

Unclassified

ENV/EPOC/WGWPR(2002)5/FINAL



Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development

11-Feb-2003

English - Or. English

ENVIRONMENT DIRECTORATE
ENVIRONMENT POLICY COMMITTEE

ENV/EPOC/WGWPR(2002)5/FINAL
Unclassified

Working Group on Waste Prevention and Recycling

HOW TO APPLY ENVIRONMENTALLY SOUND MANAGEMENT TO SMALL AND MEDIUM SIZE ENTERPRISES IN THE WASTE RECOVERY SECTOR

Synthesis Report

3rd Workshop on Environmentally Sound Management (ESM) of Wastes
Washington D.C., 25-26 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.

Henrik Harjula, Tel: +33 (0)1 45 24 98 18, Fax: +33 (0)1 44 30 61 79, Email: henrik.harjula@oecd.org

JT00139080

Document complet disponible sur OLIS dans son format d'origine
Complete document available on OLIS in its original format

English - Or. English

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 guidance. 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 synthesis report has been prepared mainly by Mr. Kees Wielenga, FFact Management Consultants, Braine l'Alleud, Belgium. It gives a general overview of the factors that influence the implementation of ESM by small and medium size enterprises and summarises the conclusions and recommendations of the case studies. 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.

Copyright OECD, 2003

Applications for permission to reproduce or translate all or part of this material should be addressed to Head of Publications Service, OECD, rue André Pascal, 75775 Paris Cedex 16, France

TABLE OF CONTENTS

FOREWORD	2
1. INTRODUCTION.....	4
2. GENERAL FRAMEWORK OF THE DUTCH APPROACH TO ESM AND SMES	6
2.1 Environmental Management Systems.....	6
2.2 Development and Implementation of EMS in the Netherlands	8
2.2.1 Objectives and Characteristics	8
2.2.2 Results	9
2.2.3 EMS for Collectors and Recyclers of Hazardous Waste.....	9
2.3 The Target Group Policy	10
2.3.1 General Characteristics and Approach.....	10
2.3.2 Company Environmental Plans.....	11
2.3.3 Relation Between CEP and EMS	11
2.3.4 Annual Integrated Environmental Report	12
2.3.5 Relation to the Licence.....	12
2.3.6 Results Target Group Policy	12
2.4 Cleaner Production Programme.....	13
2.4.1 General Characteristics and Approach.....	13
2.4.2 Results of the Programme	14
2.5 Factors Influencing Success of the Implementation of ESM by SMEs in the Netherlands.....	14
3. RESULTS OF THE CASE STUDIES	15
3.1 Car Dismantling in the Netherlands.....	16
3.2 Pre-treatment and Recovery of WEEE in Austria	16
3.3 Ship Dismantling in Canada	17
4. HOW TO APPLY THE PROPOSED CORE PERFORMANCE ELEMENTS TO SMEs	18
5. CONCLUSIONS AND RECOMMENDATIONS	22
REFERENCES.....	25

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 (WEEE) in Austria and dismantling of ships in Canada. This report summarises the conclusions and recommendations of these case studies and gives a more general overview of the factors influencing the implementation of ESM by the SMEs in the sector of waste recovery.

The three case studies described in a detailed way the mechanisms as they occurred in specific sectors of waste recovery. OECD tries to define a wider concept of ESM that should be applicable for a wider variety of activities in the field of waste recovery. To assess if the results from the case studies might be applicable for other waste recovery activities research was done to identify general mechanisms influencing SMEs adopting environmentally sound practises. This research mainly focuses on the general policy in the Netherlands aiming at implementation of measures for environmental protection in a wide group of industrial sectors. The results of this research are presented in chapter 2.

Within the scope of this study it was not necessary to include a similar analysis for Austria and Canada, the two other countries where a specific recovery sector was analysed. , The findings of the analysis of the general policy in the Netherlands provide sufficient evidence demonstrating that the findings from the case studies may be applied to wider variety of activities in the field of waste recovery.

The conclusions of the case studies will be summarized in chapter 3. In chapter 4 the applicability of the proposed core performance elements will be analysed.

General conclusions and recommendations will be presented in chapter 5.

This should provide the OECD with information on the practical implications of implementation of ESM by SMEs and should give guidance for the further development of a set of measures for the promotion of ESM for waste recovery.

2. GENERAL FRAMEWORK OF THE DUTCH APPROACH TO ESM AND SMES

In 1990 the Ministry of Housing, Spatial Planning and the Environment started a number of coordinated activities with the aim of stimulating implementation ESM by SMEs. This included:

- A programme for the development and implementation of environmental management systems.
- A Target Group Policy
- The Cleaner Production Programme

All three activities aimed at improving the environmental performance of a wide variety of sectors in the industry and are not limited to waste recovery only. These sectors included SMEs but were not limited to them. In some case specific measures targeted at SMEs were part of the activities. In all three activities implementation of EMS played a key role in improving the environmental performance of the sectors. The characteristics and results of these activities will be described in this chapter. Because of the central role of EMS first a general introduction of the features of these systems will be given.

