direct benefit to small organisations.

4. **The facility should have an operative monitoring and reporting programme**

Monitoring and reporting gives the management insight in the environmental performance of its facility. It also provides for information to the licensing and enforcement authorities and to the public. The license of the facility often includes certain requirements for monitoring and reporting. Also the EMS provides for this type of measures.

The environmental impacts of car dismantling are mainly related to storage of hazardous materials and liquid proof flooring in the area of dismantling. Monitoring of these requirements is not burdensome, however it is to a certain extend relatively superfluous to require this to be implemented in a systematic way.

5. **The facility should have an operative inspection and recording programme for all input and output materials**

Also this requirement is a tool to provide information for the management of the facility and for the authorities and the public.

The requirements in the licence for the dismantling facility require registration of the materials. Also ARN has very strict requirements on registration of the dismantling of ARN materials and is therefore part of the certification system. This requirement therefore does not pose particular problems.

6. **The facility should have appropriate house and record keeping**

Good housekeeping and record keeping are also measures the management uses to get insight in the environmental performance of the facility. Both the license and the EMS typically address these issues.

Where the car dismantlers have got clear instructions on the concrete measures that can be taken for housekeeping and record keeping this requirement is not difficult to implement. ARN companies do not have particular problems implementing this element, since they are provided with the necessary tools and programmes to do this. If these instructions are not provided implementation of this element by SMEs is a barrier due to lack of knowledge.

7. **The facility should have an appropriate and verified emergency plan**

Facilities with clearly identified risk of accidents or accidental release of pollutants should address these risks appropriately. An up-to-date emergency plan is required in these cases and for certain specific facilities this may be addressed in the license. For other recovery facilities these risks are less apparent and the license will not address these issues.

The risk of accidents in case of car dismantling is limited in particular as regards risks that would influence the environment outside the facility. There is little risk for explosions, fire risks can be managed and if the hazardous materials are stored in an appropriate way, the possible impact of failure of the storage on the environment is limited. The ARN certification system foresees measures for occupational health and safety, storage of hazardous materials and record keeping of incidents. The requirement of having a verified emergency plan is burdensome for this sector and probably superfluous in relation to the possible risk. It will therefore be difficult to implement this measure for this sector.

8. **The facility should have an appropriate and operative training programme for the personnel**

Training of personnel of recovery facilities is of high importance. The environmental performance of the facility depends directly on the correct handling of the waste and scrap materials. Also knowledge of issues related to occupational health and safety require that the personnel is adequately instructed.

The car-dismantling sector consists solely of micro-enterprises in which oral instructions and direct supervision are possible. Training mainly consists of instructions of personnel how to dismantle certain parts of ELVs and how to manipulate certain fluids and components. This training is a continuous process and is mainly done on the job. A training programme where workers are sent to training courses outside of the direct workplace are not widely accepted. ARN provides some training programmes to help the ARN enterprises to improve their skills. This programme is successful but not all companies participate. Requiring a systematic training programme beyond the normal training on the job will be a considerable barrier for implementation of this element in this sector.

9. **The facility should have an adequate financial guarantee for emergency situations and closure**

In case of accidents the facility may be liable to provide for compensation of damage. Also there may be a need for clean-up of the site after closure of the facility. A financial guarantee will ensure that adequate financial means are in place for these situations.

Under Dutch law such requirements are not obligatory for this sector. Therefore this requirement is not implemented in the sector. Implementation of this measure would be burdensome for this sector.

10. **The facility should have a system in place for the exchange of information on quality requirements with waste producers**

Information about the quality requirements for the waste to improve the performance of the recovery facility is important. The waste producers should be adequately instructed about presence of materials that would have a negative influence on the recovery process.

The situation in the Netherlands is such that the last owner can hand over any ELV without payment. However, some control of the ELV takes place upon handing over to make sure that the ELV does not contain other materials than under normal conditions should be present in the car. This may involve checking if the trunk does not contain garbage and that the car has not more than 1 spare wheel. No specific requirements are needed to inform the last owner about the way an ELV should be delivered, because there are very little factors the last owner can influence that may be beneficial or detrimental to the recovery process. This requirement for 'upstream' communication is therefore not very relevant for the car dismantling. It may be for other recovery processes.

