MILJØMINISTERIET
Miljøstyrelsen

Integrated Supply Chain Information

Synergy between Eco-labels and other Information Schemes regarding Environmental data

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Content

Foreword

The present study was initiated in January 2004 based on a call for tenders from the Danish Environmental Protection Agency. The objective of the call was to conduct studies, which may support the work at Community level regarding Integrated Product Policy. The study was financed by the Danish Environmental Protection Agency.

The report has been elaborated by Birgit Engelund, M.Sc., Lasse Kragh Andersen, M.Sc. and Preben Kristensen, M.Sc. (pk@dtc.dk) all Danish Toxicology Centre, DTC and Birgitte B. Nielsen, M.Sc., Valør & Tinge. (birgitte@v-t.dk).

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The opinions and recommendations made in the report are not necessarily supported by the Danish Environmental Protection Agency.

Summary and conclusions

Objectives of the study

The present report analyses the possible synergies between the following schemes which all include incentives or obligations to inform stakeholders, customers or the public regarding issues of relevance to health or environmental protection:

- The Integrated Pollution Prevention and Control Directive (Council Directive 96/91/EC) (IPPC)
- The Safety Data Sheet Directive (Dir. 2001/58/EC) (SDS)
- The EU Eco-Management and Audit Scheme (Reg. 761/2001/EC) (EMAS)
- The Revised Community Eco-label Award Scheme (Reg. 1980/2000/EC) (EU Eco-label)
- Member states initiatives regarding Environmental Product Declarations (EPD) based on ISO 14.025 (type III labelling)

There are other schemes applied on a global or regional scale, e.g. the EU energy label, the ISO environmental management standard (ISO 14.001), and the ISO type II standard regarding environmental self-declarations (ISO 14.024). The above 5 schemes have been selected as they are identified as being among the most important voluntary tools in Commission Green Paper for Integrated Product Policy and Commission Announcement on IPP (2003) (EMAS, Eco-label, EPD) or is obligatory for many European enterprises (IPPC, SDS).

The overall scope of the analysis is to:

- Identify barriers for achieving a better co-ordination of the 5 schemes
- Identify benefits for the users of a further integration
- Suggest measures for an improved synergy and co-ordination

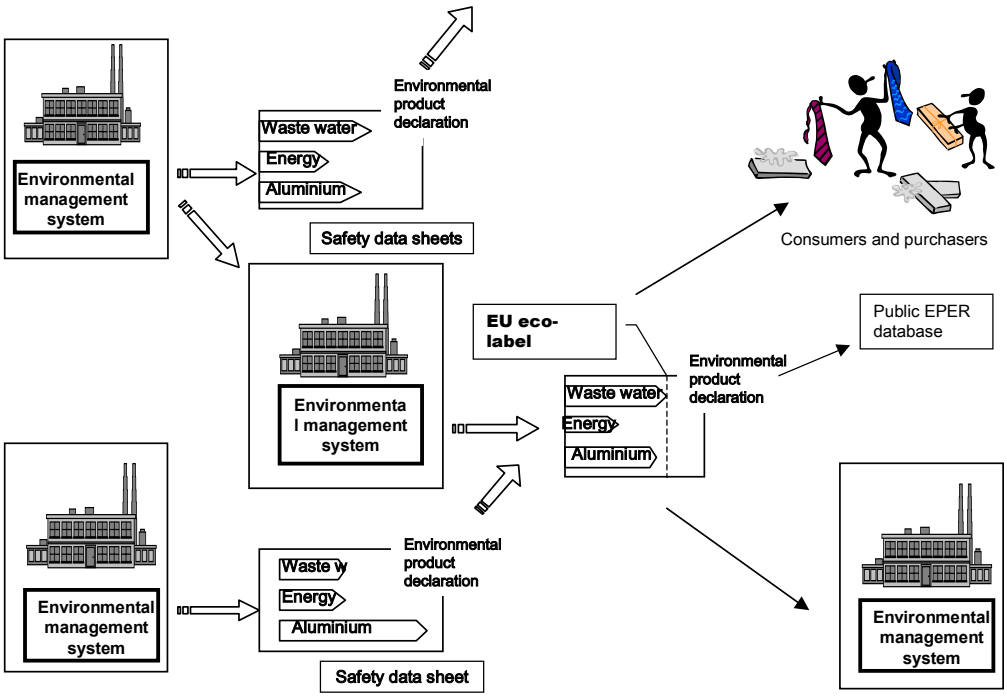
A work hypothesis regarding how the flow of information may be organised in an integrated product information system is out-lined in the figure below.

Method of analysis

The analysis is organised as a “two-factor” comparison between those combinations of tools, where an improved coordination seems most beneficial and where some barriers for an increased coordination are present today:

- IPPC and EMAS (chapter 4),
- EMAS and Eco-label (chapter 5),
- Eco-label and EPD (chapter 6) and
- Eco-label and SDS (chapter 7).

Other combinations, which are relevant to study, have been handled briefly in chapter 4-6 (e.g. the analysis of IPPC and EMAS also discusses the contribution of IPPC data reporting in relation to Eco-labels).



A horizontal analysis of data and verification requirements for all systems and how synergy may be improved are made in chapter 8, and overall conclusions and recommendations are presented in chapter 9.

The 5 different schemes are briefly outlined in chapter 3 for readers not familiar with the schemes.

Recommendations
18 distinct recommendations are made based on the study. The main recommendations are:

1. An integrated environmental and health communication system should be developed and agreed upon in EU. As a first step, a strategy for how to develop, implement and manage an “Integrated product chain environmental and health communication system” should be elaborated.

2. A common life cycle analysis (LCA) framework should be established at community level further detailing the ISO standard 14.040. This “EU-standard” should be applied for elaboration of eco-label background documents for criteria settings, for Product Category Rules for EPD’s and for the further development of the product focus in EMAS.

3. The Commission should initiate working for the preparation of an EU regulation for environmental product declarations (EPD's) based on the eco-label and EMAS regulatory framework

4. Mechanisms should be established to promote the formal coordination between the schemes at both national and Community level. The EU Competent bodies for EMAS and Eco-labels (and EPD) should merge into one single body to promote coherence between the schemes

5. A common framework for verification of environmental and health information systems should be established covering the voluntary tools Eco-labels, EMAS and EPD (if established). The stringency of compliance control

of the obligatory instruments IPPC and SDS should be similar to the stringency of the third party verification of voluntary tools.

6. Guidelines and other background documents elaborated for the purpose of a single scheme should be made available for users of other relevant schemes.

The results

The results of the analysis clearly document the need for a stronger coordination of information systems with similar target groups and objectives. Highest priority should be given to a stronger coordination of Eco-labels, EMAS and EPD's, but also the IPPC data collection and the Safety Data Sheet have many aspects, which should be co-ordinated with the three other schemes. Most of the non-consistencies identified are presumably due to low or missing coordination between sectors responsible for the establishment and management of the schemes.

There are obvious benefits for the stakeholders – both those applying the schemes (enterprises) and those receiving the information (down stream users, authorities and consumers). Perhaps one of the most important benefits is the maintenance of credibility and thus the future applicability and success of the systems.

The primary targets for increased coordination may be subdivided into

1) framework and guidelines,
2) data collection, management and reporting and
3) verification.

Eco-label criteria are based on life cycle thinking – but the way of thinking may vary considerably between various product assessments partly due to the lack of appropriate requirements and guidelines. Some member countries are in the process of establishing their own LCA-based national EPD schemes (e.g. Italy, Sweden and Denmark), which to some extend is co-ordinated informally. The LCA methodology used is based on an ISO standard, but the standard allows considerable degrees of freedom, which may lead to significant differences and thus difficulties of interpretation and comparison between the established systems. There is a need for a common EU defined LCA framework to be applied for LCA based assessments and information systems.

An Environmental Product Declaration system may fulfil the need of communicating LCA based data in the product chain. An EPD may deliver LCA based data from the company to its suppliers and professional customers. EPD may therefore link together Eco-labels (target group: the consumers) and EMAS (target group: enterprises) and may be the system needed for EMAS to further develop into an environmental product management system (EMAS II). Especially EPD's and eco-labels should make use of the same LCA framework to facilitate the use of Product Category Rules (PCR) in the establishment of eco-label criteria and vice versa.

In all schemes, a number of documents are elaborated to support the implementation, e.g. background reports and criteria documents for the eco-label; BREF documents for identification of best available cleaner technology (IPPC), guidance documents for environmental management (EMAS), and

PCR documents for EPD. These documents - although targeted a specific scheme - are valuable for all IPPC, EMAS, EPD and eco-label users and should therefore be disseminated to a broader user group, i.e. by elaboration and distribution of easy-to-read summaries of the documents to the users or target groups of all schemes.

By way of illustration it is the general impression, that much more companies use eco-label criteria as bench markers for their environmental management compared to the number actually holding a license for the label. As the overall objective of the label is to increase the environmental performance of goods and services, the former use should be promoted in parallel to promoting the labelling of products.

The extent and quality of the third party verification of the various systems is presently not coherent. Systems with a weak independent verification may not be regarded as credible by the user of the system. Presently, the SDS scheme is presumably the weakest verified system, as only a retrospective spot-check is performed. But also the third party verification system of Eco-labels is problematic as there has been established no common requirements and guidelines for the verification performed by the various national verification bodies.
The basis for the establishment of a credible common third party verification system may be EMAS, as it contains all requirements and guidelines for certification and accreditation.

An accredited certification system ensures that the same level of verification is performed in all member countries and thus that the obligations are the same for the users achieving and maintaining licences.

The management of the various schemes is placed at different national agencies or sectors. Also at EU level each scheme has its own competent body forum. There are no established mechanisms for coordination at management level neither at national nor at EU-level. To achieve a coherent EMAS, Eco-label and EPD system one competent body at EU-level should be given the responsibility for the maintenance and promotion of the schemes.

Sammenfatning og konklusioner

Baggrund og formål
De nedenfor anførte ordninger indeholder alle incitamenter eller forpligtelser til at informere forskellige markedsaktører og offentligheden om relevante spørgsmål vedrørende sundheds- og miljøbeskyttelse.

- IPPC Direktivet (The Integrated Pollution Prevention and Control Directive - Council Directive 96/91/EC))
- Sikkerhedsdatabladsdirektivet (The Safety Data Sheet Directive - Dir. 2001/58/EC))
- EMAS forordningen (The EU Eco-Management and Audit Scheme - Reg. 761/2001/EC))
- EU's miljømærkeforordning (The Revised Community Eco-label Award Scheme - Reg. 1980/2000/EC)
- Medlemslandende initiativer vedrørende Miljøvaredeklarationer (MVD) baseret på ISO 14.025 (type III mærkning)

Udover disse ordninger findes der andre ordninger, der anvendes globalt eller regionalt, f.eks. EU's energimærke, ISO standard for miljøledelse (ISO 14.024) og ISO standard for selvdeklarering (Type II miljømærkning).

De ovennævnte 5 ordninger er udvalgt, fordi de er blandt de vigtigste frivillige redskaber i Kommissionens "Green Paper for Integrated Product Policy and Kommissionens meddelelse om IPP (2003) (EMAS, EU's miljømærke, Miljøvaredeklaration) eller fordi de er obligatoriske for mange europæiske virksomheder (IPP, sikkerhedsdatablade).

Analysens overordnede formål er at:
- Identificere barrierer for en bedre koordinering af de 5 ordninger
- Identificere de fordele brugerne opnår ved en bedre integration af ordningerne
- Foreslå tiltag som sikrer en bedre synergi mellem og koordinering af ordningerne.

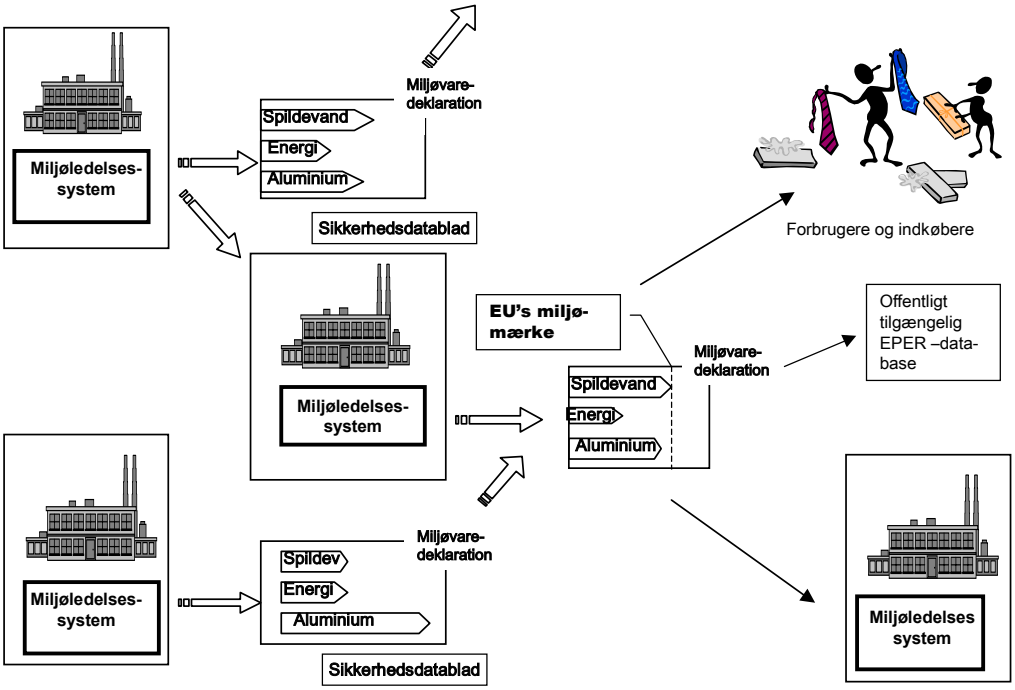
Nedenstående figur illustrerer en arbejdshypotese for, hvordan informationsflowet kan organiseres i et integreret produktinformationssystem.

Undersøgelsen
Der er gennemført sammenligning af ordningerne to og to, idet de ordninger, hvor en forbedring af koordineringen synes mest værdifuld, og hvor der i dag er barrierer, der står til hinder for denne forbedring, er udvalgt:

- IPPC og EMAS (Kapitel 4),
- EMAS og EU's miljømærke (Kapitel 5),
- EU's miljømærke og Miljøvaredeklaration (Kapitel 6) og
- EU's miljømærke og sikkerhedsdatablade (Kapitel 7)

Andre relevante kombinationer af ordningerne beskrives kort i kapitel 4-6. F.eks. er der i kapitel 4 som omhandler analysen af IPPC og EMAS også

inddraget en diskussion af bidraget af IPPC datarapportering i relation til



EU's miljømærke.
Kapitel 8 omfatter en tværgående analyse af data og verifikationsbehov for alle systemer. Anbefalingerne på baggrund af analyseresultaterne fremgår af kapitel 9.

Af hensyn til læsere uden kendskab til ordningerne, findes der en kort beskrivelse af de 5 forskellige ordninger i kapitel 3.

Hovedkonklusioner
Der er på baggrund af analysen udarbejdet 18 klare er anbefalinger. De væsentligste er:

1. Der bør udvikles et produktrettet integreret kommunikationssystem for miljø og sundhed, som kan vedtages i EU. Som det første trin, bør der udarbejdes en strategi for, hvordan man kan udvikle, implementere og styre et sådant system for "integreret miljø- og sundhedskommunikation i produktkæden".

2. Der bør på EU-niveau udarbejdes struktur for en generel livscyklusanalyse (LCA), der nærmere specificerer ISO standard 14.040. Denne "EU-standard" bør danne basis for udarbejdelse af baggrundsdokumenter i forbindelse med fastlæggelse af kriterier for miljømærker, og ved udvikling af produktspecifikke retningslinier (PCR) for miljøvaredeklarationer samt ved den videre udvikling af produktfokus i EMAS.

3. Kommissionen bør igangsætte arbejdet med udarbejdelsen af et EU-regulativ for "Miljøvaredeklarationer" (MVD'er) baseret på den regulatoriske struktur for miljømærker og EMAS.

4. Der bør etableres mekanismer til fremme af den formelle koordinering mellem ordningerne både nationalt og på EU-niveau. EU-kompetente organer for EMAS og EU's miljømærke (og MVD) bør samles i et organ, der kan fremme koordineringen af ordningerne.

5. Der bør etableres en fælles struktur til verifikation af informationssystemer for miljø- og sundhed. Systemet skal dække de frivillige redskaber: EU's miljømærke, EMAS og Miljøvaredeklarationer (hvis det etableres). Kontrollen med de obligatoriske ordninger (IPPC og sikkerhedsdatablade) bør have samme stringens som de tredjeparts verificerede frivillige ordning.

6. Vejledninger og andre baggrundsdokumenter, der er udarbejdet til en bestemt forordning, bør gøres tilgængelig for brugere af andre relevante ordninger.

Projektresultater
Det dokumenteres, at der er behov for en stærkere koordinering af informationssystemer med samme målgrupper og formål. Højeste prioriteret bør være en stærkere koordinering af miljømærkeordninger, EMAS og miljøvaredeklarationer, men også IPPC data og sikkerhedsdatablade har mange aspekter, som bør koordineres med de 3 andre ordninger. Tilfælde hvor der ved analysen er konstateret inkonsistens, skyldes formodentligt manglende koordinering mellem sektorer, der er ansvarlige for etablering og administration af ordningerne.

Der er oplagte fordele for aktørerne – både for dem, som anvender ordningerne (virksomheder) og dem, som modtager information (virksomheder, myndigheder og forbrugere) – ved en stærkere koordinering af de forskellige ordninger. Hvis ordningerne skal have succes og bevares i fremtiden, er det en forudsætning af troværdigheden bevares,

De hovedområder, hvor koordinering primært bør øges, kan underopdeles i:

1) Struktur og vejledning
2) Dataindsamling, administration og rapportering – og
3) Verifikation

Miljømærkekriterier er baseret på livscyklus tankegangen. Graden af livscyklus perspektiv, kan imidlertid variere meget inden for de forskellige produktkategorier. Dette skyldes til dels, at der ikke eksisterer veldefinerede retningslinier og tilstrækkelig vejledning i forbindelse med udarbejdelse af baggrundsdokumenter.

Nogle medlemslande er i gang med at etablere deres egne LCA-baserede nationale ordninger for miljøvaredeklarationer (f.eks. Italien, Sverige og Danmark), som til en vis grad er koordineret på et uofficielt plan. Den LCA metode, der anvendes, er baseret på en ISO standard. Denne standard tillader imidlertid en stor grad af frihed, som kan resultere i betydelige forskelle og hermed vanskeligheder i forbindelse med oversættelse og sammenligning af de etablerede systemer. Der er derfor behov for en fælles EU-defineret LCA-

struktur, der kan anvendes i LCA-baserede vurderinger og informationssystemer.

Et miljøvaredeklarationssystem vil kunne dække det behov, der er for at formidle LCA-baserede data i produktkæden. Miljøvaredeklarationen vil kunne levere LCA-baserede data fra virksomheden til dennes leverandører og professionelle kunder. Miljøvaredeklarationen vil således kunne sammenkoble miljømærker (målgruppe: forbrugerne) og EMAS (målgruppe: virksomheder) samt muliggøre en videreudvikling af EMAS til et produktrettet miljøledelsessystem (EMAS II). For at kunne anvende de produktspecifikke retningslinier (Product Category Rules) i forbindelse med fastlæggelsen af miljømærkekriterier og vice versa er det en nødvendighed at der anvendes samme LCA-struktur for både miljøvaredeklarationer og miljømærker.

For alle ordningerne gælder det, at der er udarbejdet en række dokumenter, som skal understøtte implementeringen, dvs. baggrundsrapporter og kriteriedokumenter for miljømærker; BREF dokumenter til identifikation af "Best Available Cleaner Technology" i forbindelse med IPPC, vejledning om Miljøstyring i forbindelse med EMAS, og produktspecifikke retningslinier i forbindelse med miljøvaredeklarationer. Selvom disse dokumenter er udarbejdet i forbindelse med en specifik ordning, har de betydning for alle der er involveret i IPPC, EMAS, miljøvaredeklarationer og/eller miljømærker. Information om disse dokumenter bør derfor formidles på en lettilgængelig måde overfor en bredere gruppe af aktører. Dette kunne f.eks. gøres ved at udarbejde og formidle letlæselige resuméer af dokumenterne til målgrupperne for alle ordningerne.