2.1 Environmental Management Systems

There are currently two international schemes of EMS that are widely used in different industrial sectors. The International Organisation for Standardisation (ISO) developed a number of environmental standards in its ISO 14000 series. Standard ISO 14001 contains the requirements for EMS. The EU has issued a regulation laying down the requirement of EMS called Eco Management and Audit Scheme (EMAS). Both ISO 14001 and EMAS set out a common framework for companies to be used in managing their environmental issues. The ISO 14001 standard is a voluntary system and aims at supporting management of environmental issues within companies.

ISO 14001 is the worldwide-accepted standard setting requirements for environmental management systems. The environmental management system is defined as the part of the company's overall management system that deals with the organisation, planning, procedures and means to draw up, implement and achieve the company's environmental policy.

The requirements of the ISO 14001 include five parts:

- environmental policy
- planning
- implementation and execution
- checking and corrective action
- management review

EMAS has similar features plus the additional requirements that firms:

- produce environmental statements and
- have their systems and statements verified by independent accredited organisations.

One of the critical elements in the discussion on the core performance elements regarding EMS is the question of certification.

Certification implies that an independent and impartial expert evaluates whether the object of certification (e.g. a product or a management system) complies with an established standard. If this proves to be the case, this is recorded in an official document: the certificate. Agencies working as independent experts in this process are called certification bodies.

The evaluation takes place based on rules, which should be approved by a board of experts in which all interested parties are represented. E.g. in the Netherlands the Dutch Council for Accreditation supervises the certification bodies.

A certification body awards a certificate if it is confident that the company complies with and can continue to comply with the standard. At least once a year, the company is reviewed to ensure that it still complies with the standard. If it does not, the certificate may be withdrawn. A certificate is awarded for three years, after which a complete re-audit is done.

The certificate is proof that a company meets all the requirements of the standard. It therefore provides proof of justified confidence in the capacity of the company to apply the EMS. The certificate often constitutes a valuable marketing tool towards suppliers, clients and authorities.

The role of certification in EMAS is somewhat stronger regulated than in the ISO 14001 standard. Table 2: gives an overview of the number of companies with ISO 14001 and EMAS certification.

Table 2: Number of firms with ISO 14001 and EMAS certification (2001)

Country	ISO 14001	Country	ISO 14001	EMAS
Australia	1078	Austria	223	359
Canada	760	Belgium	130	11
Czech Republic	135	Denmark	836	174
Hungary	205	Finland	620	36
Iceland	2	France	918	35
Japan	6648	Germany	2400	2665
Korea	676	Greece	66	6
Mexico	216	Ireland	200	8
New Zealand	63	Italy	1024	68
Poland	245	Luxemburg	9	1
Slovak Republic	52	Netherlands	873	25
Switzerland	688	Norway	251	64
Turkey	91	Portugal	47	2
USA	1480	Spain	1444	151
		Sweden	1911	211
		United Kingdom	2500	78
OECD (Non EU)	12339	EU 15 + Norway	13452	3894
Total OECD	25791			

2.2 Development and Implementation of EMS in the Netherlands

The first activity that was started by the Ministry to promote implementation of ESM was a program to develop and implement environmental management systems on a systematic basis and on a wide scale. This started in 1990, before the development of EMAS and ISO 14001 and therefore the methodology still had to be developed.

2.2.1 Objectives and Characteristics

The objective of this programme was that all enterprises with a relevant level of impact on the environment or specific environmental risks should have an environmental management system. The programme focussed on six elements: branch projects, individual projects, corporate environmental services (abbreviated to BMD in the Netherlands), government enterprises, information services, and training and education. Projects in these fields could be eligible for financial support till 1 January 1995. For SMEs the branch projects, corporate environmental services, information services and training and education were of particular relevance.

In the period between 1990 – 1995 about 60 branch organisations did projects to stimulate EMS for their members with financial support from the government. The result of the project was in most case a standard EMS manual, sometimes integrated with quality management and occupational health management. With the manual the affiliated enterprises could implement EMS.

A nation-wide network of 14 corporate environmental services (BMDs) was set up to assist SMEs with first line advice in environmental issues. Enterprises can affiliate with a BMD and can ask for – in most cases – free advice. When issues are too complex the BMDs can refer to other organisations.

The programme also provided a range of information services, training courses and educational activities. Branch organisations, schools, municipalities, Chambers of Commerce, trade-unions and environmental organisations could apply for a subvention for training courses and educational activities.

2.2.2 Results

In 1996 KPMG evaluated the results of the EMS programme. This showed that, in general, SMEs implanted concrete measures contributing to improved environmental protection. They did not implement all organisational elements of EMS. Around 29% of SMEs (with less than 100 employees in this case) were at an advanced stage of EMS implementation. This evaluation revealed that SMEs did not see a particular need for implementing EMS. A set of practical measures for each environmental compartment (e.g. soil and groundwater, air and surface water) was considered to be more helpful to SMEs.

Further research was done by Coopers & Lybrand (1997) to investigate why SMEs showed so little interest for systematic EMS. This research showed that SMEs apply EMS in a pragmatic way. Thinking in systems, procedures and work regulations is less present in SMEs than in large enterprises. Therefore they do not use formalised environmental management systems as this does not fit well with the characteristics of SMEs having:

- A clear and simple organisation
- Short communication lines
- Large influence of the general director
- No specialised staff.