However, 'downstream' control is very important in this sector. The companies that take over the dismantled materials for recycling do have a very important role in assuring the quality of dismantling. This is also the case for the hulk that is presented to a shredder company. It is of paramount importance that these hulk are checked on the effectiveness of the de-pollution activities of the dismantler since this largely influences the quality of the shredder residues.

8. CONCLUSIONS AND RECOMMENDATIONS

The car-dismantling sector consists solely of micro enterprises with less than 10 employees. The example in the Netherlands shows that it is possible to transform this activity, which was traditionally performed in a largely uncontrolled way with considerable impact on the environment and insufficient contribution to waste minimisation into a sector that plays a key role in the management of ELVs in an environmentally sound manner.

This success was due to the following factors:

- A coherent policy of the authorities as regards licensing and enforcement including sufficient financial support for the competent authorities and adequate measures (including financial measures) to effectively put companies that did not perform according to standards out of business.
- Support from the industry for this policy.
- Tailor made measures that had to be implemented by the car dismantlers were provided. These companies are typically too small to develop their own procedures.

- A financing scheme that provided an economic incentive to perform the required tasks related to de-pollution and dismantling for recycling in the way as required.

This sector functions best if the dismantlers are instructed on concrete measures they have to implement and if the application of these measures are systematically checked and enforced.

The requirements in the proposed core performance elements creating the main barriers for implementation are those related to formal planning and systematic management tools such as formulation of an environmental policy, development of an environmental program, establishment of training programmes, emergency plans and management reviews. It may be considered if these are necessary for this particular sector. Development of training programmes might be taken up by the professional organisations of car dismantlers.

Guidance on concrete measures to be implemented in the facilities is the most effective way to implementation of environmentally sound dismantling of ELVs. The EU directive on ELVs provides for minimum requirements for dismantling facilities. These requirements are included in Annex II. The OECD may wish to consider developing this further into a guidance document such as is under preparation for PCs.

Nearly all companies use an environmental management system as part of their operational procedures. This helps them to demonstrate to suppliers of ELVs, recyclers and shredders that have to take over their materials, ARN and the supervising authorities that they work according to the standards that are required. Having such a system is therefore nearly a necessity to remain in business. The systems used are mainly those that are tailor made for the sector and not the general schemes such as ISO 14000 and EMAS.

Environmental management systems are a key instrument in the successful implementation of ESM, provided that the system is tailor made for the dismantling sector. The ARN certification system provides such a system, but also in other OECD countries these types of sectoral systems exist. OECD might consider a further study on the characteristics of these systems and of systems in place in other waste recovery sectors in view of preparing guidance on that issue. Also the role of third party verification is important.

If the car dismantlers are provided with concrete measures how to implement ESM the core performance elements related to occupational health and safety, waste minimization, EMS, monitoring and reporting and house, record keeping and can be implemented without too many difficulties. This requires however, an active role of the professional organisations in the sector in combination of accompanying measures taken by the authorities to provide for a 'level playing field' and to overcome the problem of free-riders.

REFERENCES

ARN, environmental reports 1998, 1999 and 2000, Amsterdam, 1999, 2001, 2001.

CBS, kwartaalstatistieken milieu, 1989 – 1999

CBS, Statline 2001; www.cbs.nl

EC: Explanatory memorandum of the Directive on ELVs

EFR: information provided at the web-site www.efr2.org completed with personal communication, Ross Bartley

IME consult, Evaluatie bijdrageregeling autowrakkenbeleid, eindrapport, 1996.

Ministry of VROM, Draft national waste management plan, 2001.