Til illustration af dette, er det det generelle indtryk, at der er flere virksomheder som bruger miljømærker som benchmarkers i forbindelse med deres miljøstyring, end der er virksomheder som er licenshavere af miljømærker. Eftersom det overordnede formål med miljømærker er at forbedre de miljømæssige egenskaber af produkter og serviceydelser, bør denne anvendelse promoveres parallelt med promoveringen af miljømærket.

Omfanget og kvaliteten af tredjepartsverifikationen af de forskellige systemer er ikke konsistente i øjeblikket. Systemer med en svag uafhængig verifikation kan ikke af brugeren betragtes som troværdig. I øjeblikket er sikkerhedsdatablads systemet sandsynligvis det system, der er dårligst verificeret, idet der kun gennemføres et retrospektivt spot-check. Men også tredjepartsverifikationssystemet for miljømærker er problematisk, fordi der ikke er blevet opstillet generelle krav og vejledning til den verifikation, der skal gennemføres af de forskellige nationale verifikationsorganer.

Basis for etableringen af et troværdigt tredjepartsverifikationssystem kunne være EMAS, da der allerede er udarbejdet krav og vejledninger til verifikation under dette system.

Et akkrediteret certifikationssystem sikrer at verifikationsniveauet er det samme i alle medlemslande og at brugerne har de samme betingelser, når de skal opnå og vedligeholde licenser.

Styringen af de forskellige ordninger er placeret i forskellige nationale styrelser eller sektorer. Selv på EU-niveau har hver ordning sit eget kompetente forum. Der er ikke oprettet koordinerende mekanismer på ledelsesniveau hverken på nationalt eller på EU niveau. For at kunne opnå et konsistent EMAS,

miljømærke og miljøvaredeklarationssystem anbefales det, at ét kompetent organ på EU-niveau bliver ansvarlig for vedligeholdelse og promovering af ordningerne.

1 Introduction

During the last decade, a number of schemes have been developed by authorities and private organisations intended for the communication of environmental (and health) performance of company activities including their products and services to customers, investors and others.

Typically, the development and implementation of these schemes have taken place based on separate legislations and agreements without much reuse or attempts of synergy between the schemes. Each arrangement has its own unique character, organization and decision flow. From a user point of view, information tools with similar objectives and similar data should be integrated to facilitate re-use of data, easy management and co-ordinated verification.

This report analyses the possible synergies between the following schemes which all include incentives or obligations to inform stakeholders, customers or the public regarding issues of relevance to health or environmental protection:

- The Integrated Pollution Prevention and Control Directive (Council Directive 96/91/EC) (IPPC)
- The Safety Data Sheet Directive (Dir. 2001/58/EC) (SDS)
- The EU Eco-Management and Audit Scheme (Reg. 761/2001/EC) (EMAS)
- The Revised Community Eco-label Award Scheme (Reg. 1980/2000/EC) (EU Eco-label)
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There are other schemes applied on a global or regional scale, e.g. the EU energy label, the ISO environmental management standard (ISO 14.001), and the ISO type II standard regarding environmental self-declarations (ISO 14.024). The above 5 schemes have been selected as they are identified as being among the most important voluntary tools in Commission Green Paper for Integrated Product Policy and Commission Announcement on IPP (2003) (EMAS, Eco-label, EPD) or is obligatory for many European enterprises (IPPC, SDS).

The Integrated Pollution Prevention and Control Directive (IPPC) defines common rules of approval of industrial installations. All installations covered by *Annex I* of the Directive are required to obtain an authorization (permit) from the national authorities. A public accessible European Pollution Emission Register has been elaborated containing emission data from IPPC facilities.

Safety data sheet (SDS) is a tool used to communicate hazardous properties of substances and products (preparations) as well as measures to reduce the risk, especially the occupational health of professional customers. Companies producing or importing hazardous chemical substances or products are obliged to prepare safety data sheets as defined in the relevant EU Directives. The Directive is expected to be amended within a few years (2005/06) due to

the new EU chemical legislation (REACH) as SDS' are to be expanded to include information regarding uses/exposure of hazardous substances in the product chain.

The EU-regulation *"Eco-Management and Audit Scheme" (EMAS)* includes the obligation to elaborate a public accessible *Environmental Statement.* The purpose of the statement is to communicate the company's efforts to reduce the environmental impact from its facility to the public. The regulation came into force in 1993 and was revised in 2001. The revised scheme (EMAS II) is intended to be more product-oriented. In addition to direct environmental aspects, the products should also be considered in a life cycle perspective. The environmental statement is based on a third party verified environmental management system. Participation is voluntary.

The EU eco-label provides companies with a tool to communicate the lifecycle-based environmental qualities of their products to the consumers in a simple and reliable fashion. The label is third party verified (ISO type I). Participation is voluntary.

The environmental product declaration (EPD) is a tool for communicating life cycle based environmental data of a product to the company's professional customers. At present, there are no international adopted schemes in force. In Sweden, Italy and other countries, voluntary third party verified systems have been developed and implemented within the past few years (ISO type III). In Denmark, a system similar to that in Sweden is under development.

There is an increased focus on the need to establish a better synergy between the above tools. At the IPP authority network meeting in Copenhagen (October 2002), potential synergies were discussed. The recommendations from the meeting – distributed to a number of stakeholders – mentioned that in the long run an "intelligent integration" should be developed between environmental labels, environmental management systems and environmental product declarations.

The Commission announcement on IPP (2003) highlights the need for a coordination of IPP tools, and it is stated that environmental management systems (EMAS/ISO) provide a good framework for integration of the lifecycle way of thinking. Also the announcement identifies the need for integration with other policy areas including chemicals.

Presently there are good possibilities of improving the synergy between the five information systems. The eco-label regulation is to be analysed by the Commission regarding needs for update (2005). The EMAS regulation is to be revised (2006) and the Commission is about to define how the product dimension in the regulation is to be interpreted. As an input to the revision process, the Commission have initiated an evaluation of both schemes, which will be finalised by the end of the year (2005). The Directive on safety data sheets is to be revised in 2005-07 in connection with the implementation of EU's new chemical legislation (REACH).

The objectives of the present analysis are to identify measures, which may increase synergies between the five schemes.

2 Scope of the study

The scope of the project has been to analyse an ideal work model of a combined organisation of the various schemes for value chain environmental and health information in operation today. This model was presented by the Danish EPA together with the EUEB Policy Group as the EU informal authority group on Integrated Product Policy (IPP) at meetings during 2001/2002 (fig.1). In addition to the tools showed in fig. 1 also the regulation regarding safety data sheets and the IPPC directive have been included in the present analysis. This is due to the fact that these directives enforce obligations to inform the public in general regarding environmental impacts (IPPC) or the professional down stream users on chemical safety precautions (Safety data sheets) – information which is important for the companies' review of environmental impacts from processes and products in relation to EMAS or ISO 14001. As safety data sheets are included, the analysis has primarily been based on examples in which chemicals contribute significantly to the environmental and health load of the products.

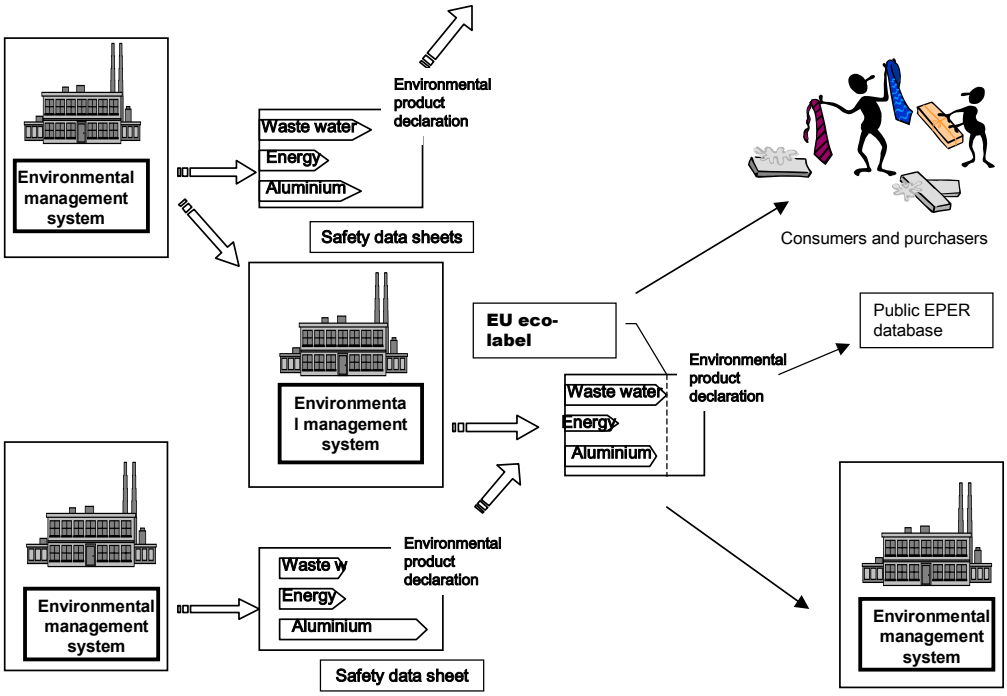


Figure 1 Combined organisation and flow of information in the value chain

The working hypothesis of the project has been that ideally the flow of life-cycle based information in the value chain should be organized in such a way, that the companies receive adequate and reliable information from suppliers on the components and materials which the company uses in its own production. By adding the company's own environmental impacts to that of the suppliers, the company can relatively easily prepare environmental and

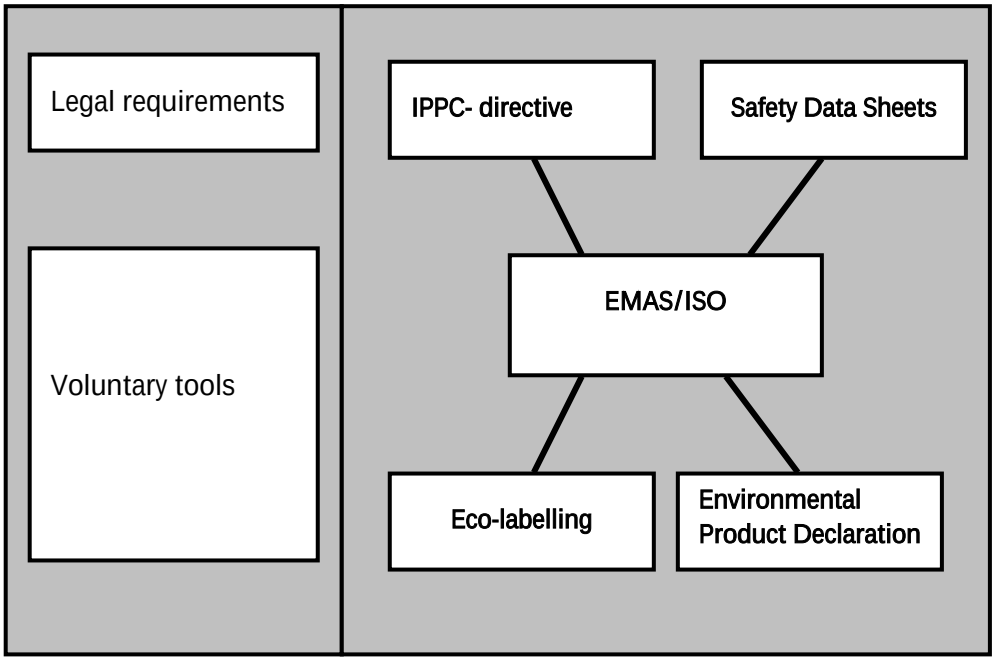
health profiles for its own products. If desired, the company may relatively easily evaluate whether it is capable of obtaining an eco-labels or an EMAS verification.

The management of environmental and health information should be based on EMAS or ISO 14001 and the basic tool for delivering relevant data up and down the value chain should be a lifecycle-based environmental product declaration.

An integrated third party verification of the environmental management system as well as the company's environmental product declarations and labels are an important part of the ideal work model.

The combined rationality of the 5 tools is illustrated in figure 2.

Figure 2: The combined rationality of the 5 tools.



Both the IPPC directive and the EMAS regulation focus on the facility, site and industrial activity, while the Eco-label, the EPD and the Safety Data Sheet focus on the product. A direct linkage of scope of the five systems is therefore not feasible. Only the potential synergy of co-ordinating the management and value chain information obligations of the systems are to be analysed.

The ideal working model as the presented does not exist today and may not be fully applicable. There are areas, however, where further integration could be achieved for the benefit of all users and stakeholder. Consequently, the overall scope of the analysis is to:

- Identify barriers for achieving a better co-ordination of the 5 schemes
- Identify benefits for the users of a further integration
- Suggest measures for an improved synergy and co-ordination

The analysis is organised as a "two-factor" comparison between the combinations of tools, where an improved coordination seems most beneficial and where some barriers for an increased coordination are present today:

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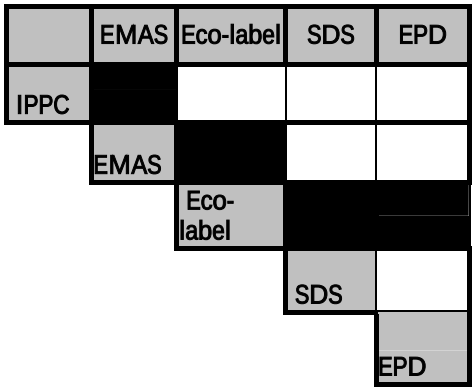
- Eco-label and EPD (Chapter 6) and
- Eco-label and SDS (Chapter 7).

Other combinations relevant to study (Table 1) have been handled briefly in chapter 4-6 (e.g. the analysis of IPPC and EMAS also discusses the contribution of IPPC data reporting in relation to Eco-labels).

A horizontal analysis of data and verification requirements for all systems and how synergy may be improved are made in chapter 8, and overall conclusions and recommendations are presented in chapter 9.

The 5 different schemes are briefly outlined in chapter 3 for readers not familiar with all the schemes.

Table 1 "Two-factor" analysis included in the present report (black marking)



3 Introduction to the five schemes

A brief introduction to the five schemes is given below - divided into systems based on mandatory requirement and systems based on voluntary approaches.

3.1 Environmental Info systems based on legal requirements

3.1.1 The IPPC Directive

The *Integrated Pollution Prevention and Control* Directive (Council Directive 96/61/EC) (IPPC-Directive) entered into force October 1996, and came into effect three years later. Its objective is to apply the principle of integrated permits to prevent or minimise air, water and soil pollution by emissions from certain categories of industrial installations in the Community, with a view to achieving a high level of environmental protection. The directive includes the following issues:

a) the general principles governing the basic obligations of operators;
b) requirements for the application, issuing, reconsideration and updating of permits;
c) minimum requirements to be included in any such permit;
d) measures to ensure compliance with permit conditions;
e) requirements relating access to information and public participation in the permit procedure.

All installations covered by Annex I of the Directive are required to obtain an authorisation (permit) from the authorities and are required to report emissions or releases. Unless they have a permit, they are not allowed to operate.

The directive contains basic rules for the permits. It is an “integrated” permit and it means that the permits must take into account the *whole* environmental performance of the industrial activity, i.e. emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, risk management, etc.
The permits must be based on the concept of *Best Available Techniques* (*BAT*). Assistance to find out which techniques is BAT is available in the Annex IV of the Directive. It contains considerations to be taken into account when determining BAT. Furthermore, so-called BREF's (BAT reference documents) have been developed for over half the sectors listed in annex 1. The BREF's are intended to assist licensing authorities and applicants in how to work with BAT.

In some cases BAT means quite radical environmental improvements, which may be very costly for companies to implement. Therefore, the Directive grants these installations an eleven-year long transition period counting from the day the Directive entered into force.

The compliance with the Directive is enforced and monitored differently in the member countries. To share experience, the European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) has

been established. IMPEL is an informal Network of the environmental authorities of the Member States and associated countries.
The IPPC Directive also provides for the setting up of a European Pollutant Emission Register (EPER).

EPER was launched in February 2004 on the EU IPPC and national homepages. The EPER is a public register to provide environmental information on industrial activities covered by the IPPC Directive. The objectives are:

- to enhance public awareness making the data accessible on an Internet site
- to trigger industry in improving environmental performance and innovating industrial processes. The achievements by industry will result in emission reductions that can be monitored and demonstrated in the EPER register
- to evaluate the progress of achievements in meeting environmental targets in national or international agreements.

The registration is mandatory, and periodically reports from companies on their releases to air, water, soil and wastes are send to the competent authorities reviewing the data.

The EPER is an integrated database with information intended for environmental management both by government in developing environmental policy and by industry in improving eco-efficiency. It is a tool to enhance public awareness of environmental pollution, to inform the public on emissions from individual sources and to enable the public to compare emissions from different sources. It also enables individual facilities to compare their own environmental performance to that of other facilities with similar industrial activities, thus facilitating gradual improvement of environmental management by these facilities and industry in general.

Approximately 20,000 facilities are included in the EPER register.

3.1.2 Safety Data Sheets (SDS's)

The purpose of the safety data sheets are to provide professional users with information on hazardous properties of products in order to enable the user to take the necessary measures to protect health and safety at the workplace and protect the environment. The information includes declaration of hazardous ingredients, as well as guidelines in connection with handling, use and disposal of the product.

Any person (manufacturer, importer or distributor) who is responsible for placing a hazardous chemical product/preparation on the market must supply the professional user with a safety data sheet providing proportionate information.

The information in the safety data sheet primarily aims at the professional user and should enable the employer to assess any risk to the health and safety of workers arising from the use of the product.

Safety data sheets must be prepared according to the EU directive on safety data sheets and requires the following basic information:

- The chemical composition of the product, as a minimum the content of hazardous substances stating percentage intervals.

- The physical/chemical properties of the substance/product.
- The use(s) of the substance/product, including application method(s).

A safety data sheet must be divided into the following 16 sections:

1. Identification of the substance/preparation and of the company/undertaking
2. Composition/information on ingredients
3. Hazard identification
4. First-aid measures
5. Fire-fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure control/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. Toxicological information
12. Ecological information
13. Disposal consideration
14. Transport information
15. Regulatory information
16. Other information.

Dangerous substances contained in preparations and presenting a health or environmental hazard within the meaning of Directive 67/548/EEC, must be listed in the SDS (section 2) together with their concentration or concentration range, if they are present in concentrations equal to or above a defined concentration limit.

For a preparation not classified as dangerous according to Directive 1999/457EC, the following substances must be indicated together with their concentrations or concentration ranges, if they are present in individual concentrations of 1 % by weight for non-gaseous preparations and 0.2 % by volume for gaseous preparations:

- Substances presenting a health or environmental hazard within the meaning of Directive 67/548/EEC
- Substances for which there are Community workplace exposure limits.

In section 16 of the safety data sheet can be stated any other information, which is considered to be important to the health and safety of the user and to the protection of the environment, e.g. information related to requirements in eco-labels.

According to the Directive, the information in the SDS must be written in a clear concise manner. The SDS should be prepared by a competent person, who should take into account the specific needs of the user, as far as it is known. Persons placing substances or preparations on the market should ensure that competent persons have received appropriate including brush-up training.

When a safety data sheet has been revised, the changes should be brought to the attention of the recipient.

The safety data sheet is an important tool with which to communicate health, safety and environmental aspects of a hazardous product in the supply chain.

The compliance with the directive – and potential additional national requirements - is monitored differently in the member countries. Most countries apply more or less frequent spot checks of the SDS's based on sampling at work places. As a result the quality of safety data sheets differs a lot.

3.2 Environmental info systems based on voluntary schemes

3.2.1 EMAS

Environmental management systems are designed to help organisations to improve their environmental performance including the lifecycle performance of their products, activities and services. The systems allow organisations to have a clear picture of their environmental impacts, help them to target the significant ones and to manage them. Environmental management systems also help introduce changes in management style by bringing environmental issues into the day-to-day management of organisations.

The EU Eco-Management and Audit Scheme (EMAS) has been available for participation by companies since 1995 (Council Regulation (EEC) No 1836/93 of 29 June 1993) and was originally restricted to companies in industrial sectors.

Since 2001, EMAS has been open to all economic sectors including public and private services (Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19 March 2001). In addition, EMAS was strengthened by the integration of EN/ISO 14001 as the environmental management system required by EMAS, by adoption of an EMAS logo to signal EMAS registration to the outside world, and by considering more strongly indirect effects such as those related to financial services or administrative and planning decisions.

Participation is voluntary and extends to public or private organisations operating in the European Union and the European Economic Area (EEA) — Iceland, Liechtenstein and Norway.

An EMAS award shows the public that the organisation has set up an environmental management system that allows it to manage its environmental aspects and continually improve its performances.