In practice, it appeared that ‘environment’ is mostly perceived as the need to execute the concrete measures prescribed by laws and regulations. Furthermore, due to the small size and lack of specialised staff it is difficult to recognise environment as a separate entity within SMEs.

2.2.3 EMS for Collectors and Recyclers of Hazardous Waste

The above-mentioned evaluations didn’t include an evaluation of the individual branch projects. Several projects were related to waste management companies. In view of their possible relevance for the OECD work the development in the sector of collection and recycling of hazardous waste is described in more detail.

In the early 90s the professional organisation for collectors and recyclers of hazardous waste (NVCA) developed a combined system for integrated environmental and quality management, showing similarities with the quality management standards from the ISO 9000 series. For this system a norm scheme and certification system was set up. Because of a series of incidents in this branch in the early 80s, the enterprises felt the need to seek recognition of their efforts in the environmental field.

Obtaining the certificate was a precondition for membership of the branch organisation.

An independent body, Certiva (Foundation for Certification for Integral Waste Management) determined which external auditors were eligible to audit the affiliated enterprises and to nominate these for certification.

Due to the development of ISO 14001 and EMAS combined with a concentration of activities resulting in a smaller number of companies the need to meet internationally recognised standards was felt. Therefore the specific branch system became less important over the last years. Certiva stopped its activities in 2000.

The fact remains that in the early 90s the collectors and recyclers of hazardous waste were trendsetters in the field of EMS. Most affiliated enterprises in the professional organisation were certified according to the standard scheme as formulated by the branch. For a number of aspects this standard scheme was less demanding than ISO 14001. However, it guaranteed a relatively high level of systematic environmental management. This resulted, at an early stage, in the presence of a high level of implementation of EMS and also eased the path for implementation of ISO and EMAS in the sector.

2.3 The Target Group Policy

The second activity the ministry started was the target group policy. This started at about the same time as the activities to stimulate EMS mentioned in Chapter 2.2. This policy aimed at reducing the environmental impact of the main polluting industrial sectors in the Netherlands. This includes the larger industrial enterprises, but also certain SMEs may contribute significantly to the environmental burden. In the context of the target group policy a specific approach was developed to address these impacts.

2.3.1 General Characteristics and Approach

In the 1980s the major areas of environmental problems were identified and at the end of this decade the Dutch Government formulated its National Environmental Policy Plan (NEPP). The NEPP set priorities and specified objectives and dates by which they were to be met for eight environmental themes, such as climate change, acidification, groundwater depletion and waste management. The government identified seven target groups. These were specific sectors of society with relevant impacts on the environment. The target groups were made responsible to help meeting the goals of the NEPP. This environmental policy programme was also called the Target Group Policy. Industry was one of the target groups.

The activities towards industry focuses on the 20 percent of the companies responsible for 80 percent of industrial pollution including the following sectors: primary metal production, chemical industry, printing industry, dairy products production, metal-electro industry (metalworking and electrical engineering), textile and carpet production, paper and cardboard production, meat processing, rubber and plastic production and cement production. In the NEPP an Integrated Environmental Target Plan (IETP) was included setting the reduction goals for the whole of the industry.

In consultations with representatives of these ten industrial sectors agreement could be reached on objectives for pollution reduction.

As a first step an environmental profile of each individual sector was made covering relevant pollutants and actual emission levels compared to a baseline (in most cases the levels in 1985).

In a second step these data were assessed against the IETP for the whole of the industry. On the basis of this assessment IETP's for each selected branch of industry were developed.

Finally the negotiations resulted in a contract, signed by all the parties concerned: a covenant. The first covenant with the industry was signed in 1992.

For the implementation of measures the Dutch Target Group Policy uses four basic instruments:

- Company Environmental Plans.
- Environmental Management Systems.
- Annual integrated environmental report.
- Framework licences.

In the next paragraphs these instruments are further explained.

2.3.2 *Company Environmental Plans*

Target group policy consistently stimulates actors assuming their responsibilities. The industrial and trade associations inform the companies on the concrete actions. In consultation with the licensing authorities, the sector targets of the IETP are translated at the company level in a Company Environmental Plan (CEP), setting out measures which fit best to management and investment plans of the individual facility. By adding up all plans, the industrial association can tell whether the overall objectives for the sector will be met. The CEP is therefore the cornerstone of Target Group Policy.

The sectors within the target group industry show big differences. Some sectors consist of enterprises with a wide variety of complicated production processes and therefore contribute to a variety of environmental problems (e.g. the chemical industry). Enterprises from these sectors had to set up a CEP. Other sectors consist of enterprises with similar production processes. Environmental problems in these enterprises are almost identical (e.g. the textiles and carpet industry). For these sectors manuals have been developed including, among others, possible state of the art environmental measures. Enterprises from these sectors can set up a CEP with the help of these manuals.

The printing industry and the paper and cardboard industry were an exception to this. Here a manual containing environment measures was been developed, but there are no CEPs. There the manual includes the targets and the dates for implementation of measures.