SGS, Norm voor certificatie van autodemontagebedrijven, 1996

WKÖ, environmental databank; www.wko.at

Worldbank, World development Indicators, 2001; www.worldbank.org

APPENDIX I: THE ARN CERTIFICATION SYSTEM

ARN requires that the hazardous liquids and components are removed from all ELVs and that a number of materials are selectively dismantled for recycling. These activities must be done by well equipped facilities, with skilled personnel and with an administrative system that allows verification of the activities. Therefore ARN has set a number of well specified requirements the companies have to fulfil if they want to apply for the dismantling premiums of ARN and these companies have to obtain a certificate to show compliance with these requirements.

In order to ensure compliance with its requirements ARN has developed a standard. This standard is laid down in a document prepared by SGS International Certification Services (1996).

The requirements in this standard include the following mandatory elements:

- All necessary environmental permits should be obtained and should still be valid.
- All professional registrations (business register, VAT registration) and insurances should be obtained.
- The workshop should have liquid-proof floorings.
- All environmental requirements regarding the safe removal for liquids and other hazardous components should be available and working properly.
- The enterprise should have the necessary equipment necessary to dismantle the so-called ARN-materials for recycling and should have the necessary means of transport.
- The enterprise should have all the necessary documentation and its administrative procedures should meet some strict requirements (in particular in relation to the input and output of materials and waste).
- The enterprise should have the necessary provisions related to health and safety.

Other elements are not 100% mandatory, but the enterprise should have implemented a large percentage (minimum 80%) of these measures.

These measures include:

- Environmental programme
- Compliance with all applicable regulations
- Established and documented tasks and responsibilities
- Training and awareness raising programme
- Provisions for corrective action
- Documentation of procedures and incidents

An accredited third party performs an audit of the facility and issues the certificate if the company fulfils the requirements laid down in the standard. The maximum period of validity of the certificate is 1 year. Costs for this audit and the issuing of the certificate are €750.

**APPENDIX 2:
PROVISIONS IN ANNEX I OF EU DIRECTIVE ON ELVS**

Minimal technical requirements for treatment

1. Sites for storage (including temporary storage) of end-of-life vehicles prior to their treatment:

- Impermeable surfaces for appropriate areas with the provision of spillage collection facilities, decanters and cleanser-degreasers,
- Equipment for the treatment of waster, including rainwater, in compliance with health and environmental regulations.

2. Sites for treatment:

- Impermeable surfaces for appropriate areas with the provision of spillage collection facilities, decanters and cleanser-degreasers,
- Appropriate storage for dismantled spare parts, including impermeable storage for oil-contaminated spare parts,
- Appropriate containers for storage of batteries (with electrolyte neutralisation on site or elsewhere), filters and PCB/PCT-containing condensers,
- Appropriate storage tanks for the segregated storage of end-of-life vehicle fluids: fuel, motor oil, gearbox oil, transmission oil, hydraulic oil, cooling liquids, antifreeze, brake fluids, battery acids, air-conditioning system fluids and any other fluid contained in the end-of-life vehicle,
- Equipment for the treatment of water, including rainwater, in compliance with health and environmental regulations,
- Appropriate storage for used tyres, including the prevention of fire hazards and excessive stockpiling.

3. Treatment operations for de-pollution of end-of-life vehicles:

- Removal of batteries and liquified gas tanks,
- Removal or neutralisation of potential explosive components, (e.g. air bags),
- Removal and separate collection and storage of fuel, motor oil, transmission oil, gearbox oil, hydraulic oil, cooling liquids, antifreeze, brake fluids, air-conditioning system fluids and any other fluid contained in the end-of-life vehicle, unless they are necessary for the re-use of the parts concerned,
- Removal, as far as feasible, of all components identified as containing mercury.

4. Treatment operations in order to promote recycling:

- Removal of catalysts,
- Removal of metal components containing copper, aluminium and magnesium if these metals are not segregated in the shredding process,
- Removal of tyres and large plastic components (bumpers, dashboard, fluid containers, etc), if these materials are not segregated in the shredding process in such a way that they can be effectively recycled as materials,
- Removal of glass.

5. Storage operations are to be carried out avoiding damage to components containing fluids or to recoverable components and spare parts.