To receive EMAS registration, an organisation must comply with the following steps:

A. Conduct an *environmental review* considering all environmental aspects of the organisation's activities, products and services, methods to assess these, its legal and regulatory framework and existing environmental management practices and procedures.

B. Establish an effective *environmental management system* (EMS) aimed at achieving the organisation's environmental policy defined by the top management. The management system needs to set responsibilities,

objectives, means, operational procedures, training needs, monitoring and communication systems.

C. Carry out an *environmental audit* assessing in particular the management system in place and the conformity with the organisation's policy and programme as well as compliance with relevant environmental regulatory requirements.

D. Provide a *statement* of its environmental performance, which lays down the results achieved against the environmental objectives and the future steps to be undertaken in order to continuously improve the organisation's environmental performance.

The environmental review, EMS, audit procedure, and the environmental statement must be approved by an accredited EMAS verifier. In addition, the validated statement must be sent to the EMAS Competent Body for registration and made publicly available before an organisation can use the EMAS logo.

The 3rd party verification system includes both a certification process for the applier and an authorisation process for the verificator. This international standardised and adopted system is further described in section 8.

Both EMAS and EN ISO 14001 have the common objective of providing good environmental management. However, they are too often seen as competitors. The Commission has recognised that the International Standard for Environmental Management Systems, EN ISO 14001, can provide a stepping-stone for EMAS. The adoption of EN ISO 14001 as the management system element of EMAS will allow organisations to progress from EN ISO 14001 to EMAS without undue duplication of effort.

EMAS goes beyond EN ISO 14001 in a number of ways, requiring an initial environmental review, active involvement of employees in the implementation of EMAS, and publication of relevant information to the public and other interested parties.

In the middle of 2004, almost 4,000 companies in Europe were EMAS-registered compared to almost 18,000 European companies certified with ISO 14.001. Worldwide approx. 66,000 companies run an ISO 14.001.

3.2.2 The EU Eco-label

The EU-regulation for the Eco-label was adopted in 1992 and revised for the first time in 2000. The regulation sets up a detailed system for managing the development and adoption of new label criteria and for their revision. The regulation also requests the member countries to set up an appropriate organisation to manage the regulation and to promote the use of the label.

The overall purpose of the eco-label is to make it easier for the consumer to identify and purchase products with a documented low environmental impact compared to similar products and that producers may make use of a credible third party verified instrument in their marketing of environmentally high quality products. Eco-labels are intended to be based on a uniform, reliable, transparent and impartial system in connection with information on the environmental performance of the products[1].

In 2004, criteria have been established for 21 product groups and 1 service area (tourist accommodation), e.g. refrigerators, hard flooring, laptop computers, and chemical products like universal cleaning agents, washing agents and paint and varnish. The intension is to increase the number of product groups to 25 - 35 by 2006. The validity period of Eco-label criteria is 3-6 years.

The Commission has established a stakeholder forum, EUEB (the European Union Eco-labelling Board) to ensure a well-balanced participation of all relevant interested parties affected.

The development of eco-label criteria is based on market feasibility studies, life cycle based assessments and state-of-the-art analysis regarding technological development. It may take up to 3 years to establish the criteria for a new product group.

New product categories can be assigned the eco-label if ”based on the consumers' choice of product there can be a substantial improvement of the environment”.

Market feasibility
Before a decision is made regarding initiation of development of new criteria, an analysis is performed on the various types of products within the product group in question on the EU market, the amounts produced, imported and sold as well as the market structure in the member states. Trade inside and outside the Union is also considered. Consumer perceptions, functional differences between the product types and the need to establish sub-groups are mapped and evaluated as well.

The objective is to evaluate the possibilities for the eco-label to be applied as a market tool both by the producers and the consumers.

Life cycle based assessments
The most important environmental impacts, for which criteria are to be prepared, are defined using life cycle based investigations. The life cycle assessments is to be characterised as “life cycle thinking” and has only in rear cases followed the ISO 14040 standard. As life cycle assessments are relative expensive to conduct, a reuse of “old” assessments are seen. This may however overlook essential new knowledge and in the end impact the credibility of the criteria in relation to the objective of the label.

The lack of strict guidelines for elaboration of criteria documents has resulted in assessments of varying strength. The background document for indoor paint and varnish product is for example based on lifecycle assessments from 11 paints. The data collection was conducted in the period 1991-1992. The

[1] www.europe.eu.int/comm/environment/eco-label/index_en.htm

present criteria document is therefore based on knowledge collected more than 10 years ago.

Technological assessments
As a supplement to the life cycle investigations, a technological improvement analysis is conducted, as a criterion is required to contribute to continuous improvement of the environmental performance of the product group.

The analysis includes the following aspects:
The theoretical potential for environmental improvements compared with the possible changes in market structures. This is based on an improvement evaluation on the basis of the lifecycle considerations.
The technical, industrial and financial feasibility and market changes.
Consumer behaviour, perceptions and preferences influencing the efficiency of the eco-label.

The selection of environmental impacts, for which criteria should be made, is based on a priority of the most environmental significant loads and those whose technology is readily available for improvement. The criteria are finally adopted by the EU competent authorities.

A detailed description of the procedure of criteria development and adoption is presented in Annex 1.

In addition to the criteria based on the lifecycle investigations, the criteria include demands for health and for handling the product, i.e. manuals, noise, reuse/recycling declarations.

Health criteria are often indirectly included as restrictions on chemicals with particular health classifications (typically chronic effects such as carcinogenic effects and reproduction toxicity), limitations of the amount of chemicals used as well as declarations of ingredients as guidance to consumers.

According to the regulations, the national authorities are obliged to establish a body for control of applications, for licensing and for compliance monitoring. No guidelines have been established for how these obligations should be implemented. It is therefore anticipated that difference in management (compliance assessment and monitoring) may exist between member states.

3.2.3 Environmental product declarations (EPD)

By 2004, seven countries had an adopted national EPD system more or less in accordance with ISO type III labels. The most developed system in Europe is the Swedish EPD system. A brief description of type III product declaration systems worldwide is given in Annex 2.

The purpose of the EPD is to sum up life cycle based high priority data regarding the environmental profile of the product. Such data may be used in environmental management, in product innovation and design and for informing professional customers of environmental profile of the product. The user-face of EPD is thus primarily business-to-business.

ISO adopted in 2000 a technical report regarding EPD after several years of discussions (ISO TR 14025). The technical report describes possible elements of the so-called ISO type III labelling. This work has progressed since then and ISO intends by the end of 2005 ISO to publish a standard for

EPD principles and programmes - ISO 14025. This International Standard will establish the principles and procedures for developing Type III environmental declaration programmes and Type III environmental declarations. It will also specifically establish the use of ISO 14040 standards on LCA in the development of Type III environmental declaration programmes and Type III environmental declarations.

The LCA – or life cycle inventory (LCI) – identifies the environmental impacts divided into a number of preset categories over the entire life cycle from cradle to grave and offers the possibility to identify where in the lifecycle the most important environmental loads are to be found. Such LCA data is the core element of the ISO type III Ends. The EPD therefore is an important fundament for the company in its effort to prioritize its environmental work. In addition the standardised approach of the ISO type III labelling facilitate that the company may compare the environmental impact of comparable and competing products from suppliers and are thus given the possibility to let environmental aspects be included in purchase decisions.

The main thoughts and ideas of the EPD system is presented in table 2 as set up by the Swedish competent EPD body.

Table 2 General principles behind the Swedish EPD programme[2]

Key words in the Swedish EPD scheme	
Voluntary	EPD programs must be voluntary in nature.
Openness and Consultation	EPD programs must implement a formal consultation mechanism for the participation of interested parties.
Product Functionality	EPD programs must be able to demonstrate transparency through all stages of their development and operation, implying that information must be available to interested parties for inspection and comment where appropriate.
Transparency	EPD programs must be able to demonstrate transparency through all stages of their development and operation, implying that information must be available to interested parties for inspection and comment where appropriate.
Accessibility	EPD programs must ensure that application and participation are open to all potential applicants fulfilling the specific data requirements for a given product category and the other program requirements, that they must be authorised to publish the declaration and, if being a part of the program, entitled to be granted a license.
Scientific Character	EPD programs must, consistent with the principles of ISO 14020, rest on the methodology to develop EPD's based on sound scientific and engineering approaches that accurately can reflect and communicate the environmental aspects contained in the declaration.
Confidentiality	EPD programs must guarantee to maintain the confidentiality of all information identified as confidential.
Cost Effectiveness	EPD programs are usually based on existing ways of working with verification and registration currently available on the market, based on open and established systems.

In order to compare the environmental impact at a quantifiable level in a lifecycle perspective and thus to compare the EPD's for different products, the results obtained must be presented in a uniform manner. It is therefore necessary on top of the ISO standard to define functional units, system limits, set up strategies for data collection, calculation methods and result analysis guidelines. Within the Swedish EPD scheme this has been covered through the development of a document identifying, in a detailed and structured

[2] www.environdec.com

manner, which product information must be included in the environmental product declaration and which may be excluded. The general EPD document specifies how the ISO standard should be interpreted within the geographic area to be covered by the EPD competent body – private or public.

It is necessary to implement specific guidelines for each product category. Within the EPD framework, this is accomplished by so-called ”Product Category Rules” (PCR)[3]. The PCR is based on a LCA approach as described in ISO 14040 for the defined product category and identifies the primary environmental impacts of the product seen in a life cycle perspective. The PCR document also defines the data format, the structure of the EPD, etc.

PCR must be prepared as a supplement to the general regulations to ensure comparability between the products within the same category. At the moment, approximately 50 PCR documents have been prepared in Sweden.

In Sweden the EPD competent body (”The Swedish Environmental Management Council”) has prepared a guideline for how a PCR should be established[4].

The period of validity for a PCR in Sweden is typically 3 years.

[3] ISO 14025 use the term Product Category Rules (PCR). Many countries use the term Product Specific Requirement (PSR) meaning the same. Countries that have prepared PCR documents: Sweden, Japan. Countries where PCR documents are being prepared: Denmark, South Korea, and Italy.

[4] Product specific requirements (PCR) for preparing an environmental product declaration (EPD), volume III, Swedish Environmental Management Council (www.environdec.com)

4 IPPC and EMAS

Both the IPPC directive and EMAS regulation have the facility, site and industrial activity in focus. It therefore seems reasonable to analyse similarities and synergies between IPPC and EMAS, but also to discuss further links to the product oriented approach in the Eco-labelling and a possible future EU-EPD scheme.

The main questions to be answered are:

- What are the possible synergies between the activities required of an IPPC listed industrial activity and the requirements of an EMAS registered organisation, for instance reviews, data collection and compliance monitoring and use of BREF documents?
- Do EMAS and the IPPC require the same and/or overlapping/duplicating activities regarding e.g. reporting requirements?

4.1 Data collection and environmental aspects - IPPC and EMAS

The permit system in the IPPC framework aims at ensuring that operators of industrial activities must take preventive measures against pollution, to secure in particular that

- the best available techniques are applied
- no significant pollution is caused,
- the waste that cannot be avoided is recovered or safely disposed of,
- energy is used efficiently,
- accidents are prevented and their consequences limited and
- the site of operation is at a satisfactory state when the installation closes. (IPPC directive, article 3)

This integrated, holistic approach should ensure that the total number of the many environmental issues relevant for an industrial facility is considered and data are collected.

The similarities and differences of the environmental aspects to be considered in IPPC and EMAS by a company are compared in Table 3.

The overlap of environmental aspects, for which the companies must collect data and control are obvious, although they are not described in the same way and in the same detail. The IPPC directive indicates in most cases the effect of the environmental aspects to be reduced and/or controlled, while EMAS identifies the aspect of an activity to be considered. EMAS seems to be broader in its inclusion of aspects such as indirect environmental aspects, which include the environmental aspects of its products. Environmental aspects of the company’s products are not mentioned in the IPPC directive, but could be included if the product influences the company's contribution to the environmental effects.

Table 3 Environmental aspects in IPPC and EMAS

IPPC	EMAS (Annex V to the regulation)
• Emissions to the air; • Acidification resulting from emissions to air; • Eutrophication of land and waters resulting from emissions to air or water; • Oxygen depletion in water; • Global warming; • Stratospheric ozone depletion; • Photochemical ozone formation	• Emissions to air
• Releases of persistent, bio accumulative and toxic pollutants to water or land;	• Releases to water; • Use and contamination of land;
• Generation of hazardous and non-hazardous waste;	• Avoidance, recycling, reuse, transportation and disposal of solid and other wastes, particularly hazardous wastes
• Consumption of raw materials and water.	• Use of natural resources and raw materials including energy
• Noise and odour;	• Local issues (noise, vibration, odour, dust, visual appearance, etc.
•	• Transport issues (both for goods and services and employees) • Risks of environmental accidents and impacts arising, or likely to arise, as consequences of incidents, accidents and potential emergency situations Effects on biodiversity. • Indirect environmental aspects, including products

It would be helpful to companies, if the listed environmental aspects were further coordinated in the use of terms and definition - it would facilitate the use for both purposes.

It is also interesting to see how industrial facilities must review and control the environmental aspects.

An IPPC facility must send an application for a permit to the authority. The application must include a description of the activities and processes, inputs and outputs, and the related pollutants as follows:

- The installation and its activities
- The raw materials and auxiliary materials, other substances and the energy used in or being generated in the installation
- The sources of emissions from the installation
- The conditions of the site of the installation
- The nature and quantities of foreseeable emissions from the installations into each medium as well as identification of significant effects of the emissions on the environment
- The proposed technology and other techniques for preventing or, where this is not possible, reducing emissions from the installation
- Where necessary, measures for prevention and recovery of waste generated by the installation

- Further measures planned to comply with the general principles of the basic obligations
- Measures planned to monitor emissions into the environment" (IPPC directive, article 6)

An application for a permit must also include a non-technical summary of the details referred to in the above-mentioned indents.

This application will have several similarities with the demands of the Initial Environmental Review in EMAS.

An organisation participating in EMAS must establish its current position with regard to the environment by means of a review. The aim should be to consider all environmental aspects of the organisation as a basis for establishing the environmental management system.

The review should cover five key areas:

A. Legislative, regulatory and other requirements to which the organisation subscribes;
B. An identification of all environmental aspects with a significant environmental impact, qualified and quantified as appropriate, and compiling a register of those identified as significant;
C. A description of the criteria for assessing the significance of the environmental impact;
D. An examination of all existing environmental management practices and procedures;
E. An evaluation of feedback from the investigation of previous incidents".

Both application and review are descriptions of the situation of the company at a certain time. The application and the review document will also give a description of how operational control and monitoring and measuring of environmental aspects and pollution are carried out for the time being.

After having prepared the initial review, an EMAS company will "establish and maintain documented procedures to monitor and measure on a regular basis, the key characteristics of its operation and activities that can have a significant impact on the environment. This must include the recording of information to track performance, relevant operational controls and conformance with the organisations environmental objectives and targets" (EMAS Regulation, Annex 1- I.A5.1)

Thus for an IPPC listed company, the requirement of an environmental review in EMAS will be rather easy to fulfil, because the task is similar to establishing an IPPC application. And in the later dialogue with the authorities issuing the application and meeting the measuring and monitoring requirements in the permit the EMAS procedures can be helpful ensuring that the requirements are met.

When EMAS II was launched, it was emphasized that an EMAS registered company should also look into the environmental aspects of its products. These aspects are as mentioned above not explicitly covered by the IPPC directive. The IPPC directive only set requirements for the site based emissions and has no life cycle or product chain approach. An EMAS applicant would therefore not be helped by its IPPC application in relation to

the review of the environmental aspects of the products. Depending on the sector, the company belongs to, it may be able to find guidance in the BREF guidance notes. Otherwise the company may seek guidance in the Eco-label or the EPD documents.

EMAS is open for participation of any organisation dedicated to improving its overall environmental performance. Several organisations participating today in EMAS are not IPPC listed companies. These organisations, for instance the service industry, hospitals, public administrations have nothing similar to an initial review or an IPPC application, when they start running for EMAS. Some less polluting industrial companies may have gathered some data and information to authorities, which might be helpful.

There is an obvious synergy in a co-ordination of the requirements in an IPPC application and the requirements in EMAS regarding the initial environmental review. Companies preparing for an EMAS registration and thus requesting information regarding purchased products at its supplier may find it easier to process the received information if the structure and content of an IPPC application and that of an EMAS review was more similar.

4.2Environmental improvements based on BAT

One of the basic IPPC obligations of an industrial facility is to take all the appropriate preventive measures against pollution, in particular through application of best available techniques (BAT).

Over the years, various definitions of BAT have been used in the framework of EU legislation as well as in other contexts such as international conventions. The Directive includes a comprehensive definition that is supplemented by 12 specific considerations listed in an annex. It provides for the determination of BAT not only in a general sense but in specific cases as well.

“BAT shall mean the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for emission limit values designed to prevent and where that is not practicable, generally to reduce emissions and the impact on the environment as a whole”. (IPPC directive, article 2,11)

“Available” does in this context mean those techniques developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator".

This means that BAT can actually vary from one plant to another because costs and benefits can obviously vary. The fact that costs and benefits are elements in the definition of BAT also means that BAT inevitably is a balance between different environmental impacts and associated costs.

When applying for a permit the applicant must investigate and assess the possibilities of implementing BAT. The applicant must be able to explain (account for) the choice of technology and how it is related to BAT.

There are similar considerations to be made in meeting the requirements in EMAS. EMAS requires that the participants are committed to continual improvement of the environmental performance beyond the emission limit values in an IPPC permit and other legal environmental requirements, since it is expected that an EMAS registered company complies with legislation.

"Continual improvement of environmental performance' shall mean the process of enhancing, year by year, the measurable results of the environmental management system related to an organisation's management of its significant environmental aspects, based on its environmental policy, objectives and targets; the enhancing of the results need not take place in all spheres of activity simultaneously". (EMAS Regulation, Article 2b)

This means that a participating company in EMAS year after year must set objective and target for improving the performance and set out action that will ensure that the targets are met. The EMAS regulation does not set performance requirements as the authorities set emission limit value when issuing an IPPC permit. The performance requirements in EMAS are set by the company it self.

AS an IPPC listed industrial facility the company is aware of the BREF-documents. These documents may be a helpful checklist for EMAS companies – listed as IPPC facility or not - in order to identify what is accepted among experts as BAT and how the performance can be improved. These can also be used in the dialogue with suppliers and other stakeholders in the product chain on how to improve the product seen in a life cycle approach. Therefore BREF-documents should be published in a way making them more readable and visible also for other companies than IPPC facilities.

4.3External reporting requirement

Annex III of the IPPC Directive lists the relevant pollutants to be considered to fulfil the requirement of reporting to the EPER (European Pollutant Emission Register). 50 pollutants have been selected based on the environmental significance of the industrial emissions of pollutants and including pollutants for which international reporting requirements already exist.

In addition to the list of pollutants, a threshold value for each of the substances has been specified. The purpose for applying these threshold values is to avoid the need for industry to report insignificant emissions. In general, an industrial facility will usually exceed threshold values for a limited number of pollutants, so that the reporting burden for industry in practice will not be excessive.

In the IPPC directive *facility* is defined as an industrial complex with one or more installations on the same site, where one operator carries out one or more activities. The advantage of this choice is that industry is allowed to report the total emission of each pollutant released by a facility and exceeding its threshold value. To simplify the reporting obligations for the EPER, it is only required to report the total of the industrial emissions of the facility for all pollutants for which the threshold values are exceeded. These data are accessible to the public from the EU EPER website and similar websites at the national Environmental Protection Agencies. It is data of high validity as they are controlled by the local or central authorities although different approaches are applied in the Member States.

In EMAS there is also reporting requirements. The industrial facility must prepare an environmental statement.

The organization must produce environmental information in the form of an environmental statement, to be validated by the environmental verifier. This information must be available for the public. The environmental statement is a tool for communication and dialogue with the public and other interested parties regarding environmental performance.

The minimum requirements for the environmental statement are:

A. A clear and unambiguous description of the organisation and a summary of its activities, products and services;
B. The environmental policy and a brief description of the environmental management system
C. A description of all the significant direct and indirect environmental aspects
D. Description of the environmental objectives and targets
E. A summary of the data available on the performance of the organisation
F. Other factors regarding environmental performance including performance against legal provisions with respect to their significant environmental impacts; (EMAS regulation Annex III)

In EMAS the requirement is also based on the total emission of the facility – not detailed emission on each activity/product. The requirements says a summery of data, but in general verification terms all data on all significant environmental aspects should be mentioned, which should include at least what is required to be reported to the authorities.