2.3.3 *Relation Between CEP and EMS*

Each individual company is given the opportunity to make its CEP on the basis of exact knowledge of their emissions. It draws up a list of the problems and possible solutions. This inventory is almost identical to the inventory which is part of ISO 14001 and EMAS. The CEP can be incorporated into the environmental policy and programme, which is also part of these systems. A CEP can therefore become one of the cornerstones of the EMS of the company. The CEP however must address a specific level of environmental protection to be obtained by the company. This level should be in conformity with the environmental laws and regulation but also should allow the sector as a whole to meet its objectives as indicated in the NEPP and the covenant with the government. The CEP therefore does not only fulfil a procedural requirement in the system, but also defines the level of ambition. It therefore goes beyond the typical characteristics of EMS and makes it a tool to define environmentally sound management on a company level.

2.3.4 Annual Integrated Environmental Report

To monitor the progress of the implementation enterprises must report the results of implementation of their CEP annually. This includes reports on the reductions of emissions that have been achieved. Comparison of the annual reports of enterprises in the same sector provides information on the progress made by the sector as a whole and also provides for possibilities to do benchmarking.

For enterprises that have implemented EMS this annual reporting can coincide with the annual evaluation required by ISO and EMAS. The reporting therefore does not necessarily have to be an additional administrative burden for these companies.

2.3.5 Relation to the Licence

There is a relation between the Target Group Policy and the environmental licence-system. Firstly, if after the assessment of the CEP this plan is considered to be consistent with the environmental objectives of the covenant, it is signed by the company and the licensing authority concerned. It then has the status of a contract for a period of four years comprising the basis for a new licence.

Secondly, a company is stimulated to go beyond the requirements of the CEP. It is stimulated to integrate the CEP in an environmental management system. Those companies that did this and had a certified system and transparent reporting on their environmental performance could qualify for a framework licence.

Unlike the traditional licence, a framework licence does not contain detailed prescriptions of measures to be taken but contains environmental targets. It therefore gives the company greater flexibility in choosing the measures to meet these targets. This flexible licence has to be 'earned' through good environmental performance, adequate self-monitoring capacity and proven reliability. The company must have proven it can organise implementation of environmental targets by themselves.

Research by Coopers & Lybrand (1997) showed that companies regard issuing framework licenses as a step that logically follows from the implementation of an EMS. When companies themselves implement a 'higher' level of monitoring within the company, they expect that the government to adjust to that.

It also showed that this expectation doesn't work the other way round. Companies are not implementing an EMS to be able to qualify for the framework licence. The Dutch government had hoped this would be the case but the research shows that stimulation by the government doesn't play a big role in weighing up the pros and cons to implement an EMS.

2.3.6 Results Target Group Policy

Despite a rise in production in the Netherlands, the emissions of most pollutants have been reduced steadily. E.g. for SO₂ an absolute reduction in industrial emissions since 1990 of 44% was obtained and 22% for NO_x, 43% for VOC and 52% for dust. In 1996 industry had already nearly reached nearly most of the target for the year 2000 for the emissions of the 73 most important industrial pollutants. There are also problem areas. Emissions of NO_x, CO₂, SO₂, fluoride and cadmium will not be reduced in time.

The environmental benefit of the programme should not only be evaluated in terms of the reductions in emissions. It was essential government and industry have created a durable system within which they have learned to work together.

The implementation of EMS is not a goal in itself within the Target Group Policy. Nevertheless progress of the EMS implementation was monitored. The requirements of having to draw up a CEP and perform an annual evaluation facilitated the implementation of EMS.

In 1999 313 enterprises participated in the Target Group Policy of which 76 (24%) were certified on the basis of ISO 14001 or EMAS.

However, in sectors consisting mainly of SMEs, such as the metal and electrical engineering industry and the printing industry, only a few enterprises had implemented EMS.

2.4 Cleaner Production Programme

The third activity to promote the implementation of EMS was the cleaner production programme. This programme aimed at encouraging small and medium-sized enterprises to implement environmental activities. However, also larger companies could profit from the programme. The programme was an initiative of the Ministry of Economic Affairs, the Ministry for the Environment and the Inter-Provincial Consultative Committee.

2.4.1 *General Characteristics and Approach*

The Cleaner Production Programme provides an integrated approach to the environmental problem on five environmental themes:

- environmental technology,
- prevention of waste and emissions,
- environmentally friendly product development,
- energy conservation,
- corporate environmental protection.

The Cleaner Production Programme targets advisors to small and medium-sized enterprises (SMEs), such as Chambers of Commerce, corporate environmental services, commercial environmental consultancies, financial advisors, professional and branch-related organisations, prevention teams, and provincial and municipal authorities. There are also programmes providing funding for implementation of EMS and energy-efficiency improvements.

Permit control staff are trained to help SMEs implement EMS and to give advice on waste prevention. This new regime is part of an updated and integrated permitting and enforcement scheme.

2.4.2 Results of the Programme

In 1999 and 2001 (KPMG) two evaluations of the Cleaner Production Programme took place. These evaluations made clear that 85% of the companies knew about the existence of the programme and were active in addressing environmental problems. It should be noted that in spite the fact that particular emphasis is put to SMEs in particular also large companies (> 100 employees) were participating in the programme. The most important reasons to join the programme were commitment to responsible care (33%), government regulation (25%) and cost-reduction (22%). For large companies cost-reduction was the most important reason to join the programme and for small companies this was commitment to responsible care.