This means that an EMAS registered facility must prepare a report, which covers more than emission data, but as a minimum includes the same data already reported as a consequence of the IPPC-directive. These IPPC data will thus be a subset of the EMAS Statement. There is a significant synergy foreseen, if this type of data were applied also in down stream value chain communication (EPD, eco-labels).

4.4 Synergies between IPPC and EMAS

There are some advantages and benefits for companies working with both the IPPC requirements and EMAS mostly because the schemes are site and facility based and both have focus on improving performance of the whole site and the technology used. These can be further exploited, and authorities, competent bodies and other advisors to the IPPC companies and EMAS applicants ought to communicate these synergies more adequately to the companies to reduce their hesitance to EMAS, because of the risk of a big workload

Better management of environmental aspects
Implementing EMAS makes it easier to comply with the requirements of the IPPC Directive, for example when it comes to preparing applications and monitoring reports. The burden of having both systems *will not* double up because of several overlapping activities. Participating in EMAS (or another Environmental Management System, EMS) might make the IPPC workload less time consuming, as EMAS gives the company a management system,

which organises and structures the work and gives a systematic approach. This also counts the other way around. Having an IPPC application in place gives a quick start to the initial environmental review in EMAS.

The EMAS initial environmental review and IPPC application have similar elements
Both information systems require that the participating company establishes an overview of its current environmental position. Overlapping environmental aspects must be considered and it should be further co-ordinated, especially with respect to terms, definition and structure of the documents.

Guidance on initial environmental review with links to IPPC and BREF
In many member states guidance documents for individual sectors and for SME's have been developed, for instance instructions on how to prepare an initial environmental review. These guidance documents might establish links to the IPPC and the BREF-documents, but it would be helpful to have the link right up front in the EMAS regulation. The EU EMAS Guidance on identification of environmental aspects and assessment of their significance (Available from the EU EMAS homepage) mentions in a toolbox that the company should "review its documents (e.g. safety datasheets, licences)", but the similarities of the data and how they can be used are not further explained.

BREF documents includes valuable information
BREF documents should be used more widely and published in a form and a language, which is useful to a broader audience than IPPC listed facilities, for instance their suppliers and downstream users. The BREF documents will help EMAS companies identify technologies for continual improvement of their performance.

Less work on reporting to authorities
Reporting of emission data in the EPER format will require additional workload for the facilities except for companies with an EMS. For them it is a limited additional effort to provide information on emissions in the EPER format. In case a facility has an environmental management system (EMS), the environmental aspects of the facility are already documented and reported in the system.

The data collected by an IPPC company in relation to its application are controlled by the authorities and are therefore data of high validity also in relation to an EMAS registration and to the validation of the EMAS statement, although the data required for the statement encompass more environmental aspects than is covered by the IPPC.

EPER type information is valuable in the relation to products
The EPER type information (summary of emissions of up to 50 hazardous substances) is a subset of the EMAS statement and could be applied also in down stream product chain communication tools (EPD, eco-label).

The site-specific emission reported to the EPER can be used as an assessment tool to estimate environmental loads for downstream products, if adjustments are conducted. If the EPER should be applicable for downstream value chain communication tools, the following adjustments must be implemented.

1. Today, the EPER sums up the emission of 50 groups of hazardous substances. No differentiation of the substances is applied. To be applicable for Life Cycle Investigations, a quantifiable graduation of

the 50 substance groups must be elaborated in order to estimate the toxicity potential for each substance group. It is recommended, that a determination of toxicity scores for the 50 substances in the EPER register be elaborated by a central EU body, since commonly accepted criteria are essential to the credibility of such method.

2. The EPER are site specific, whereas the EPD and eco-label background data documentation are product specific. Hence, a conversion factor must be used in order to estimate the emission from the functional unit based on the total site emission of a substance group listed in the EPER. To assign a reliable conversion factor, the responsible person must have a thorough knowledge of the production site. The more specific the production at the site is, the better the conversion factor estimates will be. If the product diversity of the site is large, it is more difficult to assess the conversion factors with reasonable precision, as the individual mass flow of each product has to be estimated.

The revised EMAS from 2001 (EMAS II) has emphasised a focus on products. This is not emphasised in the IPPC directive and most EMAS companies will have to find guidance elsewhere since no guidance on how to include the product dimension into the management system is available.

In table 4 below some of the main activities in EMAS and IPPC and product related issues are listed. The table compares how these elements are reflected in the more product-oriented schemes and includes a very rough scoring (one to three marks, where 3 is the highest) on the rate of significance of the activity in the different schemes. The scoring illustrates the rate of significance and gives an idea of where to look for more synergies.

Table 4 Scoring of activities in the different schemes

Activity applied	IPPC	EMAS	Eco-Label	EPD	SDS
Data collection and assessment of environ-mental aspects relating to the production site	XXX	XXX	XX	XX	
Data collection and assessment of environ-mental risks relating to the production site	XX	XX		X	
Assessment of BAT	XXX	XX	XX		
Data collection and assessment of environ-mental aspects in relation to the product		X	XXX	XXX	XX
Data collection and assessment of environ-mental aspects of hazardous chemicals	X	X	X	X	XXX
Data collection and assessment of environ-mental aspects relating to all phases of the product life cycle		XX	XXX	XXX	
Procedures and operational instructions for the management of environmental aspects	XX	XXX	XX		XX
Procedures and operational instructions for measuring and monitoring of environmental aspects	X	XXX	XX	X	
External public reporting	X	XXX		X	X

5 EMAS and Eco-labelling

5.1 Introduction

Both EMAS and the EU Eco-label focus on continuous improvement of the environmental performance of the company and its products. In this chapter it is analysed how companies can profit from having both an EMAS registration and an Eco-label license and how synergies between EMAS and the EU-Eco-label scheme can be further developed to achieve a more intelligent integration.

A study concerning similar issues[5] was carried out in 2002 using tourist accommodation and printing paper as cases. In the text box below a brief summary of the study is given.

Summary of an earlier study

The study included interviews with the companies and organisations on the potential synergy and interaction between the EU Eco-label and the EMAS regulations on the operational, performance and marketing level and if there are any barriers for that synergy to be established. The study was limited to two sectors - namely the services from hotels and youth hostels and production of printed matters. These two sectors were chosen because they have experience with both schemes. The study gave a clear picture of how the participants work with the two schemes. They have integrated the two schemes in the daily routines as far as possible. EMAS serves as an instrument to ensure that the correct data are collected and ensure continuous improvements. The Eco-label criteria document is the instrument that helps companies identify significant environmental aspects and set the target for improvements.

Many possible synergies were found at company level, and several recommenddations were made to improve the synergies between the schemes especially at administrative and verification level. According to the interviewed, the administrators of the schemes do not always see the same synergies and are not willing to accept an integrated approach.
The general impression of the schemes is that they are appropriate but implemented in an inappropriate manner and promoted much too weakly. There is a marked wish for a joint verification process and a less bureaucratic process. Several of the interviewed have ideas as to how the schemes can be further developed.

The interviewed companies also reported, that their stakeholders either do not know or have misunderstood the concepts. Some have not understood that the concepts are to reward “the best in the class” and thereby direct product and technology development in an environmentally sound direction through the market forces. Another often met misunderstanding is the concept of the environmental impact of a product. It is not understood that the concept includes environmental impact of the product in the entire life cycle and not just the environmental impact of the final product.

The present study extends the former study with 2 additional case-areas: Textiles and paint & varnish producers.

[5] Possible interaction and synergy between environmental management systems and Eco-labels. Report presented at IPP authority informal meeting in Copenhagen, Valør & Tinge, 2002

In both sectors several companies have experience in EMAS and a number of companies have also one or more licenses for the EU Eco-label.

EMAS and the EU Eco-label scheme have the same overall objective, which is to reduce pollution and to help the front-runners, who want to go beyond the regulatory demands to obtain a competitive advantage, but the approach of the schemes is in the outline completely different.

EMAS requires that organisations set up a management system including targets for continual improvements but without specific environmental performance requirements, such as emission limit values. In EMAS, the organisations set their own performance level.

The eco-label requires organisations to meet specific environmental performance requirements set by an independent third party. The requirements of the products are intended to leave only 30% of the products capable of complying with the requirements. The EU eco-label includes no requirements for a complete and certified management system, but some criteria documents require elements or parts of an Environmental Management System.

In the following, a short introduction to EU Eco-label criteria on textile and paint & varnishes is given including relations to the EMAS requirements.

5.2 The textile industry

In Europe, there are 49 textile companies registered in EMAS and 55 textile products holding the EU Eco-label. The sector has also several other labels and declarations used for environmental claim, for instance Öko-tex. This shows a sector for which the environmental profile of the company has been and still is an important factor in the general management of these companies. It shows an interest in environmentally sound products in the market place, although the environmental factor is never the only and decisive factor in the strategic and market related decisions.

Due to this, many companies in this sector have experiences with both EMAS and an eco-label and they are able to identify areas at both operational and strategic level. They can tell where synergies exist and could be further exploited and what the potential barriers might be.

5.2.1 The EU Eco-label textile criteria document

In the criteria document there are several criteria, and the specific assessment and verification requirements are indicated within each criterion. Where the applicant must provide declarations, documentation, test reports, or other evidence to show compliance with the criteria, the documents states where these should originate.

As part of the introduction to the criteria document it is said: "The Competent Bodies are recommended to take into account the implementation of recognised environmental management schemes, such as EMAS or ISO 14001, when assessing applications and monitoring compliance with the criteria". This recommendation is not mentioned and developed further throughout the document. However, for a company marketing products with

and without eco-labelling several sets of documentation are required, and it would not be possible to manage all requirements without some kind of management system.

As a help to the applicant the competent bodies have developed a common user manual and an application form available from the EU Eco-label homepage. The purpose of the Users Manual is to describe the requirements in form of data and documentation to be compiled by the applicant in order to apply for the EU Eco-label for textiles. In addition, the manual describes the requirements for demonstrating continued compliance once the label has been granted. From this document, the applicant will get an impression of the kind of (quality) management system it would be appropriate to establish in order to secure that for instance the correct environmental impacts are controlled and that control of documents is in place. However, there are no specific requirements concerning an environmental management system.

The criteria document is based on a background report from 2002, which evaluate the various environmental impacts in relation to available technology. This is valuable reading for companies interested in possibilities for environmental performance improvement.

The criteria document is based on a life cycle assessment and covers what the experts and competent bodies agreed on as being the most significant aspects for environmental improvements (for a given time period). The performance level is set with respects to what is technologically and economically viable. Other environmental aspects are left out. This is how the criteria development works in general; it is not a specific issue for the textile product group.

The criteria are divided into three main categories concerning textile fibres, processes and chemicals, and fitness for use. In each of the three main categories there are several requirements to be met and documented that they are met.

There are ecological criteria concerning the fibres:

1. Limitations of toxic residues in the fibres. In cotton for example the residues of certain pesticides must be less than 0.05 ppm
2. Reduction of air pollution during fibre processes. For example VOC emissions from polyester must be less than 1.2 g/kg
3. Reduction of water pollution from fibre processing. For example from viscose emission of zinc must be less than 0.3 g/kg.

There are also limitations of the use of substances harmful for the environment in the production, use and end of life of the textiles. There are for example limitations in the level of impurities, limitations in the level of pigments, limits for formaldehyde, heavy metals, PAH and COD in wet-processing.

The documentation can be made either by:

- providing declarations on non-use
- providing declarations of compliance e.g. a certificate, safety data sheets or product information sheets to prove that certain risk phases are not applied
- analysis test reports
- or other evidence or documentation

This means that the Eco-label applicant or holder must ask for different declarations and test reports from his suppliers ensuring that one or more criteria are met. But the applicant will not necessarily get the actual data, which may be used for an Environmental Product Declaration, Product Oriented Environmental Management System (POEMS) or LCA based product development in general.

5.3 The paint and varnish Industry

The paint and varnish industry is facing a challenge from the consumer who is increasingly aware of the health and environmental risk from the use and disposal of the products.

On the research and development front, the emergence of the public environmental debate has been central in pushing manufacturers towards producing more environmental compliant products. This product group is therefore among those with the highest number of licences.

The product group comprises indoor decorative paints and varnishes, wood stains and related products for use by do-it-yourself and professional users. (Criteria document, Article 2)

5.3.1 The indoor paint and varnish criteria in the EU Eco-label

The purpose of the eco-label for indoor paints and varnishes is:

- to promote effective product use and reduce the amount of waste to a minimum
- to reduce the risk to the environment as well as other risks (such as troposphere ozone) by reducing the emissions from solvents
- to reduce the discharge of toxic substances and other pollutants to the aquatic environment.

Paint is defined as a pigmented coating material, in liquid or in paste or powder form which when applied to a substrate, forms an opaque film having protective, decorative or specific technical properties.

Varnish is defined as a clear coating material which when applied to a substrate forms a solid transparent film having protective, decorative or specific technical qualities.

The criteria have been established based on lifecycle evaluations of 11 paints with the purpose of identifying the greatest potentials for environmental impact. The eleven products selected are considered to be a typical selection of paints and varnishes on the market. They are however, from Germany and Denmark only. Based on these evaluations, the criteria have been established at levels that take into account both the environment and the industry. The life cycle evaluation was performed in 1991 and has not been updated since. This seems very inadequate in relation to the technology innovations during the last 14 years

The criteria for indoor paints and varnishes are divided into 8 main categories:

1. Content of white pigments
2. Volatile organic compounds (VOC)
3. Volatile aromatic hydrocarbons (VAH)
4. Heavy metals
5. Dangerous substances

6. Fitness for use
7. Consumer information
8. Information appearing on the eco-label

In each of the main categories there are several requirements to be met and it must be documented that they are met. The applicant must provide a declaration of compliance for each criterion.

The ecological criteria define limitations of substances harmful for environment and health e.g.:

- white pigments content: must be less than 38 g/m^2 of dry film,
- reduction of air pollution: Sulphur emissions (SO_2) in the production titanium dioxide: SO_x < 300 mg/m^2 of dry film
- limitations in air pollution by solvents (VOCs): wall paints < 30 g/l (minus water)
- heavy substances: Cadmium, lead, chromium VI, mercury and arsenic must not be used as an ingredient of the products
- limitations in the use of dangerous substances: Alkylphenolethoxylates (APEOs) must not be used.

These criteria are in detail and form very similar to the criteria in the textile criteria document. The applicant is recommended to take into account the implementation of recognised environmental management schemes, such as EMAS or ISO 14001. It also means that the applicant or holder must ask for different declarations and test reports from his suppliers. And again the applicant will not necessarily receive the actual data.

As a support to the applicant the competent bodies have developed a common application package and user manual available from the EU Eco-label homepage. It includes application forms and declaration sheets, which the applicant may use to prove that the criteria are met. There is no guidance on how to obtain the information and declarations from the suppliers and there is no reference to EMAS or ISO 14001 as a management tool, which could be used to meet the criteria.

5.3.2 Interview with Danish textile and paint and varnished producers

Eight Danish textile and paint and varnish industries having obtained both EMAS (or ISO 14001) and one or more eco-label license have been interviewed. The person interviewed was the environmental manager of the company.

The textile companies are SME's with both EMAS and eco-label certificates. There are no Danish EMAS registered paint and varnishes companies, but many have ISO 14001. These companies differ from the textile industries in terms of how they use their environmental profile in the market and how they use the ISO 14001 and the Eco-label. It is in general bigger companies delegating the environmental work to different people. As an example, the production manager of one of the companies is responsible for ISO 14001, the marketing director is responsible for the EU Eco-Label license and the laboratory manager is responsible for the tests and declarations required.

Especially for the textile companies the synergies are obvious, because all environmental responsibilities are placed at only one manager. Their general conclusion is that the combination of EMAS and the EU Eco-label has

improved the effect of both EMAS and the Eco-label. They find that EMAS gives management procedure, discipline and documentation and ensure continual improvement of performance – The label criteria identify the level of environmental performance. It is applicable working tools inside the company and gives credibility outside the company.

When the companies regularly are reviewing their list of significant environmental aspects according to EMAS requirements, one of the tools is the EU Eco-label criteria document. The criteria document is based on international expertise and together with other literature and experts assessments it gives a credible view of which significant aspects to pinpoint. But the criteria document does not cover all possible environmental aspects. BREF documents may be another option for inspiration but these documents are not widely used.

The criteria document can be used for setting targets in the period of time – until the companies have a renewed license for the label and the criteria are met. In the application process for the Eco-label, one of the companies made this objective a target in EMAS. For this company, the next target in EMAS in relation to the Eco-label license could be to extend the Eco-label to more product groups or to meet new requirement in the next set of criteria, when they are revised.

The company also identifies environmental targets in EMAS other than those included in the Eco-label criteria. Most of the criteria in the Eco-label are not related to the company itself, but to the suppliers.

Another company mentioned that for instance an EMS target could be to phase out the chemical APEO, which is also required in the Eco-label. But as an EMS target, it could cover all products, not only the licensed ones.

The suppliers are very different – some are at a very high level of environmental performance, others are in a learning process. One of the companies had a procedure for supplier assessment as part of their EMAS. The suppliers are sometimes audited up against the criteria document or the criteria document is used as a tool in the knowledge transfer from the company to the suppliers. The company is demanding that the supplier carries the burden of documentation - now and then after an initial learning process.

Many companies are using their environmental management system to manage both a product label and the eco-label. This means that documentation from suppliers is controlled through their EMAS/ISO 14001 system. For those companies who had a management system in place at the time they began to prepare for the application of the EU Eco-label, they were able to use the existing procedures and routines. At that time they needed general advice in the Eco-label user manual on how to build up a documentation system. It would also help if all company's suppliers and verifiers had the same reference guidance manual.

The general experience of the companies is, that the dialogue with the suppliers has been extended when working with the Eco-label application, and at this stage the synergy between the two schemes is most evident. The collection of data not only at the site, but in the whole product chain has overlapping tasks in EMAS II and the Eco-label.

Also for the verification and certification process the synergies are very evident. Both the EMAS verifier and the Eco-label controller are looking for the same information and documentation in relation to supplier management. It would be less time consuming both in relation to preparation of the visits and the visits themselves if both verifications could be made at the same time.

Several of the interviewed companies underlined that they are not interested in a complete integration of the two schemes. EMAS allows the company to have a broader view on its environmental aspects while the Eco-label is narrowed to the selected environmental aspects. The Eco-label on the other hand allows the company to focus on a selected product category– not the whole variety of product – for instance only the products made from cotton – not the products made from polyester.

5.4 Synergies of EMAS and Eco-label

Based on both the present and the former study it can be concluded that EMAS and the Eco-label, as tools are very helpful to the organisations for their internal environmental work. Most organisations using both tools find that the combined use creates synergy.

- EMAS serves as an instrument to ensure that data are collected and managed according to procedures and in a systematic manner and ensure a process towards continual improvement of the environmental performance.
- The Eco-label is an instrument helping companies identify significant environmental aspects and set targets for the environmental improvements.

Eco-label helps EMAS companies appointing significant aspects and targets
Both schemes require that the participant collects data on environmental performance. In EMAS, the participants must identify its significant environmental aspects and set up criteria for how these were identified. The criteria document as well as the background analysis for the criteria identifies several aspects, which may be significant aspects for any company in the related supply chain and therefore help the EMAS companies identify the significant aspects.

Also the emission limits stated in the criteria documents could assist the EMAS company regarding objectives and targets. As the emission limits are proposed by experts and adopted by authority, the credibility is high. They are valuable bench markers, as they are selected in a way that only the best can meet them.

EMAS helps eco-label applicants with documentation and supply chain management
EMAS management system may likewise help the eco-label holding company in managing all documentation and measurements required to meet the eco-label criteria.

EMAS also set requirement for how the company may communicate with its suppliers. A procedure for supply chain management will also help the Eco-label applicant.

Similar type of requirements in EMAS and the Eco-label

It is well-known that the criteria documents for each product group in the Eco-label scheme are not made from the same template and vary a lot in structure and level of detail in the description of the single criterion.

For some product groups there are examples of EMAS and Eco-labels setting the same requirement for the same issues. The requirement might not be expressed in the same wording, but there is a clear correspondence and overlap. For example several criteria documents have requirements for controlling procedures and training or awareness among employees.