The three environmental measures that were most frequently implemented were improved use of raw materials and products for production-process, reduction of energy consumption and improvements in production processes to reduce pollution.

The results related to the implementation of environmental management showed that in 2001 only 10% of the companies had implemented an environmental management system. Of the large companies (>100 employees) 53% indicated the presence of an environmental management system. In larger companies the need for a systematic implementation using an environment management system to control environmental problems is stronger.

Measures for registration of waste, energy, water, raw and auxiliary materials were more widespread than on the previous two issues. Registration gives insight in the costs involved with environmental protection and the possibilities to reduce these. Each item is registered by an average of 40% of the companies.

The level of implementation of registrations were also strongly linked to the size of the companies. In well over 40% of the companies with less than 5 employees no registration took place, while this was only for 14% of the companies with 50 or more employees.

This clearly demonstrates that generally larger companies are more inclined to implement EMS than smaller companies. SMEs do not implement EMS by themselves. They do this if it is a requirement imposed by the market or by authorities.

2.5 Factors Influencing Success of the Implementation of ESM by SMEs in the Netherlands

On the basis of the results of the different programmes in the Netherlands a number of conclusions formulated with regard to the possibilities to stimulate implementation of ESM by SMEs.

There is evidence that many companies pursuing ISO 14001 solely for its trade benefits, not for improving their environmental performance. E.g. countries like Singapore, Thailand and Malaysia are very concerned that ISO 14001 will be used as a trade barrier by developed countries. According to ISO 14001 consultants, much of their certification business is currently in Asia's small trading nations. Many companies are seeking ISO-certification in order 'not to be left behind'. The Japanese car-producers are moving ahead with ISO 14001 and pushing their suppliers to do the same. It is also worth noting that Rover and Jaguar in the UK are supporting their suppliers to adopt EMS. This is in line with the developments regarding the implementation of quality management. Where the presence of a quality management certificate is required for companies to become a client or supplier, the companies makes sure they have this certificate.

An obligation enforced by the market itself is in general very effective. Also the example of the organisation of collectors and recyclers of hazardous waste shows that an obligation from the market to implement ESM is effective.

All policy initiatives of the Dutch government showed the same picture: SMEs show less interest in the implementation of ESM in a pro-active way than large companies. This doesn't fit well with the characteristics of SMEs in particular for the small companies. Evaluation of the Clean Production Programme shows that companies with less than 50 employees showed little interest in the implementation of ESM. For companies with more than 50 employees the chances for implementation were better. In view of possible policy initiatives it might therefore be useful to distinguish the small companies from the medium-sized companies.

The target group policy showed that it was possible to stimulate companies on a broad scale to adopt an environmental plan and to evaluate this annually. The Cleaner Production Programme showed that about 40% of the companies participating in the programme are willing to do environmental registrations. Small enterprises are more inclined to integrate the environmental aspect into their operational management than into process control.

The example of the intervention philosophy of the Dutch government showed the importance to adapt the type of measures governments used for steering and stimulating implementation of environmental measures to be in line with the level of internal control of the companies. Small companies, with less than 50 employees, have a clear organisational structure and communication is mostly by direct instruction not on paper. Providing such a company with a package of specific measures would be more effective than forcing implementation of an environmental management system.

When companies are of the size that direct monitoring is no longer possible, and when the company already needs a system in other fields like quality management and occupational health management, it is effective to link environmental management to it.

3. RESULTS OF THE CASE STUDIES

Three case studies were done to analyse the implementation of environmentally sound management in three sectors involved in waste recovery. These sectors were:

- The car dismantling sector in the Netherlands.
- The sector of pre-treatment and recovery of waste electrical and electronic equipment (WEEE) in Austria.
- Ship dismantling in Canada.

The case studies gave answers for the specific sectors 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?

The main results of these case studies are given and analysed in the following sections.

3.1 Car Dismantling in the Netherlands

The car dismantling sector in the Netherlands consists of approximately 800 companies. Nearly all of these are micro enterprises with less than 10 employees.

The implementation of environmentally sound management in this sector took place in two distinct phases. In the period from 1989 to 1995 the wreck policy programme was implemented. As a result of this programme the number of companies was reduced from 1700 in 1989 till approximately 800 in 1995. At the beginning of the programme almost none of these companies had a licence or had implemented measures to protect the environment. In 1995 most of the companies were properly licensed and had taken the necessary measures to protect the environment.

In the period from 1995 till 2001 the ARN (Car Recycling Netherlands) system of extended producer responsibility was implemented. The 269 companies operating under this system dismantle end of life vehicles (ELVs) in view of their de-pollution and increased recycling of materials. In 2001 the ARN companies dismantled 90% of all ELVs in the Netherlands under strict environmental conditions. All of them have implemented an environmental management system. However, none of the companies has ISO 14001 or EMAS certification.

The successful implementation of these measures was due to the following factors.

- A consistent 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.

3.2 Pre-treatment and Recovery of WEEE in Austria

The sector of pre-treatment and recovery of WEEE in Austria consists of approximately 20 companies specialised in handling WEEE. There are also 6 shredder companies that take WEEE alongside other waste and scrap materials. Most of these are SMEs. However, some of them are owned by companies that themselves are not SMEs.

A considerable number of the companies has implemented EMS. Some of them have ISO 14001 or EMAS certification and several even have both systems.

The companies in the sector developed their activities the beginning of the 1990's anticipating on the introduction of legislation with requirements of extended producer responsibility. Since this legislation was not introduced as quickly as expected, some of these early initiatives did not continue. From 1995 onwards the Ministry for the Environment financially supported pilot projects on collection, pre-treatment

and recovery of WEEE in nearly all States in Austria. This allowed the companies to further develop their technologies. The results of the projects will be used when EU legislation has to be implemented in the future. Moreover, the experience gained over the years allowed the government to determine technical and environmental requirements for the handling of WEEE. These have been incorporated in a standard in the waste management plan and is used for issuing licences for these operations. Export of WEEE is only allowed when treatment abroad meets the Austrian standards.

Separate schemes were implemented for refrigerators and fluorescent lighting equipment. These are already subject to legislation including principles of extended producer responsibility.

To date the schemes set up under the pilot projects continue to function, even though the financial support from the central government has stopped or most of them. It is estimated that to date 50% of WEEE is collected separately and pre-treated and recovered following the standard in the waste management plan. For refrigerators and fluorescent lighting equipment this is estimated to be 80-90%.

The successful implementation of these measures was due to the following factors.

- A strong believe within industry that legislation was eminent which triggered them to invest in development of new technologies.
- Support by the government in the form of pilot projects
- Continuation of the pilot schemes by the local authorities after the finalisation of the scheme
- Development and enforcement of legal standards on the technical requirements for treatment of WEEE
- Effective measures to provide a level playing field for companies in Austria and protection against unfair competition from companies abroad.

3.3 Ship Dismantling in Canada

The case study focussed on the implementation of environmentally sound management at the Marine Recycling Corporation (MRC), an SME located at the North shore of Lake Erie, Ontario, Canada.

The key environmental issues for ship dismantling are de-pollution of the vessel and recovery of materials (mainly steel) for recycling. To that end MRC has developed a practise of dismantling including a survey of the vessel, removal of liquids, removal of asbestos and PCBs, surface preparation (if required), cutting and recycling and disposal of materials. The industry is mature and has had little recent technological development.

The company dismantles approximately 2 large vessels per year applying high environmental standards. It has obtained ISO 14001 certification since December 2000.

The successful implementation of these measures was due to the following factors.

- A regulatory framework working in favour of recycling of various materials.
- Training and education of management and employees.

- Self-checking through monitoring, internal audits and management review.
- Integration of the above-mentioned measures in an adequate environmental management system.

4. 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 sectors of the case studies and the results of the analysis of the general policy in the Netherlands 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 success of the implementation of EMS for WEEE in Austria this element was the key to the success. Also for car dismantling in the Netherlands the regulatory infrastructure and enforcement proved to be of key importance amongst other factors. In the case of the ship dismantling company in Canada it was identified as helping to implement ESM. However, in this last case this was not identified as a key factor driving towards implementation of ESM.

Identification and tracking of applicable legal requirements was identified as a challenge of SMEs since they typically do not have resources and competent staff to do this. Supportive activities by authorities or branch-organisations (industrial NGO's) helps reducing this barrier. The experience from the general policy in the Netherlands shows that it is possible to set up and support an infrastructure to effectively help SMEs with these issues.

If governments have an active policy of enforcement this promotes the establishment of a level playing field and reduces the problems of free riders.

2. The facility should be appropriately authorised/permitted/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.

SMEs have in general no problems meeting this requirement, provided they are properly informed about their obligations. This element was not identified as posing particular problems for SMEs. However, typically they need support to know which legal provisions are applicable and about changes in these requirements.

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.

SMEs have in general no problems meeting this requirement either when properly informed about measures they could take. Depending on the specific risk, either the regulatory framework requires that specific measures are taken by the facility, or these risks are not of great concern and therefore do not involve too complicated or costly measures. Key factor is that SMEs need support to be informed about the practical measures they can take to address these concerns.

4. **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.

In particular for small enterprises EMS is only implemented if it is a legal requirement or a market demand. The systematic approach does not fit naturally to the characteristics of in particular small enterprises. For medium-sized enterprises EMS fit better to their characteristics.

Often costs of implementation are identified as barrier. The Canadian study indicated that in particular internal costs to develop the a certified ISO 14001 EMS may be important (US\$ 31.000 – 62.500), depending on the complexity of the EMS, the complexity of the operations and the number of staff employed. Also data from the Austrian ministry for the Environment give similar data on internal costs (BMUJF, 1999).

However, implementation of EMS may also have benefits. A German study involving over 700 companies indicated that 1/3 of these have annual benefits from implementing EMS between € 5.000 – 50.000 and 1/3 even report annual benefits between € 50.000 – 250.000. (DBU, 1997). Also Australian studies have shown companies having net benefits when implementing EMS.

The example of the car dismantling in the Netherlands shows that these micro enterprises implement EMS but in a way which is adapted to their activities and characteristics. In particular those activities that generate the highest internal costs (planning, training programme etc.) are implemented in a much more general way than in the systems like EMAS or ISO14001.