Similarities in requirements of EMAS and the Eco-label – example from printing industry and printed matters

EMAS and eco labels set requirement for the same issues, but at different levels of detail. This is illustrated by the following examples of the demands made on the suppliers:

EMAS I-A.4.6:
"Ensures that activities are carried out under specified conditions by establishing and maintaining procedures related to the identifiable significant environmental aspects of goods and services used by the organisation and communicating relevant procedures and requirements to suppliers and contractors."
EMAS Annex XI 6.3:
"The organisations should endeavour to ensure that the suppliers and those acting on the organisations' behalf comply with the organisations' environmental policy within the remit of the activities carried out in the contract."
Extracts from the Nordic Swan label criteria on printed matters:
"Documentation requirement: 1) Certificate from the manufacturers/supplier of plastics (e.g. specification of plastics) that the plastic present in the printed matter (e.g. lamination) does not contain chlorine or phthalates. 2) Certificate from the license applicant stating that no metal dyes or foil printing is present in the printed matter (exception on book covers, binders, folders and official documents). 3) Certificate from the license applicant stating that no carbon papers are present in the printed matter. 4) Certificate or technical specification from the manufacturer/supplier of plastics that plastics used in packaging (also tapes and plastic foils) does not contain chlorine or phthalates."

For some product groups, there is a complete overlap in requirements. These are found in service oriented product groups e.g. in the tourist accommodation sector.

More and more criteria documents are referring to elements of an environmental management system as helpful for complying with Eco-label criteria. EMAS does not yet have the same recommendation although the product dimension is included in EMAS II. EMAS has a set of guidelines on several issues of building up a management system, but still not a guide on how to incorporate the product dimension. Here a useful reference to the EU-Eco-label should be made.

Table 5 shows some examples of links between EMAS and Eco-label requirements as they are presented in the regulations, criteria documents and other guidance.

Table 5 Links between EMAS requirements and criteria in four criteria document in the EU Eco-label and the Nordic Swan label

Eco-label / Criteria / Environmental Management Systems	The Nordic Swan on Hotel-services	The Nordic Swan on Printing matters	The EU Eco-label on Textiles	The EU Eco-label on Paint and varnishes
Initial environmental review	-	-	+	+
Scope and policy	+	-	-	-
Significant environmental aspect	-	-	-	-
Legal requirements	+	+	+	+
Objectives, targets and programmes	+	-	-	-
Structure and responsibility	+	+	-	-
Training, awareness and competence	+	+	-	-
Communication	+	-	-	-
EMS Documentation	+	-	-	-
Document control	-	-	+	+
Operational controls	+	+	+	+
Emergency preparedness and response	-	-	-	-
Monitoring and measurement	+	+	+	+
Non-conformance and corrective and preventive action	+	+	-	-
Records	+	+	+	+
EMS Audits	+	-	-	-
Management review	+	-	-	-

- : no link
+ : a link in terms of similar requirements

All the interviewed companies were interested in an integrated verification process, especially the SMEs. In the SMEs, often one single person is in charge of and carries out all the work in relation to environmental management, including dialogue with authorities, application for Eco-label, internal audits etc. When it comes to verification, the authorities, the Eco-label verifier and the EMAS verifier have their site visit at different times and the environmental manager must prepare each meeting individually although they are looking for more or less the same issues and the same documentation. This question is further discussed in section 8.3.

6 EU-Eco-label and EPD

The EU Eco-label and the EPD system are analysed with the objective to identify potential synergies between the two schemes. The analysis is based on product categories for which both EPDs and eco labels are available. The Swedish scheme – based on ISO type III labelling - is presently among the most developed schemes in Europe and is therefore used as example of an EPD-system in this analysis.

Environmental impact parameters handled in the eco label criteria for two product areas have been identified, and suggestions are made for how environmental product declarations might look if they were to be based on already exiting criteria documents.

6.1 Strengths and limits of the EU eco-label scheme

One of the main advantages of the eco label is that it is simple and easy to recognise. The eco label is therefore an easy tool for the consumers who want to buy environmental high quality products. Furthermore the system is reliable as it is 3rd party verified and as the products has to comply with criteria defined by experts and adopted by authorities.

Advantages and disadvantages of the EU Eco-label

Advantages:

- Simple
- Easily recognizable at the product
- Reliable as 3rd party verification
- Based on well defined criteria adopted by public authorities

Disadvantages:

- Simple – “either-or” criteria
- There may be non-labeled products on the market with a better environmental profile than labeled products
- Long periods between up-dated versions compared to progress of product innovation
- The criteria documents and guidance may not be readily understandable by applicants

Some companies find that the eco label is not applicable as a market tool. The most often arguments used is that the eco labelling system is subjective and very simplified as they are based on politically established “either-or” criteria. If the environmental impact of a product was presented in a quantifiable manner, an impartial comparison of the environmental impacts of the product could be achieved. Therefore, some companies would instead prefer a product declaration system based on the internationally adopted ISO standard, type III labelling.

The box above highlights some of the advantages and disadvantages of the eco label as a market tool.

6.2 Strength and limits of the EPD scheme

The ISO type III labelling was introduced as a consequence of the growing industrial demand for quantifiable environmental information about products and services.

The Swedish scheme was the first in Europe and is primarily intended for the professional part of the value chain. The objective is to facilitate a standardised and credible market communication of environmental aspects of products.

Until now, EPDs have primarily been developed for heavily energy consuming products such as refrigerators, washing machines, pumps etc. An outline of existing EPD's in Sweden is presented in Annex 2.

As is the case for general life-cycle assessments, there is a tendency for EPD's not to represent hazardous chemicals sufficiently. A PCR has been developed for chemical products in general[6], which can be used for technical-chemical products such as paint/varnishes, detergents etc. So far, an EPD has only been prepared for methyl ethyl keton[7].

Advantages and disadvantages are roughly listed in box below.

Advantages and disadvantages of the EPD system

Advantages:

- The presentation is impartial and neutral
- Impact categories selected by experts based on LCA assessment priority setting
- The quantifiable presentation form makes the manufacturer able to continuously measure the development of his products
- Products may be compared according to level of environmental loads within preset categories

Disadvantages:

- Environmental load information is difficult to interpret for non-experts
- It is costly to establish product specific requirements for new product areas
- The data collection process is very comprehensive
- It may be difficult to achieve quantitative data from suppliers (for eco-label criteria, compliance statements are sufficient)

6.3 Comparison of the Eco-label and EPDs

General similarities and differences between the EU Eco-label and the EPD are presented table 6.

The table illustrates, that the primary differences are to be found in aspects linked to the different targets groups: The professional "up-stream" users and the end-users. A linkage of the two systems seems obvious, as the upstream user needs life cycle data to be able to document the compliance with the eco-label criteria.

[6] Product Specific Requirements for Chemical Products, PCR 2000:5. The Swedish Environmental Management Council, Version 1.0 (www.environdec.com)
[7] Environmental product declaration (EPD) for Methyl Ethyl Ketone. Chemiway Maruzen Petrochemical co (www.environdec.com/reg/e_epd49.pdf)

The barriers for a technical linkage are analysed in the following for product groups for which both EPD product specific requirements and criteria for eco-labels are present: Washing machines and paint/varnishes. The primary data is presented in Annex 3 and the main findings discussed below.

Table 6 Brief comparisons of the EU Eco-label and the Swedish EPD scheme.

The EU Eco-label	Swedish EPD scheme (ISO Type III label)
Benchmark environmental performance criteria within a product group.	Quantitative aggregated environmental impacts categories within a product group
Primary target group: The consumers and other end users	Primary target group: Professional down stream users
Based on life-cycle performance of a pre-defined and weighted set of core environmental attributes	Based on the lifecycle performance of a pre-defined set of core environmental attributes
Third party verified	Third party verified
Only products fulfilling preset criteria are to be assigned the label	All products within the preset product group and which fulfil the data requirements may apply the declaration
Rigid categorisation. Either the product/service is assigned the EU Eco-label or it is not.	Quantitative assessment based on well-defined system boundaries and data requirements. Comprehensive data providing environmental information on a product, similar to a nutritional declaration for food.
Signalise the product's environmental performance.	Need more products with an EPD within the same category to asses the environmental performance of the product.
Based on life cycle thinking – only criteria for selected parts of the life cycle represented	Based on life cycle assessment. Only selected parts of life-cycle loads represented in the EPD
Public authorities adopt criteria based on expert assessments.	A Competent body decides upon product specific requirements for each product category. Down stream users make their own judgement regarding environmental quality.
Relatively moderate data collection requirements. Supplier needs to provide guarantees that the criteria are fulfilled, not exact data.	Very time demanding. Supplier must provide the producer with specific data of the product performance. Can be problematic due to confidentiality concerns.
Chemical content a significant factor in the criteria for some product categories.	Tendency not to consider hazardous chemicals

6.3.1 Washing machines

For washing machines all necessary data for the potential documentation of fulfilment of EU Eco-label criteria are included in the PCR (table 7) with a few exceptions. Hence, if an EPD for a washing machine is prepared, the extra workload of applying for the EU eco label is very low provided the applicant can document compliance.

The EPD on the other hand requires much more information to be available compared to the eco-label requirements.

Table 7 Data inventory requirements for the EU Eco-label and PCR for washing machines.

Category	EU Eco-label	PCR
MANUFACTURER INFO		
Manufacturing Company	Yes	Yes
Manufacturing Site	Yes	Yes
Issuer and contact	Yes	Yes
Guarantee statement	Yes	No
Estimated lifetime	No	Yes
ENVIRONMENTAL PERFORMANCE DECLARATION		
Refinement	No	Yes
Resource Consumption	Yes	Yes
Electricity use	Yes	Yes
Transportation		
Refinement→ Production	No	Yes
Production → Sale	No	Yes
Sale → Use	No	Yes
Use → Disposal	No	Yes
Production		
Energy Consumption	No	Yes
Use of Chemicals	Yes, detailed	Yes, detailed especially for use of heavy metals as well as halogenated and brominated flame retardants
Material List	Yes, some specific materials, mainly chemicals.	Yes, total list
Emission Estimation to air and water	Yes, name of components	Yes
Greenhouse Emissions	No	Yes
Resource Consumption	No	Yes
Use of resources		
Energy Efficiency	Yes	Yes
Water Consumption	Yes	Yes
Spin Drying Efficiency	Yes	Yes
Noise	Yes	Yes
Control of Detergent use	Yes	No (not mandatory)
Criteria for users manual	Yes	No
Washing Performance	Yes	Yes

Category	EU Eco-label	PCR
Disposal		
Recycling	Yes, declaration has to be prepared	Yes Specification has to be made
Amounts of waste	No	Yes
Hazardous waste	Yes	Yes
Separable hazardous materials	Yes, declaration has to be made	No
3 Public accessible data	Data is kept confidential.	Specific data is kept confidential depending of the PCR. The environmental key figures and conclusion are to be stated in the EPD, which is public accessible.

6.3.2 Chemical products / Paint and varnish

Under the Swedish EPD scheme a PCR for chemical products in general have been elaborated (Annex 1). In the following, this EPD has been compared with the background document and the criteria document for the EU Eco-label.

As the product group definition for the two product groups is very different – paint and varnish being a sub-group under "general chemicals"- a detailed comparison is not directly possible. However, it is interesting to compare the two documents in order to analyse whether the generic information relevant for paint and varnish eco-label is included in the PCR for chemicals (table 8) and also the LCA inventory applied for both of them.

Table 8 Comparison of EU Eco-label criteria for paints and varnishes and PCR for chemical products.

The EU Eco-label Paint/Varnish	The EPD/PCR Chemical Products
General Information	
Product group well-defined	Product group not specific
Amount of product needed for 20 m2 surface	Based on functional unit of 1000 kg
	Definition of product, manufacturing process, manufacturing location etc is needed
Health and safety labelling	
A declaration description (safety data sheet or similar) for ingredients has to be forwarded to the certification body	Labelling: Safety and risk phrases have to be stated according to section 15 in the safety data sheet
Cut-off rules	
Eco-label criteria values pre-selected	The manufacturer can omit information concerning activities assessed to contribute to less than 1% of the total environmental impact. The manufacturer has to explain the reason for omitting data
Production	
Not required	Detailed description of environmental impact potential in the production phase, keeping the cut-off rule in mind.

The EU Eco-label Paint/Varnish	The EPD/PCR Chemical Products
	Detailed information on resource consumption
Requirements to emissions of SO_x, sulphate waste and chloride waste from the production of the titanium dioxide pigment used.	Emission to air (CO_2, CH_4, NO_x, CO, VOC and particles) Emission to water: N total, P total, COD. Emission of toxic substances. Selection criteria shall be included.
Product requirements	
Declaration of composition required.	Declaration of composition required.
Instruction manual required.	Description of application method needed.
Restrictions on the content of white pigment, VOC, VHS, heavy metals and dangerous substances.	General information on chemical content of a product is required.
Ingredients criteria: Restrictions on content of compounds classified with N "D*angerous to the environment*", the content of formaldehyde, and isothiazolinone compounds.	
Any use of alkylphenol ethoxylates and diethylene glycol methyl ether is prohibited	
Use	
Declarations on covering efficiency, water resistance etc.	Not mandatory.
Safety instructions required	No immediate requirements, but if the chemical product has a predominant field of application, a quantitative assessment of environmental performance of this particular scenario should be presented.
Transport	
No requirements	Impact potentials from transport have to be estimated.
Disposal	
Description of recommended disposal procedures has to be declared, if possible through pictograms	Recycling material, hazardous waste and other waste information is mandatory. An explicit recycling declaration is voluntary
Other	
	Name of certification body and reference to homepage of EPD system needed.

The major differences appearing from table 8 are predominantly due to the different coverage of the two labels and concrete criteria values selected for the Eco-label. For example declaration demands will primarily be missing in connection with the (end) use of the product, such as instructions for use, warranty etc. that should not be difficult for the manufacturer to prepare or produce.

An interesting point regarding the PCR for chemical products is that additional requirements are needed, if the chemical product has "a predominant field of application". If this is the case, a quantitative description of the environmental performance related to the specific use of the product is

required. This will make the EPD for a specific chemical product groups more similar with an eco-label background document. However, there is no requirement to the form of this additional information.

Based on the eco-label criteria, the relevant safety data sheets for a "generic" paint/varnishes and the generic PCR for chemical products an "environmental product declaration for a paint/varnish" has been prepared (annex 2). This example shows that most of the information requested to elaborate a product specific EPD fulfilling the generic PCR requirements may be obtained from the eco-label criteria document (the eco-label application). On the other hand, relevant information to be used for an eco-label application may be picked up from a paint and varnish specific PCR.

The functional unit is very different in the two labels and for good reasons. For the EPD, the functional unit is 1000 kg product (to be applied for comparison of various chemical products with different applications) whereas for the EU eco-label criteria, it is the amount of paint required to cover 20 m^2 surface (comparison of products with the same application). There is a need for guidance regarding the additional requirements when an EPD are to be elaborated for a specific product group based on the generic PCR requirements. Such guidance should apply the eco-label functional unit whenever appropriate.

The type of information which only appears in one of the labels are summarised in the boxes below:

EPD

- Description of the production process- upstream data in general
- Description of Lifecycle inventory
- Resource Consumption
- Information of environmental impact potentials from LCA-emission categories
- Quantifiable data
- Common functional unit

Eco-label

- Instruction manual
- Warranty statement
- Disposal recommendations
- Use of personal protective equipment
- Use based functional unit

There are no obvious reasons for most of the differences and they are therefore probably the result of lacking co-ordination.

6.4 Synergy between the EU Eco-label and a (future?) EU EPD system

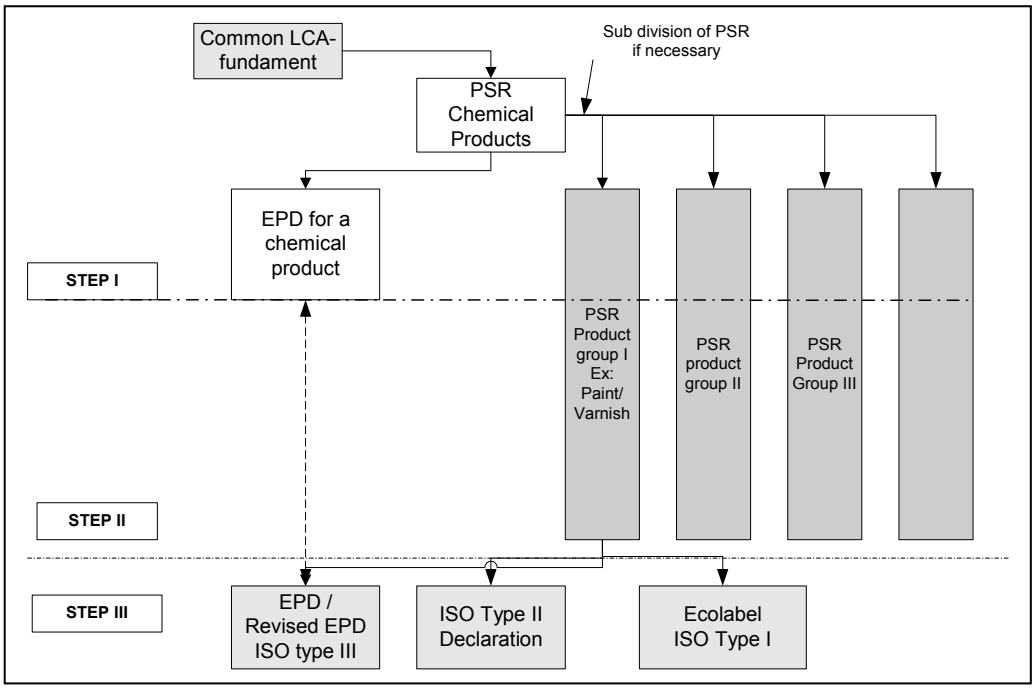
The above analysis of the data requirements for the Swedish EPD and the EU Eco-label gives rise to a number of recommendations for coordination needs should an EU EPD scheme be established.

1: Common LCA foundation
As both schemes are life cycle based, it would be an advantage to use a common LCA foundation. This would lead to consistency in the data collection and to joint system boundaries/definitions. Data collection for lifecycle assessments are very time consuming and a joint data collection effort would save resources. Consequently, it is recommended, that a common

background document should be prepared for the establishment of criteria for the EU eco-label and for the preparation of PCR for the EPD's, respectively.

2. Common PCR for both schemes
Both schemes may be based on the same PCR elaborated as a concerted action between the competent bodies for the two schemes. If eco-label criteria were to be developed for a given product group, this could be done based on the PCR for the product group. This would ensure that a manufacturer in the process of developing an EPD immediately would be able to determine whether it would be possible to obtain an eco-label for the product. A rough example of a coordinated information flow is shown in figure 3.

Figure 3 Example of subdivision of PCR for chemical products



3. Individual "functional units"(FU)
The PCR documents for preparation of EPDs under the Swedish EPD-system are worded very broadly whereas the EU Eco-label criteria document is specified for each individual product group. The functional unit for a PCR thus covers a wide range of product types, particularly for chemical products. When a PCR is to be elaborated, functional units should be specified for sub-categories of products to make it compatible with the functional unit for the EU Eco-label criteria. In practise, this work could be performed as "concerted action" between the relevant competent bodies.

4. Common verification body
If the data collection was coordinated and a common LCA foundation was established for the two schemes, certificates could be awarded in a combined or co-ordinated certification procedure. The same competences are needed for a verifier of the two schemes and since the two systems are meant to complement each other and not to be competitive it is expected that a common verification body may improve the efficiency significantly.

7 Safety Data Sheets and EU Eco-Label

Safety data sheets are part of the picture regarding environmental and health product chain information. SDS is the legislative obligatory instrument for passing information regarding hazardous properties of chemical products and information, how to handle such products safely within the professional part of the product chain. In that way SDS's for chemical products are comparable with EPD's for products in general.

Based on selected product groups (paints/varnishes, washing and cleaning agents), the SDS scheme is analysed for the possibility of supporting relevant data to be used for eco-label documentation. The criteria for paint and varnishes and universal cleaning agents are used as examples of products containing chemicals, or put in another way, as examples of products, which are *not* articles, as there is (presently) no demand for preparation of safety data sheets for articles.

Documentation with regard to eco-labels is in this context defined as the documentation to evaluate whether the product complies with criteria in a given set of eco label criteria and not as the documentation to establish the criteria.

The data need for safety data sheets is outlined in section 3.1.2.

The SDS directive is expected to be amended in the near future due to the upcoming new EU chemical regulation REACH. As REACH is expected to extend the requirements in SDS for information on recommended uses and how chemical products may be used without significant risk to man and environment, a short outline of REACH is presented below.