For the WEEE sector in Austria this is less apparent. These companies are typically larger than those in the car dismantling sector and they have more possibilities to have such systematic approaches implemented. A relative large number of these companies have obtained ISO or EMAS registration.

The ship dismantling company in Canada did not have particular problems meeting the requirements of the ISO standard albeit against considerable costs.

The evaluation of the general programmes in the Netherlands also showed a clear link between successful implementation of ISO and EMAS and size of the enterprise.

It should be noted that, if there is a clear request from the market for ISO or EMAS certifications, the companies make sure they obtain this certificate. In those cases obtaining the certificate becomes a precondition to stay in the market.

In particular for micro-enterprises and small enterprises (less than 50 employees) obtaining ISO or EMAS registration may be a serious barrier. The characteristics of these companies which have a clear and simple organisation, short communication lines, large influence or the general director and no specialised staff do not fit very well with the formalised character of EMS. This means that the (perceived) costs for implementing and maintaining the system are not compensated by direct benefits or increased market share.

For these companies tailor made schemes for EMS including concrete measures they have to implement and reduction of the administrative aspects of EMS may help reducing this barrier. Also the fact that clients require this registration effectively removes the barriers for SMEs.

5. **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.

Depending on the type of environmental hazard related to the specific type of installation, these programmes may be more or less important. In principle all SMEs in the waste recovery sector could implement this requirement. There are no particular problems meeting this requirement once it is known what parameters should be monitored and how there are

6. **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.

Depending on the type of activities the input materials may be recorded in different degrees of detail. For car dismantling sector and treatment and recovery of WEEE both input and output of materials are adequately recorded. For car dismantling because this is required by ARN and the payment of the dismantling premiums depend on this registration. For WEEE this is a requirement in the license. For ship dismantling the input is typically not well known. Inspection and recording of the output streams is a normally accepted practise in the waste recovery sector. Therefore this element does not involve additional efforts from companies or pose any particular problems.

7. **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.

This element does not pose particular problems, since these are measures that are normal for companies that are appropriately managed.

8. **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 case studies from the Netherlands and Austria indicate that the implementation of this element might prove problematic, because the regulatory framework in those countries does not normally require this from the companies in these sectors. The Canadian study indicated that in for the ship dismantling company of the case study implementation of this requirement was not problematic. The company has prepared such plans and the presence and content of these plans are subject to control by the competent authorities.

9. **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.

Training of personnel was identified as one of the key factors of success in all three case studies. The way this training is organised is however quite different in the different sectors. In car dismantling training is mainly done on the job and via direct instructions and supervision. These companies do not have a specific programme for training, but this is organised in an informal way. A support programme for training developed by the professional organisation however, is seen as a relevant activity. To a certain extent this is the same for the WEEE sector.

Only for the ship dismantling the training programme was well established. It was integral part of their ES. Here the internal costs for this requirement were also mentioned as possible barrier for SMEs.

10. **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.

Both for the car dismantling sector and the WEEE sector this requirement was identified as problematic. For ship dismantling it was not seen as problematic. It seems that this difference is mainly due to the fact that this requirement is part of the regulatory framework in Canada, whereas in Austria and the Netherlands it is not for the sectors of the case studies. Even in the Canadian study this element was identified as a substantial barrier to some SMEs although the SME of the case study did not have particular problems.

11. **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.

For the car dismantling sector this requirement was considered less important since this type of information has only limited impact on the quality of the recovery process. Downstream information from shredders and recyclers to dismantlers is more relevant. For WEEE the information exchange should focus on the collection more than on the waste producer.

The Canadian study did not assess this particular element.

It seems that for waste streams mainly coming from private households, providing information from the waste recovery facility to the waste producer is less effective. In those cases the collector should be used as interlocutor. The collector can more effectively inform the private householder if necessary. This may be different if the waste producer is an industrial installation.

5. CONCLUSIONS AND RECOMMENDATIONS

The main conclusions from the general policy in the Netherlands were.

- An obligation for the implementation of ESM enforced by the market itself is in general very effective.
- It may be important to distinguish small-sized companies from medium-sized companies.
- Companies are more inclined to integrate environmental aspects into the operational management as than as part of the control process.
- Generally, for small-sized companies imposing a package of concrete environmental measures will be the most effective method to obtain specific environmental results.
- In medium-sized companies the introduction of ESM has a potential.

From the case studies it was clear that the legal and institutional frame in which the sector operates clearly influences the chances of success of implementation of ESM. In particular for micro-enterprises and small enterprises clear instructions on the measures to be taken and support to identify which measures are appropriate for their particular situation are very important. Pro-active attitudes to integrate environmental improvements into the operational management or to implement a system for that are not to be expected from these companies.

For medium-sized companies the implementation of the policy cycle included in EMS is relatively easy. This involves an inventory of environmental aspects and the applicable rules, formulation of a policy and programme based on this inventory and evaluation on a yearly basis. As concluded from the Cleaner Production Programme is also expected that the registration of the results in order to monitor the policy is a possibility. The results from the case studies support this. The combination of elements required by the market, requirements in the license and a systematic approach in the form of a EMS would for a very large extend cover the core performance elements as proposed by the OECD.

As regards the core performance elements it can be concluded that the most important elements are:

- The regulatory infrastructure and enforcement;
- The authorisation; and

- The environmental management system

These three elements are not only important as element as such but also ensure the successful implementation of most of the other elements.