7.1 Safety data sheets and the new chemical regulation (REACH)

The Commission has brought forward a proposal for a new chemical regulation among others intended to increase product chain information regarding chemical products and articles to liberate chemicals during use and disposal. In addition to the present information included in SDS, the new regulation requires information on how the product may be used by down stream users so that environment and health are not at risk. The legislation is expected to be adopted in 2006/07.

7.1.1 The new EU Chemicals regulation (REACH)

On 29th October 2003, the European Commission adopted a proposal for a new EU regulatory framework for chemicals.[8] Under the proposed new system called REACH. REACH stands for: **R**egistration, **E**valuation and **A**uthorisation of **CH**emicals and will replace 40 different pieces of legislation including the current Safety Data Sheet Directive (91/155/EEC). The proposal is based on the White Paper on the Strategy for a Future Chemicals

[8] COM (2003) 644

Policy, which was published by the Commission in February 2001 and the results of a hearing process.

Under REACH, enterprises that manufacture or import more than one ton of a chemical substance per year would be required to register it in a central database. The aims of the proposed new Regulation are to improve the protection of human health and the environment while maintaining the competitiveness and enhancing the innovative capability of the EU chemicals industry. REACH would furthermore give greater responsibility to industry to manage the risks from chemicals and to provide safety information on the substances. This information should be passed down the product chain. The proposal is now being considered by the European Parliament and the Council of the EU for adoption under the so-called co-decision procedure.[9]

The demands of REACH depends on the marketed tonnage of the substance and the level of concern:

- Registration (> 1 t/year/producer)
- Evaluation (> 100 t /year of substances of concern)
- Authorisation (substances of very high concern)

7.1.2 Registration

All companies manufacturing substances in, or importing substances into, the EU in quantities of 1 ton or more per manufacturer or importer per year must submit relevant information to the Agency before new substances are marketed. Registration requires collection of information on the manufactured or imported substance. The information collected should be used for responsible and well-informed management of the potential risks of the substance and should be documented in their Chemical Safety Report. The information required increases at the tonnage thresholds of 10, 100 and 1000 tonnes respectively, and is describes in Annexes V to VII in the REACH regulation.

If information required for substances manufactured or imported in quantities of 100 tonnes and more is not available, testing proposals to meet these requirements will have to be submitted as a part of the registration.

7.1.3 Evaluation

Evaluation of substances > 1000 t/year: Industry prepares a registration dossier and proposal of further testing if needed and forwards this to the authorities. Authorities evaluate the information and the proposal for further testing in order to ensure that appropriate tests will be performed and double testing is avoided.

7.1.4 Authorisation

All use of substances with intrinsic properties of very high concern will have to be authorised.

[9] http://europa.eu.int/comm/enterprise/reach/overview.htm

Such substances of very high concern are:

- category 1 and 2 CMR's
- substances which are persistent, bioaccumulative and toxic (PBT)
- substances which are very persistent and very bioaccumulative (vPvB)
- other substances, such as endocrine disruptors, that present an equivalent level of concern

To obtain an authorisation, a manufacturer, importer or down-stream user will have to demonstrate that the risk from the use of a substance can be adequately controlled, or that the socio-economic benefits outweigh the risk.

7.1.5 Restrictions

Any substance may be subject to restrictions regardless of whether they are subject to registration or not.

7.1.6 The Chemical Safety Report (CSR)

A chemical safety report (CSR), including a chemical safety assessment and details of risk management measures, is required for registrations of substances manufactured or imported in quantities starting at 10 tonnes per year by a manufacturer or importer.

CSA for a substance
The chemical safety assessment must address all identified uses. It must consider the use of the substance on its own, in a preparation or in an article. The assessment must consider all stages of the lifecycle of the substance as defined by the identified uses. The chemical safety assessment must be based on a comparison of the potential adverse effects of a substance with the known or reasonably foreseeable exposure of man and/or the environment to that substance.

The information to be considered includes information related to the hazard of the substance, the exposure arising from the manufacture or import and the identified use of the substance.

The main element of the exposure part of the chemical safety report is the description of the manufacturer's or importer's exposure scenario(s) and the exposure scenario(s) recommended by the manufacturer or importer to be implemented for the identified use(s). The exposure scenarios contain a description of the risk management measures which the manufacturer or importer has implemented and recommends to be implemented by downstream users. If the substance is placed on the market, these exposure scenarios including the risk management measures must be summarised in an annex to the safety data sheet.

CSA for a preparation
The Chemical Safety Assessment for a preparation must be based on the information on the individual substances in the preparation contained in the Technical Dossier and/or the information communicated by the supplier in the safety Data Sheet. It must also be based on the information for the preparation itself.

7.1.7 New requirements for the content of the Safety Data Sheet

Annex 1a in REACH sets out the requirements for a safety data sheet. The safety data sheet provides a mechanism for transmission of appropriate information in the relevant CSR's down the supply chain to the immediate downstream users. The information provided in the safety data sheet must be consistent with the information in the CSR, where required.

According to REACH, the importer or manufacturer must prepare an annex to the safety data sheet, which must contain exposure scenarios and describe appropriate risk management measures for the identified use in a lifecycle perspective. This information must be based on the Chemical Safety Assessments prepared by the importer or manufacturer.

7.1.8 Information in the supply chain

The Commission has initiated a number of Reach Implementation Projects (RIP) to elaborate background documents for explaining the procedures to be followed regarding the various parts of REACH. Of special interest for supply chain information is the types of use information down stream users are expected to pass on to their suppliers and how articles are to be included in REACH.

For eco-labels and EPDs it is interesting to note that when REACH is fully implemented (11 years after adoption) hazard information for all dangerous substances should appear in the SDS. Also information regarding supported use and how risks may be prevented should appear. SDS's are therefore expected to include sufficient information to be used as documentation regarding eco-label criteria compliance in future.

It is anticipated by the Commission that REACH will lead to an important market pressure against substances where stringent risk management measures are needed or where the uses is very restricted (high risk identified, substances under authorisation). Eco-labels and EPDs may have a role to facilitate this market effect.

7.2 Comparison of data requirements for SDS and EU Eco-label (indoor paints and varnishes)

Table 9 lists the criteria for assignment of the EU eco-label for indoor paints and varnishes and the presence of this information in SDS.

Table 9 Comparison of EU Eco-label criteria for paint and varnish and the information in SDS'. The numbers in the first column refers to the numbering of the criteria document[10].

The EU Eco-label Paint/Varnish		The EPD/PCR Chemical Products
1a	**White pigments**: The content of white pigments in paint must be 38 g/m^2 or lower	No information
1b	Demands for emission and discharge of waste from production of the pigment titanium dioxide	No information
2	**Volatile organic compounds**: The limit for content of VOC e.g. max 30 g/l for wall paints	To the extent that they must be declared, the content of VOC compounds will be stated in section 2 and the limit value for certain VOC compounds must be stated in section 8.
3	**Volatile aromatic hydrocarbons**: The limit for VAH e.g. max. 0.15 % for wall paints	To the extent that they must be declared, the content of VAH compounds will be stated in section 2 and the limit value for certain VAH compounds must be stated in section 8
4	**Heavy metals**: Ban against content of the heavy metals Cd, Pb, Cr (VI), Hg, As	If the content exceeds certain limits, this must be declared in section 2. No declaration of the non-appearance of the substances
5a	**Dangerous substances**: The product shall not belong to hazard classes "Very toxic" (Tx), "Toxic" (T), CMR[11] cat.1 and 2 or "Dangerous to the environment (N)	The classification of the product can be seen in section 15 of the safety data sheet
5b	Ban against the use of ingredients classified as "Very toxic", "Toxic" which have been or may be awarded one or more of the following R-phrases or combinations thereof: R23, R24, R25, R26, R27, R28, R39, R45, R46, R48, R60 or R61. Active ingredients with R23, R24, R25, R26, R27, R28, R39 and R48 are, however, allowed up to 0.1 %.	The content of these substances will be stated in section 2 if they comprise 0.1 % or more of the product.
5c	Ingredients with: R50, R51, R52, R53 or combinations thereof may each only comprise 2.5 % of the product and combined no more	The content of such substances will be stated in section 2 if they comprise ≥ 0.1 % of the product when classified with R50

[10] Commission Decision of 3 September 2002 establishing revised ecological criteria for the award of the Community eco-label to indoor paints and varnishes and amending Decision 1999/19/EC

[11] CMR=Carcinogenic, mutagenic or toxic to reproduction

The EU Eco-label Paint/Varnish		The EPD/PCR Chemical Products
	than 5 %.	and R51 and/or ≥ 1 % for substances classified R52/53 or R53.[12]
5d	The product may not contain APEO	APEO-compounds are usually classified as "Dangerous for the environment" and the content will therefore be stated in section 2 if it is equal to or exceeds 0.1 %
5e	The product may not contain diethylenglycol methylether (DEGME CAS-nr: 111-77-3)	The substance is classified Rep3;R63 and will therefore have to be declared at a content corresponding to 1 % or above
5f	The content of isothizolinone compounds may not exceed 500 ppm. The content of kathon may not exceed 15 ppm	The limit for content of kathon corresponds to the classification limit. Content of 15 ppm or above will therefore have to be stated in section 2 of the safety data sheet. The declaration limit for other isothiazolinone compounds depends on the classification of the substances
5g	The content of free formaldehyde may not exceed 10 ppm (=0.001 %)	Formaldehyde must be stated in section 2 if the content is 0.1 % or above
6	**Fitness for use:** Demands for durability, scrubbing resistance, resistance to water and adherence	No information. Parameters such as durability, resistance and wearability are usually stated in the technical information
7	**Consumer information**: Information on purpose, cleaning instructions for painter's tools and removal instructions for waste. In addition, information on storage after opening including safety instructions if relevant as well as preventive safety precautions for the painter	This information must be stated in sections 7, 8 and 13 of the safety data sheet
8	**Information appearing on the eco-label:** Box 2 of the eco-label shall contain the following text: "Good performance for indoor use, hazardous substances restricted, low solvent content	- The eco-label is not usually depicted in the safety data sheet but rather on the packaging of the product as well as sales material such as brochures etc.

As it appears from table 9, some of the information needed to apply for an eco-label may be obtained from the product's safety data sheet, but the safety data sheet cannot be used in its present form as the sole basis for an application for an eco-label. However, they can to an extent be used to estimate whether an indoor paint or varnish is qualified to obtain an eco-label, particularly if the information is supplemented with the information that will typically be given in the technical data sheet.

A common denominator for the two systems is that detailed composition information, i.e. the recipe of the product, is needed. The documentation for the eco-label may e.g. have to be supplemented by an analysis documenting the absence of heavy metals or that the content of free formaldehyde is less than 10 ppm. In practice, this documentation is most often delivered by the supplier in the form of a (verified) certificate.

[12] Unless lower limits is given in Annex I to Directive 67/548/EEC or in Annexes II, III or IV to Directive 1999/45/EC

Should the SDS technically be able to deliver the appropriate documentation, the following information should be included (requested from the supplier). It is important to note, that there are no hindrance in the legislation regarding such additional information to be included.

- Content of white pigments
- Content of total VOC in g/l
- Content of VAH in g/l
- Limits for e.g. content of formaldehyde and isothiazolinone compounds. Alternatively, it may be supplemented by a section specifying the absence or level of certain ingredients (AEPO, diethylenglycolmethylether, formaldehyde etc.).
- Technical qualities, including information on durability, scrubbing resistance, resistance to water and adhesive qualities.
- LCA-related information, including emissions and discharge of waste during the production of titanium dioxide.

Should the product be in compliance with and be awarded the eco-label, the logo may be reproduced in the safety data sheet, for example in section 16.

7.3 Comparison of data requirement (All purpose cleaners)

In table 10 the same type of information is compiled for all -purpose cleaners as above for paint and varnish.

Table 10 Criteria for all-purpose cleaners compared with information in the safety data sheet. The number in the first column refers to the numbering of the criteria document[13] (2005-2008).

	The EU Eco-label All-purpose cleaners	Safety Data Sheet
	All purpose cleaners must have water content ≤ 90 % (w/w) (Article 1a)	Could be stated in section 2
1	**Toxicity to aquatic organisms:** The critical dilution volume for the product, toxicity (CDV_{tox}) may not exceed 20000 l/functional unit[14] *)*	No information. Could be stated in section 12[15].
2a	**Biodegradability of surfactants:** Aerobic: Each surfactant used in the product shall be readily biodegradable	Could be stated in section 12 of the safety data sheet
2b	**Anaerobic biological decomposition**: Each surfactant used in the product shall be biodegradable under anaerobic conditions (minimum 60%)	Could be stated in section 12 of the safety data sheet
3a	**Dangerous hazardous or toxic substances or preparation**: Ban on the use of: • Alkyl phenol ethoxylates (APEO) and APEO derivatives • Nitro musk and polycyclic musk • EDTA • NTA	Declaration in section 2 depends on the classification of the substances and the amount in which they are contained in the product
3b	Ban on use quaternary ammonium compounds that are not readily degradable	Could be stated in section 12 of the safety data sheet
3c	May not contain ingredients classified with: R31, R40, R45, R46, R49, R68, R50/53, R51/53, R59, R60, R61, R62; R63, R64 in amounts of more than 0.01 *%*. Specific requirements are prescribes for biocides see 4 below	If it exceeds certain limits, the content will have to be declared in section 2.[16]

[13] www.europe.eu.int/comm/environment/ecolabel/pdf

[14] The functional unit is the dosage in grams of the produc recommended by the manufacturer for 1 litre of washing water.

[15] According the EU draft chemical regulation (REACH) the parameters PNEC (Predicted No-Effect Concentration) and DNEL (Derived No-Effect Level) shall be stated in section 8 of the SDS:

[16] According to the draft EU regulation on chemicals, it must be stated in the SDS if the product contains substances for which the use has to be authorised (CMR cat. 1 and 3, PBT- and vPvB substances and other substances with serious irreversible effects (e.g. hormone disrupting chemicals).

	The EU Eco-label All-purpose cleaners	Safety Data Sheet
4	**Biocides**: The product may only include biocides in order to preserve the product, and in appropriate doses for this purpose alone. It is prohibited to claim and suggest that the product has an antimicrobial action. Biocides classified with R50-53 or R51-53 risk phrases may not be potentially bioaccumulative. The concentration of biocides in the final product shall not exceed the maximum authorised concentration in the Council Directive 76/768/EEC (Cosmetic directive)	Declaration in section 2 depends on the classification of the substances and the amount in which they are contained in the product
5	**Dyes or colouring agents**: Any dyes or colouring agents used in the product must be permitted by the cosmetics legislation or regulation on colours for use in foodstuffs<[17], or must be characterised by environmental properties that do not imply classification with R50/53 og R51/53	No information.
6a	**Fragrances:** The product may not contain perfumes with nitro musk or polycyclic musk as specified under 3a. See also section 7	See section 3a.
6b	Any scent must be produced and handled according to code of practice of the International Fragrance Association	No information
7	**Sensitising substances**: The product may not be classified with R42 and/or R43. The content of substances classified with R42 and/or R43 may not exceed 0.1 % by weight of the final product	Classification of the product with R42 and/or 43 is immediately apparent from section 15 of the safety data sheet. There is no demand that ingoing substances with R42 and/or R43 in concentrations below 0.1 shall be stated in section 2
8	**Volatile organic compounds**: May not contain more than 10 % volatile organic compounds with a boiling point lower than 150°C	The content of volatile organic compounds will, to the extent they are contained in amounts of more than 1 %, have to be declared in section 2 and the limit value for certain volatile compounds must be stated in section 8
9	**Phosphorous**: The total content of phosphorous (P) may not exceed 0.02 g/functional unit.	No information

[17] Council Directive 76/768/EEC and Council Directive 94/36/EC and subsequent amendments

	The EU Eco-label All-purpose cleaners	Safety Data Sheet
10a	**Packaging requirements**: Ban against propellants	No information
10b	Plastic goods must be labelled according to specific regulations[18]	No information
10c	If the primary packaging consists of reused materials, statements of this must comply with ISO 14021	No information
10d	Different materials in the primary packaging must be easy to separate	No information
11	**Fitness for use**: The product must be user friendly and comply with consumer needs.	No information
12a	**User instructions:** Dosage instructions and the text (or equivalent text) "Proper dosage saves costs and minimises environmental impacts" shall appear on the packaging	Usually no information. May appear from technical information sheets
12b	Safety advice. The text: "Keep away from children", "Do not mix different cleaners" as well as "Avoid inhaling sprayed product" for products packaged as sprays and the equivalent pictogram Do not inhale this spray" for aerosol products	The can be found or included in section 7. Classified products will be assigned the corresponding S-phrase (S2, S50 and S23) and this will be stated in section 15. Pictograms are not normally used
12c	Declaration of ingredients according to regulation (EC) No. 648/2004	May be stated in section 16
12d	The following (or similar) text must appear on the packaging: "For more information visit the EU eco-label web-site: http://europa.eu.int/ecolabel"	No information
13	**Information appearing on the eco-label**: Box 2 of the eco-label must contain the following text: "reduced impact on aquatic life, reduced use of hazardous substances, clear user instruction"	The eco-label is not usually reproduced in the safety data sheet
14	**Professional training:** Offer for training	No information

As it appears from table 10, some of the information needed to apply for an eco label can be obtained from the safety data sheets, but the safety data sheet cannot be used in its present form as the sole documentation when applying for an eco-label. However, it can be used to estimate whether an indoor paint or an all-purpose cleaner comply with the demands for assignment of the EU eco-label.

[18] Directives 94/62/EC or DIN 6120, sections 1 and 2 in connection with DIN 7728, part1

In this case, the safety data sheet must be supplemented with information on:

- Critical dilution volume of the product
- Biological degradability of surfactants
- Declaration
  - of absence of certain substances – either that the product does not contain the substances or the concentration is below certain limits
  - of production and handling of scents according to specific regulations
  - of names of certain scents
  - of content of volatile organic solvents
  - that included dyes and colouring agents comply with the Directive on cosmetics or the regulation on colouring agents allowed in foodstuffs or should not be classified with the risk phrases R50/53 or R51/53

7.4Conclusions

The eco-label criteria operate with 3 criteria levels: ban, limitation and/or declaration demand while safety data sheets include demands for declaration of dangerous substances and safety advice for protection of health and environment.

Essential for the elaboration of both eco-label application and safety data sheet is the complete chemical composition of the product – i.e. a split of the recipe at substance level.

If the full recipe (chemical names and percentages) is available at a substance level, it is possible to prepare both a safety data sheet *and* to examine whether the product is in compliance with the criteria for absence of certain substances (e.g. substances that have been assigned certain R-phrases) and the criteria for the content being below a certain level. In addition, it would be possible to e.g. calculate parameters as the critical dilution volume as set out in the criteria for universal cleaners and the combined content of phosphor and phosphonates in g/functional unit.

However, the down-stream user/manufacture seldom has full information on the chemical composition of the product but in most cases only the summarised information in the safety data sheet. Based on the two examples above, it can be concluded that it is not possible to determine whether a product complies with the criteria for assignment of the eco-label on the basis of the information in the existing safety data sheet alone. However it will be possible for the supplier (on request from the customer) to add relevant information to the SDS. It may also be more operational/understandable for the producer to extend the information in the SDS instead of being requested to elaborate additional information in a format unknown to the producer.

When elaborating new eco-label criteria documents, guidance should be given on the information that may be requested by the supplier as part of the safety data sheet.

Environmental Product Declarations have the same fundamental need for data as eco-labels. As no limits are requested, EPD’s should be able to take the

relevant information directly from the SDS or request the information in the form of an appropriate extended SDS.

A basic problem using the safety data sheet, as a provider of information through the product chain is that the quality is often very poor, even though it is stated in the safety data sheet directive that "the safety data sheet should be prepared by a competent person". This problem has also been acknowledged by the Commission in the directive 2001/58/EC[19] : "It is known from recent enforcement activities and studies in the Member States that many safety data sheets are of poor quality and do not provide adequate information for the user ." It is furthermore stated that one way to improve the quality is to improve the guidance given to compilers and that the Commission and the Member states will consider other means by which the quality of safety data sheets can be improved in the future."

It is the responsibility of the national authorities to ensure that the safety data sheets meet the requirements of the Safety Data Sheet Directive. However, the national authorities do not allocate the resources necessary to check all safety data sheets, and therefore the control can only take place in the form of spot checks. The validity of SDS may presently therefore not be at the same level as third party verified schemes.

The implementation of REACH may increase focus on the quality of the Safety Data Sheets. Furthermore REACH will contribute to the generation of the necessary information on the hazardous properties of substances through the registration procedure.

The potential use of Safety Data Sheet information for other purposes than chemicals regulation and the need for appropriate co-ordination should as a minimum be explained in the new chemicals regulation documents.

[19] COMMISSION DIRECTIVE 2001/58/EC of 27 July 2001 amending for the second time the Directive 91/155/EEC

8 Integrated information

8.1 Introduction

The aim of this chapter is to present and discuss possible synergy between the schemes presented in the previous chapters.

In all presented schemes there is a flow of elements/tasks to be carried out and concluded to meet part of the requirements in the schemes and regulations. These tasks are illustrated in the flow chart in figure 4 (each scheme to be read vertically). This also illustrates the areas of possible synergy (highlighted by arrows in figure 4).

The dotted boxes in the flow chart illustrate different background documents, which are or could be used in the different schemes, as they are very valuable information input in preparation of the tasks.

In the following, the synergies are discussed in relation to:

- the data collection process and the mapping of environmental aspects and impacts in the five schemes
- the verification process in the five schemes

8.2 Combining the data collection

All the data supply chain schemes are based on data of various details and presentation form. The data requirements of the information systems can roughly be divided into two layers: Background information and information needed to document compliance. Key aspects regarding the data requirements of the different systems are presented in the previous sections and are summarized in table 11

Figure 4 Synergy elements in the five schemes

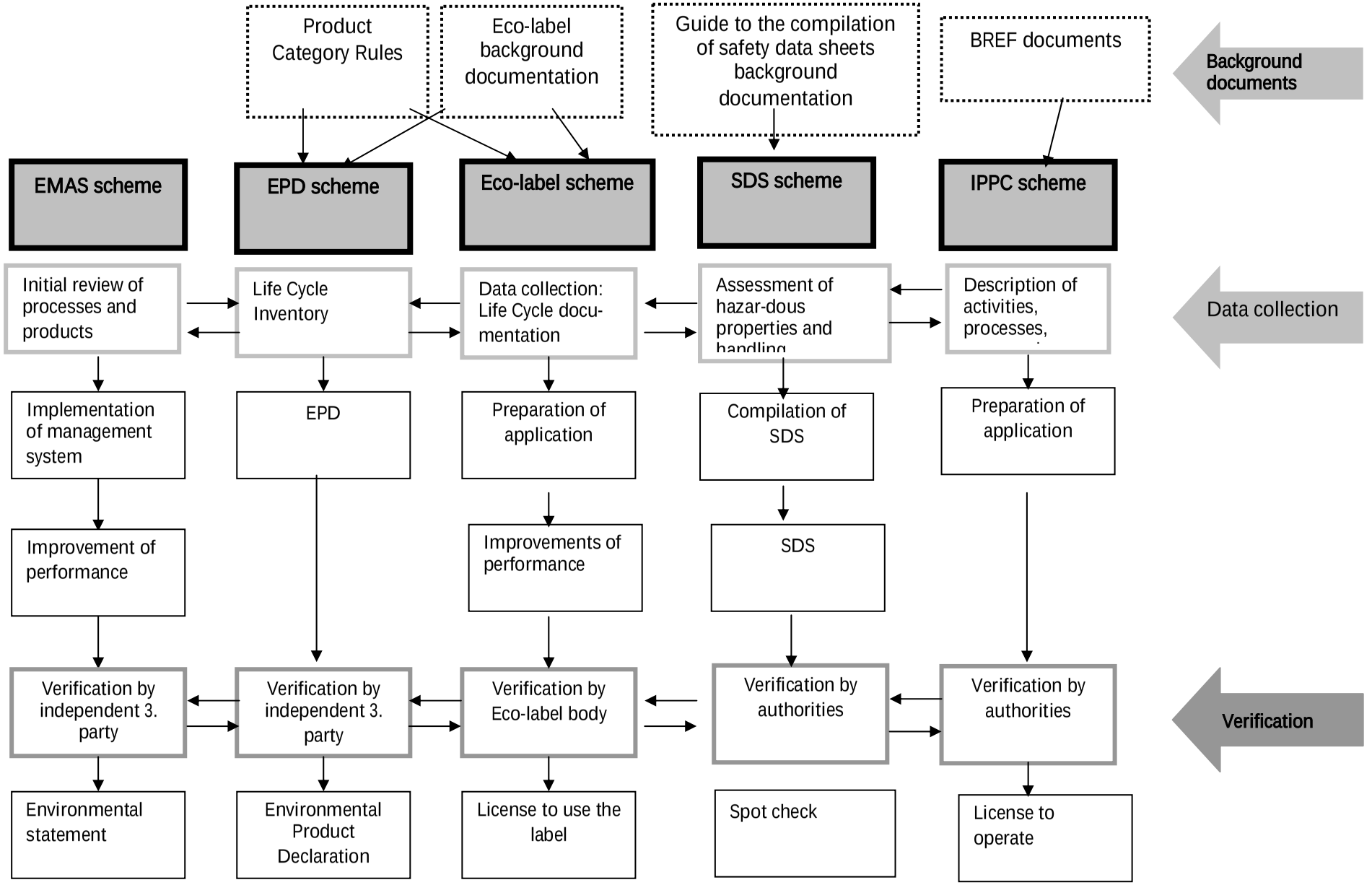


Table 11 Overview of data types of the 5 supply chain systems.

	IPPC	SDS	EMAS	Eco-Label	EPD
Base of evaluation	Site-specific	Product-specific	Site-specific	Product-specific	Product-specific
Legal status	Legislation	Legislation	Voluntary	Voluntary	Voluntary
Specificity	Sector-specific	No specificity	Sector-specific	Product-type specific	Product type specific
Background Information	BREF/BAT	Full chemical specification	BREF/BAT	Lifecycle-based- data	Life cycle Assessment data
Background information data form	Quantitative	Quantitative	Quantitative	Partially Quantitative	Quantitative
Lifecycle coverage	On-Site and downstream	Downstream only	Primarily on-site and downstream	In principle the whole lifecycle	Whole lifecycle
Data needed for approval	Site-specific data	Hazardous substances, properties and risk reduction measures	Site and sector specific	Criteria specific statements & load data	Life cycle data
Approval documentation	Environmental permit	No	EMAS logo and diploma	EU Eco-label logo	Environmental Product declaration logo

8.2.1 Overlapping data requirements

The data requirements needed to fulfil the criteria of each scheme are similar in several sections but rarely identical.

The environmental information required by the schemes in general is outlined in Table 12.

One of the main barriers is the inconsistency in the designation of the environmental impact categories. The environmental impact for one category is assigned different names and definition depending of the information system. One way of overcoming some of the obstacles regarding this problem is to merge the initial investigations. Coordinated initial data collection guidelines – one for product-specific verification tools (EPD and eco-labels) and one for site-specific tools (EMAS and IPPC) are recommended. It is recommended to carry out the data collection for SDS individually as the objective of this communication tool differs from the others. A pathway for input to the implementation of the new chemical regulation of chemicals should be established, especially for articles (goods). A common LCA-investigation[20] and common definition of impact categories for EPD and the EU-Eco-label would give significant synergy effects. When the initial LCA investigations are carried out, specific individual criteria/impact categories can be established as the target groups for the two systems are not the same.

When establishing criteria for fulfilling the requirements of the EU Eco-label it is recommended to use the same cut-off values as stated in the SDS. By using the same cut-off criteria, the information may be collected directly from a SDS whether a product can comply with the EU Eco-label criteria or not.

A similar co-ordination could be achieved by coordinating the emission data applied in IPPC and EMAS.

Overlapping data requirements occur for a number of environmental impact categories depending of the information system as outlined in Table 12.

Some of the information tools contribute as suppliers for others. For example, SDS may, if the data collection and presentation is coordinated, be used directly for an Eco-label or EMAS certification.

A broadly accepted data foundation and collection strategy would ease the data collection process significantly. This would require a co-ordinated management of all schemes to be established.

[20] A common LCA- foundation shall as minimum follow the ISO 14040, have a common Functional Unit, System Boundaries and Data Requirements.

Table 12 Environmental aspects in the five schemes (general, issues covered, product specificity)

EMAS	Eco-labelling	EPD	IPPC	SDS
Emissions to air Releases to water; Avoidance, recycling, reuse, transportation and disposal of solid and other waste, particularly hazardous waste Use and contamination of land; Use of natural resources and raw materials (including energy);	The eco-label may be awarded to product possessing characteristics enabling it to con-tribute significantly to improvements in relation to key environmental aspects	Use of resources Use of renewable and non-renewable energy Emissions to air, water and land Waste production	Emissions of substances to air, water and land Generation of Waste Use of Raw Materials Energy Efficiency Noise Prevention of Accidents Risk Management	No direct environmental data requirements. Properties of hazardous chemicals Specification of Intended Use Management to reduce risk
Local issues (noise, vibration, odour, dust, visual appearance, etc.) Transport issues (both for goods and services and employees) Risks of environmental accidents and impacts arising, or likely to arise, as consequence of incidents, accidents and potential emergency situations Effects on biodiversity.	The key environmental aspects shall be determined by identifying the categories of environmental impact where the product to be examined provides the most significant contribution from a life cycle perspective, and among such aspects the ones for which a significant potential for improvement exists	Impact categories of life cycle impact assessment (LCIA): • Climate change; • Depletion of the ozone layer • Acidification of land and water sources • Eutrophication; • Formation of photochemical oxidants; • Depletion of fossil energy resources; • Depletion of mineral resources.		Disposal recommendations Description of hazardous handling scenarios. Toxicity information Risk reduction measures Transport information Disposal recommendation Composition of hazardous substances given in intervals.
Indirect environmental aspects Related to specific production site	No specific aspects are mentioned in general – they are specifically related to the product group criteria Environmental aspects in a life-cycle perspective, but not necessarily accumulated LCA data.	Cradle to grave accumulated LCA data for a product unit	Related to specific production site	Statements, no LCA perspective

Table 13 Identified synergies regarding data collection

	SDS	EMAS	Eco-label	EPD
IPPC	**Background information:** No immediate synergy effects **Reporting requirements:** No immediate synergy effects	**Background information:** BAT notes useful for identification of environmental improvements **Reporting requirements:** Emission data can be re-used directly.	**Background documentation:** BAT-notes can be used for identification of best production practice **Reporting requirements:** No synergy	**Background Documentation:** BAT notes can be used for benchmarking **Reporting requirements:** Some specific emission data can be re-used.
	SDS	**Background information:** Information regarding hazardous chemicals **Reporting requirements** No immediate synergy effects	**Background information:** Hazard information of a product may be reused **Reporting requirements:** It is recommended to use same cut-off values and/or intervals for hazardous chemicals in the two systems	**Background information:** Hazard information of the product can be re-used. **Reporting requirements:** Hazard classification and labelling of chemical products
		EMAS	**Background information:** The Background LCA-based data can be used as a tool in EMAS to ensure continuous improvements. Benchmark criteria **Reporting requirements:** No immediate synergy effects	**Background information:** The background LCA can be used as a tool in EMAS to ensure continuous improvements **Reporting requirements:** Possibility of coordinating sectors-specific EMAS requirements with Product specific PCR
			Eco-label	**Background documentation:** Conduct com-mon lifecycle assessment with same functional unit is recommended. **Reporting requirements:** Quantifiable EPD data can be used for Eco-label, compliance documentation
				EPD

8.2.2 Overall data synergy effect considerations

Table 13 identifies examples of synergy in data collection coordination between the schemes. The identification is sub-divided into background documentation (in-put) and presentation data requirements (out-put).

In general, there is overlapping data requirements within the different supply chain information systems. A co-ordination of the data collection strategy and an introduction of common terms for the description of the impact categories could give a significant synergy effect. A centralized set-up of uniform data criteria is recommended as the workload of the data collection process could be significantly reduced.

Additionally, it is recommended that common criteria for the assessment of conversion coefficients estimating product-specific data from site-specific emissions should be implemented.

An optimal planning of the data collection process will also ease the verification process for the 5 systems.

8.3 Combining the verification processes

All schemes include a verification process performed by an external verifier, but each scheme has its own verification process and its own data requirements for the verification process.

Seen from a company point of view they already have too many "verifiers" coming into the company. There are health and safety inspectors; environmental authorities; quality auditors, if they have an ISO 9000; EMS auditors; eco-labelling inspectors; and in the future there might even be Environmental Product Declaration verifiers.

In the previous chapter we showed that there are overlapping data requirements, but the verifiers are asking the companies to present them in different ways according to the various verification requirements.

Although environmental verification is based on the same core group of data and information it can be very overwhelming and a barrier to participate in one or more of these voluntary schemes for many companies. It would be an advantage to many companies if the core data and information could be verified at one stage and not several times depending on the scope of the different verifications.

Therefore the question is whether it would be possible and feasible to combine the verification process and assessment visit of these schemes as far as possible to avoid unnecessary duplication, cost and time of the company? Would it be possible to let one environmental verifier carry out the total verifying process of all the relevant schemes at the same time?

8.3.1 Verification or certification

EMAS has a verification process, in ISO 9000 and 14001 it is called a certification process, in the Eco-labelling it is called a control, and in the national EPD schemes globally, both verification and certification is used. At

the moment, verification is used as the term in the committee draft of the ISO 14025 on environmental product declarations.
Here the term verification is used in the meaning: ”confirmation, through the provision of objective evidence, that specified requirements have been fulfilled”[21].

There is an on-going discussion on who should be doing the verification. It is the question about first, second and third party verification:

- First party = Demonstrate conformity making a self-determination and self-declaration
- Second party = Seek confirmation of its self-declaration by the customer
- Third party = Seek verification by an external person or organization independent of the producer and receiver of the information. Independence may be documented in the form of an accreditation by a competent body (authority or other credible and independent organisation)

SDS and IPPC schemes are verified by the authorities. They are regulatory mandated controlling procedures, which cannot (should not) be combined with voluntary schemes including third party verification, because the legal status of an authority and a third party verifier is different.

This project only discusses third party verification and does not differentiate between an individual (accredited) person being the verifier or if a body (organisation) carries out the verification.

The following is based on official documents on the EMAS verification process; on the practice for eco-labelling controls in Denmark and public available document on the EPD development in ISO, Sweden and other countries. There has been no formal contact with any verification bodies, accreditations bodies, but a few interviews have been carried out with experts on verification to clarify specific issues.

8.3.2 The verification process

EMAS verification
To prepare for an EMAS verification process, the companies work directly from the EMAS regulation (or the ISO 14001 standard) as their tool. In some countries there may be a sector specific manual explaining the requirement, particularly related to the significant environmental aspects of the sector. These are, however, only to be regarded as voluntary guidance documents.

In consultation with the company, the verifier must design a programme to ensure that all elements required for registration with EMAS are verified in a period not exceeding 36 month. This requirement of designing a programme is similar to the requirements of ISO 14001 and other ISO management standards, and in most cases the verifiers visit the company ones a year.

An EU guidance document on verification, validation and audit frequency recommends regular interaction between the verifier and the company, because it helps creating credibility and confidence in the users of EMAS as well as the scheme itself. In order to ensure ongoing surveillance of the organisations, EMS and the environmental performance, good practice would

[21] ISO9000:2000

be to structure the verification so that one third of the activities of the organisation are verified each year and within a period of maximum 36 month all activities have been verified. This will also help to give confidence to the verifier on the accuracy, credibility and reliability of information in the environmental statement.

Eco-label verification
A general process of product information verification for the use of the Eco-label is not specified in the Eco-label Regulation or any other official documents, such as for instance for the Nordic Swan label. The criteria document describes the requirements the product must meet and how it must be documented, but it is not specified, how the verification of the documentation should be effected.

It is up to the national competent body to set up rules for the process. This might indicate the possibility of different rules in different countries under the same scheme and thus different stringency of the verification. For compliance control in Denmark, the competent body has developed internal procedures for the verification process.

The producer must put forward an application in which the company documents the fulfilment of the criteria for the product group in question. The process therefore seems similar to the process in an application under the IPPC directive. At the end of an application period – when the documentation is in place – the Eco-label secretariat or a person appointed by the administration will make a compliance monitoring visit.

An eco-label verification must be renewed when the criteria document has been revised and updated. The interval of updating is for most product groups three years – for some up to six years.

EPD verification
In the Swedish EPD® system, an independent verification of the information in an EPD is guided by ISO 14040: Life Cycle Assessments - General Principles and Framework stating that the results of any LCA study must be critically reviewed if the information is to be used for comparative purposes.

An independent and accredited certification body conducts the verification. There are currently several certification bodies accredited for ISO 14001 and EMAS, which also hold an accreditation for EPD to enable cost-effective integrated certification services to their clients. The independent verifier must validate the quality and accuracy of the data and the supporting information in the EPD based on all information given.
The presentation of the LCA study must be comprehensive with regard to the way the study has been carried out and the results of the study. The relevant PCR used as a basis for the EPD must be referred as well as the valid requirements for environmental product declarations.

In the draft ISO/DIS 14025 standard detailed requirement for the verification process is described. The standard requires that when developing an environmental declaration programme, the rules for verification must be set up in accordance with ISO 14025, ISO 14040 and ISO 14020 and the programme operator must establish the appropriate verification procedure, also including that the data must be independently verified either internally or externally, but not necessarily by third party verification.

ISO/DIS 14025 requires a review of the PCR document conducted by a third party panel. The PCR review must demonstrate that:

- the PCR has been developed in accordance with ISO 14040,
- the PCR fulfils the general programme instructions,
- the LCA-based data together with the additional environmental information prescribed by the PCR describe the significant environmental aspects of the product.

ISO/DIS also requires an independent verification of the EPD data and of additional environmental information, which as a minimum must confirm:

- conformity with the PCR
- conformity with ISO 14040 series of standards
- plausibility, quality, accuracy and completeness of the LCA-based data
- quality and accuracy of data

The verification procedure must be transparent. The independent verifier must generate a report documenting the verification process. This report must be available to any person upon request. The verification procedure must confirm whether the information given in the EPD accurately reflects the information in the documents on which the declaration is based. The verification procedure must also confirm whether this information is valid and scientifically sound.

The PCR review and the independent verification of an EPD are two separate processes. The independent verification of the EPD may be carried out by the PCR review panel or may be carried out by an independent verifier who may or may not have been a member of the PCR review panel.

An EPD verification is usually valid for three years.

The steps in the verification process in the EMAS scheme, the Eco-label scheme (based on the applied procedures at the Eco-labelling Denmark) and the EPD scheme (Sweden) are outlined in Table 14.

The SDS and the IPPC authority controls are not included in the table, because they are regulatory mandated controlling procedures, which cannot (should not) be combined with voluntary schemes including third party verification (although the same stringency of procedures and evaluation should be applied to assure the same level of verification quality).

Table 14 Steps in the verification process - Comparison between the three schemes

Step	EMAS[22]	Eco-label [23]	EPD [24]
Validation of data Data review	The reliability, credibility and correctness of the data and information included in the initial review and the EMAS statement	Application review in terms of data and other information to validate the compliance with the criteria	Verification of LCA data: The verifier shall review the way the LCA study has been carried out focusing on goal, scope, assumptions, underlying data and presentation of performance in the EPD
Document reviewed (desk review)	EMAS statement Management system documentation	Application	LCA study and the chosen LCA methodology
Contact to authorities	Written confirmation from environmental authorities that the company is in compliance with all legal and other environmental requirements	Written confirmation from environmental and H&S authorities that the company is in compliance with all legal and other environmental requirements	The verifier shall be convinced that the company has routines for monitoring, up-dating and compliance with relevant process- and product related laws
Initial visit	Yes - Planning for the verification programme	No	No
Verification Programme	The verifier shall establish a verification programme. At the first verification visit, the verifier shall, in particular, check the following requirements: • a fully operational EMS • a fully planned audit programme, which had already begun • completion of one management review • an environmental statement is prepared	Country specific. Checklists exist for each product group. (The Nordic Swan have common requirement to ensure equal procedures across the boarders)	The verification procedure may differ from country to country but will in most cases include verification • of background information (report) and compliance with the relevant PCR • that he right data is existing and calculated correct • that the right template for the EPD has been followed • that LCA and EPD data are corresponding
Subject/issues in verification programme	General issues are: • strength and confidence in the internal audit programme including audit frequency • complexity of the EMS • the implementation of the environmental policy • size, scale and nature of activities, products and services • direct and indirect environmental aspects • strength of data and information management and retrieval system • past problems • extent of activities subject to environmental regulations • results of previous verification • experience of the organisation	Specific control issues depend on the criteria document for the product group, but will in general include: • review of QS & EMS especially procedures for changes of products • management of purchase and sale • non-conformances • control of raw materials • records and documents control • marketing and use of logo • extension of licence • new chemicals and/or	General issues are examining: • underlying data • information about environmental performance • other information in the declaration • the presentation of the declaration • routines for documentation and follow-up The verification shall include sample tests data to check their conformance with the original data source

22 based on the document "EMAS guidance on verification, validation, audit frequency"
23 based on interview with Eco-labelling Denmark
24 based on ISO 14025 and the Swedish EPD scheme

Step	EMAS[22]	Eco-label [23]	EPD [24]
		suppliers	
Technical and environmental review of site	Yes	Yes	Sweden: No (Korea: Yes) Draft ISO 14025 standard: No
Public statement	Validated EMAS statement and other validated information	The label	The declaration
Report from verifier to client	Report covering the observations and non-conformances	Report covering the observations and non-conformances	Report covering the observations
Finalisation	The diploma and registration of company	Issue of the licence	Registration of company and the EPD

8.3.3 Verifier qualification and competence

General
In all three schemes there has been – and are on-going – discussions of the qualifications of the verifier to make sure that the schemes and the verification processes enjoy the expected credibility.