As the waste treatment and recovery sector is typically quite heavily regulated and since the authorisation of the facilities typically includes already a large number of the elements indicated in the list of core performance elements, this sector has less problems with the type of requirements indicated in the core performance elements than would be the case in other sectors of the industry. The application of the elements may differ between OECD countries.

The implementation of the control-related aspects of ESM by SMEs, or in other words the factual integration of environmental aspects beyond the measures of operational management, is difficult. It is expected that the implementation of the following elements will pose problems:

- Attribution of tasks and responsibilities;
- A programme of training and education;
- Documentation of process procedures;
- Execution of an audit programme.

Moreover, when the legal framework within the country does not require emergency plans and financial guarantees to be established, implementation of these core performance elements will be problematic as well.

A general problem of SMEs is the fact that they do not have specialised staff. Therefore they need support in getting information on issues such as:

- Regulations applicable for their activities.
- Measures they can take to address specific environmental and health and safety concerns.
- Possibilities for training and awareness raising of their personnel.

It is therefore recommended:

- To put specific emphasis on enforcement of the legal and institutional framework in which SMEs have to implement ESM. Since the waste recovery sector is traditionally used to being relatively tightly regulated the chances of implementing ESM are better than in some other sectors. This may also work toward improving the 'level playing field' for treatment and recovery within the OECD.
- To develop more precise guidance for those sectors of waste recovery where the majority of companies consists of micro and small enterprises. The guidelines on environmentally sound management of PCs is an example on how this could be addressed. It should be noted that it may be necessary to include more detailed information on practical measures for certain types of activities.

- To stimulate implementation of some form of EMS by making it a requirement. The implementation of EMS is one of the important factors to assure integration of environmental protection into the day to day operations in a company. It should be considered if the full implementation of EMAS or ISO 14001 is required in all cases or if for certain sectors parts of these systems may be enough. In particular some of the more procedural aspects of EMAS and ISO 14001 may be a barrier for implementation by small enterprises. To that end it might be useful to study the features of some of the management systems that have been developed for specific sectors of waste recovery and to further investigate into the specificities of these systems.
- To consider how the requirements for training can be tailored towards a system which is supporting the needs of in particular small and micro enterprises.
- To consider limiting the requirements for emergency planning to operations for which the environmental risks are of such a nature that emergency plans would be a useful tool.
- To reconsider the need for financial guarantees in cases this is not required under national legislation.

The core performance elements as they are under development in combination with specific guidance for specific waste streams and maybe in the future for specific waste treatment operations have the potential of becoming powerful instruments fostering ESM. Particular emphasis on the specific characteristics of SMEs will increase the chances of success of such a programme.

REFERENCES

- BMUJF, Evaluierung der Umsetzung der EMAS-Verordnung in Österreich, Band 10/1999.
- Certiva, normblad milieu- en kwaliteitssystem voor de verwijderingsbedrijven van gevaarlijke afvalstoffen, 1995
- Coopers & Lybrand, MKB kan met milieuzorg voor de dag komen, Utrecht, 1997
- Coopers & Lybrand, De vergunning op hoofdlijnen als stimulans voor bedrijven is belangrijk, maar kent beperkingen, Utrecht, 1997
- DBU, Umweltmanagement und Öko-Audit. Erfahrungen für eine erfolgreiche Praxis, 1997
- Doelgroepenbeleid industrie, Uitvoering van de convenanten met de industrie, 1996
- European Commission, Report on SMEs and the Environment, Analysis of the replies given by 6 European Union Member States to a European Commission's questionnaire on Small and Medium-Sized Enterprises (SMEs) and the Environment, Brussel, 17 February 2000
- Facilitaire organisatie, Doelgroepenbeleid Milieu en Industrie , FO-07, 1996
- Facilitaire organisatie, Doelgroepenbeleid Milieu en Industrie, jaarrapportage 1999, FO-755, 2001
- Kerr, Robert, Cosby, Aaron, Beyond regulation, Exporters and Voluntary Environmental Measures, International Institute for Sustainable Development, Canada 1998
- KPMG Milieu/IVA, Evaluatie Bedrijfsmilieuzorgsystemen, Den Haag/Tilburg, 1996
- KPMG, Schoner produceren in Nederland 2001, 2001
- Milieu & Bedrijven, Informatiebuletin bedrijfsinterne milieuzorg, April 1995
- Milieu & Bedrijven, Certificatie van milieuzorgsystemen, ISO 14001, EMAS, November 1997
- Ministry of Housing, Spatial Planning and the Environment (VROM), Silent revolution, January 1998
- OECD, SMEs and environmental management, Working Party on SMEs, 17th Session, Paris, 4-5 December 2001
- RMK, Milieuzorg op maat van het MKB, Den Haag, 1997
- SCCM, Jaarverslag 2000, 2001
- SCCM, Certificatie van milieuzorgsystemen, informatie en achtergronden.
- Wegwijzer Vergunning op Hoofdzaken, Vergunningverlening op maat, Zoetermeer, 1999
- Dutch web-sites
- www.fo-industrie.nl
- www.SCCM.nl
- www.schonerproduceren.nl