It is also an issue whether the verification of schemes should be open to anybody able to document sufficient qualifications or only to appointed organisations.

Another issue is whether only third party verification should be accepted. For both EMAS and Eco-labelling this issue has been solved by the regulation and only third party verification is accepted. In EMAS, an accreditation of the certification body is required. In the Eco-labelling scheme there is no accreditation process. In some countries the scheme is run by the authorities in others the authorities have outsourced the administration including specific requirement on how to run the administration. This means that most administrations have a quality management system of the schemes setting up some quality requirements. In the various national EPD schemes there are still different requirements – some require accreditation of the verifier - others have other means to ensure credibility of the verifier.

EMAS
In the EMAS regulation it is stated that it is necessary to ensure and steadily improve the competence of the environmental verifiers by providing for an independent and neutral accreditation system, retraining and an appropriate supervision of their activities in order to ensure the overall credibility of EMAS. Close co-operation between the national accreditation bodies is underlined as a necessity as well.

The following competence constitutes the minimum requirements with which an environmental verifier, individual or organisation, must comply:

- knowledge and understanding of the general functioning of environmental management systems, relevant standards and guidance
- knowledge and understanding of the legislative, regulatory and administrative requirements
- knowledge and understanding of environmental issues, including the environ-mental dimension of sustainable development;
- knowledge and understanding of the technical aspects, relevant to environmen-tal issues, of the activity subject to verification;
- understanding of the general functioning of the activity subject to verification in order to assess the appropriateness of the management system;
- knowledge and understanding of environmental auditing requirements and methodology;
- knowledge of information audit (Environmental Statement).

Appropriate evidence of the verifier's knowledge and of his/her/its relevant experience and technical capacities should be assessed by the accreditation body.

Eco-labelling
There are no general rules for the qualifications of the verifier in the Eco-labelling scheme, but the individual countries have qualification requirements. The following requirements are from Eco-labelling Denmark.

For the first period of his/her appointment, a new person is placed as a trainee together with a more experienced controller. In this period the trainee is trained in regulatory matters, the sector specific technology and environmental issues in questions and audit and interview techniques. After this period the trainee will get his/her own application to approve, but still with supervision from the experienced controller.

After three control visits together with the more experienced controller, the trainee is left on his/her own as a qualified controller.

The main training issues as mentioned above are described in the quality management system of the (Danish) verification body.

EPD
In the proposal for an ISO/DIS 14025 on Environmental Product Declarations the qualifications of a verifier are specified:

The programme operator must establish minimum requirements for competence of verifiers, including:

- knowledge of relevant sector, product and product-related environmental aspects
- process and product knowledge of the product category
- expertise in LCA and methodology for LCA work
- knowledge of relevant standards in the fields of environmental labelling and declarations and LCA
- knowledge of the regulatory framework within which requirements for environmental declarations have been prepared
- knowledge of the EPD programme.

In each of the existing national schemes, the qualifications of the verifier are specified in even more detail, especially in terms of how much practical experience is required.

In South Korea, the requirement is either 2 years of LCA related working experience, 5 years of working experience related to industrial process control or 7 years of working experience related to Environmental Management Systems. In Japan, the verifier must be an EMS auditor and have passed a system auditor and an environmental data verifier examination. The verifier must carry out an EPD verification twice a year in three years.

In Sweden and Denmark, the work experience is important as well, but combined with an exact experience in elaborating a LCA-study. Only in Japan and South Korea the qualification of the verifier is linked to experiences in Environmental Management Systems, although in Sweden the actual verifiers are also EMS verifiers.

The different qualifications and competences requirement by the verifier is outlined in Table 15. The documentation is based on the EMAS regulation, the management procedures of the Eco-label scheme at the Eco-labelling Denmark and the EPD scheme in Sweden.

Qualification requirements of the authority controllers in relation to SDS and the IPPC have not been analysed – although it is anticipated that sufficient qualifications may be documented also by the authorities.

As it can be seen, all three schemes are demanding experience in the relevant industrial sector, working experience in the environmental area and knowledge of the regulatory framework. As it appears, there seem to be requirements for similar qualification on the overall level, but at a detailed level there are no LCA qualification requirements in EMAS and no auditor qualification requirements in the EPD. A verifier from one or the other scheme, who would like to be a verifier in all three schemes, needs more competence and qualification or should he join a team, where the team as a whole has all the needed qualifications. This is discussed further below.

Qualification and competence	EMAS	Eco-labelling	EPD
Scheme competence Knowledge in Regulation, Schemes, Systems and Standards	Knowledge and understanding of the Regulation, the general functioning of EMSs, relevant standards and guidance. Understanding of the general functioning of the activity subject to verification in order to assess the appropriateness of the management system;	Knowledge of the labelling scheme and its overall goals and products in question Some countries are outsourcing the control visit to an EMS auditor	Knowledge of the relevant standards in the field of environmental labelling and declarations and life cycle assessment
Verification methodology	Knowledge and understanding of environmental auditing requirements and methodology	Knowledge and understanding of auditing methodologies	No specific requirements
Personal skills Attitude and personal attributes that enable the verifier to perform effective and efficient	No specific requirements in EMAS (Requirement are found in auditing standards e.g. ISO 19011)	No specific requirements	No specific requirements
Technical Industry Expert Competence Experience in the Industry Sector	Knowledge and understanding of the technical aspects, relevant to environmental issues, of the activity subject to verification	Practical experience is not an requirement, but the controller are trained in controlling a specific industrial sector	Knowledge of relevant industry Process and product knowledge of the product category Practical experience not mentioned yet
Environmental Industry Expert Competence Working Experience in the Environmental area	Knowledge and understanding of environmental issues, including the environmental dimension of sustainable development	Knowledge and understanding of environmental issues, including product-related environmental matters	Knowledge of product and product-related environmental matters
Information audit	Knowledge of information audit in relation to the Environmental Statement.	No specific requirements	No specific requirements
LCA data and methodology	No specific requirements	Expert on LCA and methodology for LCA work is not an requirement for the controller, but general knowledge an advantage	Expert on LCA and methodology for LCA work
Regulatory framework	Knowledge and understanding of the legislative, regulatory and administrative requirements relevant to the activity subject to verification	Knowledge and understanding of the legislative, regulatory and administrative requirements relevant to the product subject to verification	Knowledge of the regulatory framework in which requirements are prepared

Table 15 Comparison of qualifications and competence requirements in the three schemes

8.3.4 Integrated verification of information systems.

Over the years, several companies – especially the SMEs – have indicated that it would be valuable for them to have an integrated verification system used for different schemes: EMAS, Eco-label and EPD. In the following is discussed whether such a system could be established and what would be required from the verification bodies.

The EMAS verification system is chosen as the basis element for a possible integrated verification system, because EMAS already has the most developed and experienced verification system and because it already provides for product coverage. As an example, an EMAS registered company must identify its significant environmental aspects and the EMAS Regulation advises the company to include product considerations:
"Considerations in establishing the criteria for assessing the significance of an organisation's environmental aspects may include "…(f) design, development, manufacturing, distribution, servicing, use, re-use, recycling and disposal of the organisation's products;" (EMAS, Annex VI, 6.4)

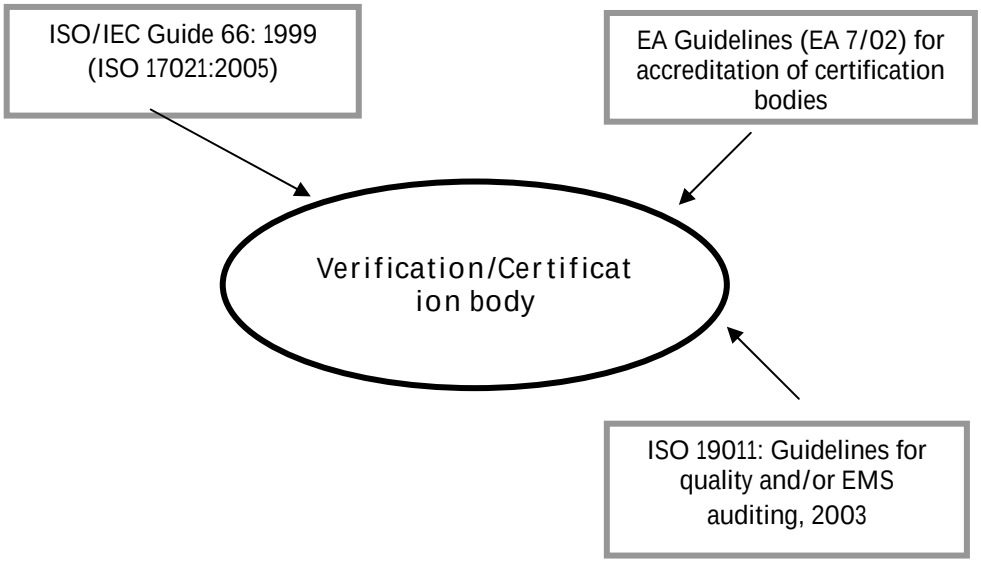
Certification of Environmental Management Systems
Certification of the Environmental Management System is standardised worldwide through a set of Guidelines.

The ISO/IEC Guide 66:1999[25] is a short International Guide which sets out the overall criteria and requirements for bodies operating with assessment and certification / registration of the Environmental Management System. For bodies accredited and working globally, it has been necessary to provide more guidance to ensure that certification and verification are carried out in a harmonised manner. The EA Guidelines (EA 7/02) for accreditation of certification bodies for the environmental management system provide such guidance.

The main issue of the ISO guide is to ensure that the certification/registration body is able to conduct assessments across the entire range of its activities using resources under its own control which meet the ISO requirements on auditing[26] - ISO 19011.

[25] The guide in under revision and will be published as ISO 17021 in 2005
[26] EA 7/02 – Issued by the European co-operation for Accreditation in Dec. 2001 refers to the Environmental Management Systems Auditing standards ISO 14010, 14011 and 14012. Today, these have been taken over by ISO 19011: Guidelines for quality and/or environmental management systems auditing, 2003

Figure 5 Guidance documents assisting the verification/certification body in EMS certification and EMAS verification



Auditor competence
It is a condition of accreditation that accredited certificates must not be issued until adequate resources can be deployed to conduct an audit. The certification / registration body's procedures must ensure that staff employed to assess the organisation are competent in the field in which they are operation.

The ISO guide EA 7/02 puts a lot of emphasis on the competence of the staff directing and managing the certification process (Clause G4.2.7-15) because they represent the pathway to ensure the credibility of the certification process. The essential elements are to select, provide and manage individuals whose collective competence is appropriate to the activities to be verified and the related environmental aspects.

The certification body must have criteria for training and selection of audit teams that ensure appropriate competent levels of:

- Understanding of the EMS standards
- Understanding of environmental issues
- Technical knowledge of the activity to be audited
- Knowledge of regulatory requirements relevant to the EMS
- Management system audit competencies
- EMS knowledge

Each member of the audit team or the audit team as such should at least be familiar with:

- the EMS standard
- the concept of management systems in general
- issues related to various environmental media (such as air, water etc.)
- auditing principles and methods
- knowledge of legislative, regulatory and legal requirement in the environmental field
- current technical knowledge of the specific sector
- techniques to reduce harmful environmental impacts and the application of these techniques in practice

ISO 19011 has also specific requirements with respect to the knowledge and the skills of environmental management system auditors (ISO 19011, clause 7.3.4.). These are similar to those referred to above but are more specifically related to environmental science and technology.

ISO 19011 is also more specific in relation to the technical and environmental aspects of operations. Knowledge and skill in this area should enable the auditor to comprehend the interaction of activities, products, services and operations with the environment

Competences in relation to eco-labelling and EPD verification.
If an EMAS verifier was to carry out an eco-label assessment and EPD verification as well, the requirements should be extended to comprise:

- genuine knowledge of the eco-label and EPD-schemes in question
- knowledge of the criteria document and EPD-PCR in question

More detailed the main differences between the EMAS verification, the eco-labelling and the EPD verification is the expanded focus on:

- *products* – requiring current technical knowledge of the product, knowledge of the critical environmental characteristics of the product and product specific terminology body.
- *life-cycle approach and assessment* –requiring knowledge of LCA methodology and techniques such as the ISO 14040 series. A requirement mainly in relation to the EPD verification
- *performance evaluation and data auditing* – requiring a broader and more comprehensive knowledge on test, monitoring and measurement methodologies. It should also be recognised that data auditing is a task that differs from auditing control requirements.

These competences could be further elaborated and presented as specific knowledge requirements in the audit team, if an integrated verification was to be performed.

Stages in the audit process
The EA Guidelines (EA 7/02) for accreditation of certification bodies for environmental management systems set up requirement for the application for the certification process (hereafter the audit) and the stages to be included. These are divided into stage 1 and stage 2. Stage 1 is a review of documentation and the planning process of the site audit. Stage 2 is the actual assessment of how the system works on site and finding objective evidences. This is further explained below including an explanation of the similar element in an eco-label assessment and EPD verification.

Stage 1

Document review
Companies requiring EMAS-verification must document their Management System. This means that the verifier must review the available documented evidence to assess that the documentation requirements in EMAS are met. The EMAS statement is an essential document and requires special attention from the verifier.

An application for Eco-labelling must include all required certifications and necessary documents and a procedure concerning changes of the product.

The application is to be completed with the enclosures (e.g. test reports, measurement data, etc.) that are required in accordance with the criteria document for the particular product group. The verifier must conduct a document review to ensure conformities in the documentation compared to the criteria document.

The application for a verification of an EPD includes the actual EPD and an EPD report, and the verifier will go through the documentation to see if the LCA is conducted as set out in the PCR and the relevant ISO standards (ISO 14020, 14025, 14040), assess data and how they are calculated.

Initial visit
The initial visit is performed to obtain a clear picture of the complexity of the organisation's operation and to provide a focus for planning the audit stage 2 and to achieve an understanding of the EMS in the context of the organisation's environmental aspects and associated impacts, policy and objectives and in particular the organisation's preparedness for the audit stage 2. It must also ensure that the organisation fully understands the verification process. The information gained must serve as a basis for audit planning.

No initial visit is conducted in the Eco-label and EPD verification process.

Stage 2

Audit Programme
A detailed audit programme is issued to the organisation prior to the EMAS-audit. The objectives of the audit (stage 2) are to confirm that:

- the organisation adheres to its own policy, objectives and procedures
- the EMS conforms with all the requirements of the EMS standard and is achieving the organisation's policy and objectives
- the information in the environmental statement is correct

To do this, the verifier must address the implementation of the EMS. The extent of the audit stage 2 should be influenced by the degree to which the auditor can rely on the organisations internal audit

There is no detailed audit programme in the Eco-label and EPD verification process, and there is no internal audit that the verifier can rely on.

Verification-Audit
The objective of the EMAS verification-audit is to ensure that the company's documented Management System and Environmental Statement complies with EMAS and the documented system and procedures/instructions are implemented sound and properly through site visits and interviews with selected personnel. If however non-conformities are identified, non-conformity notes are given.

An Eco-label verifier also conducts a site visit at the organisation to find non-conformities in the performance compared to the criteria document.
For the time being, only a few the EPD schemes require an audit or site visit in the organisation, and it is not included as a requirement in ISO 14025.

Technical review and issue of certificate
When the auditor has ensured that all activities stated in the EMAS assessment process have been completed and all non-conformities are closed, he/she hands over the audit file to the authorised person for technical review. The authorised person must review the records in order to verify that the

documentation is satisfactory. If the documentation is found satisfactory, a certificate/verification diploma may be issued.

The EU Eco-label has no such requirement as a technical review, but it is a practice with many of the Eco-labelling administrators. For instance it is a requirement in the procedures of the Nordic Swan label. The verifier conducts a technical review and if an application is approved, the label is awarded.
There is no suggestion of a technical review in the ISO/DIS 14025 and it has not been found in any of the existing EPD schemes.

Registration
When above procedure has been completed, the validated statement is sent to the Competent Body to be published and registered. The company is now listed in the register of EMAS organisations and has the right to use the EMAS logo.
Similarly, companies with the Eco-label and an EPD will be registered by the Eco-label competent bodies and the EPD programme operator.

Definition of the scope, organisation, site and products
Another important issue to take into account when discussing integrated verification is the different scopes of the information systems.

In an Environmental Management System, the scope of the system is either defined by a specific location (a site) or the boundaries of the organisation. In the Eco-label and the EPD, the function of the product and the product chain defines the scope. and also when a company decides to have a product label or an EPD on one selected product (product category), but not all its products. One could say that EMAS includes part of the product chain and the product-oriented schemes include part of the production site.

In several places, EMAS refers to a product-oriented approach from the (initial) environmental review to the final environmental statement. However, the EU has not prepared any guidance with respect to the extent and the integration of the product in EMAS. Few interviews give the impression that EMAS seems to be dealt with in various ways by the verifiers and to various degrees in companies EMAS systems.

The element of product verification in the EMS verification has been discussed by the Forum for Accredited Bodies in Europe (FAB), but no conclusion and/or guideline has been developed yet. Also the EA 7/02 and ISO 19011 have elements of product related issues, but these elements have to be exploited further to ensure that the different scopes do not contradict each other. It should still be possible in an integrated verification to have a complete management system assessment, but only selected products assessed.

Surveillance audits
The surveillance audit process is the core of EMS verification maintenance and must be planned and executed to ensure a continuing evidence of an acceptable maintenance of the management system. The surveillance audit is based on 12-month intervals and must cover all parts of the management system within the 3-year life of the verification. All verification bodies must have clear procedures laying down the circumstances and conditions in accordance with which the verification will be maintained.

The verification of an Eco-label and an EPD does not include any surveillance audit. But again such a procedure is known from the Nordic Swan label, where the Eco-label verifier conducts an assessment within the verification period. This means that the working process in the Eco-label scheme in companies (and expectedly in the EPD) is reconsidered every three years when the application must be renewed, while an EMS working process is continuous and on-going.

	EMAS	Eco-label	EPD
Verification cycle	36 months – annual updates	Vary from product group to product group – often 36 months	36 months
Surveillance audit cycle	12 months (in critical cases 6 months)	No surveillance audit Required	No surveillance audit required

By including a surveillance audit in an integrated verification process, the Eco-label and EPD schemes might gain credibility and make the benefits of integrated information processes more obvious, because the same data are gathered for more purposes at the same time. It might benefit many companies to have a more continual and integrated working process and not only an integrated verification.

The ISO guide EA 7/02 sets up specific guidelines for the surveillance audit.

An EMAS verification is normally valid for a period of three years. A re-assessment audit must be carried out before the verification can be renewed. In principle, the re-assessment audit is similar to the initial audit, but because of the knowledge collected during the surveillance audits, it will normally take the form of an extended surveillance audit ensuring that all elements are audited.

The Eco-label verification and the EPD verification are valid as long as the criteria document is valid – for three years or more - and the organisation must send a new application after the three years according to the new criteria document and the new PCR and the application process starts again.

Conclusion
A common and integrated verification process of the voluntary information schemes could be established and create benefits especially for the small and medium sized companies and it could create more credibility to the verification of the individual schemes especially the Eco-label schemes which today have no common European verification framework.

It is possible to develop a better process, which would benefit not only the companies but also the verifiers, competent bodies and other stakeholders and it would gain credibility in all three schemes seen as an initiative to make the verification process less bureaucratic. But today it would require further qualifications of most verifiers, who should also have thorough knowledge of all schemes in question.

There are no formal restrictions in EMAS on an integrated verification process. On the contrary, EMAS already provides for inclusion of the product-oriented issues.

Both the EMAS (via the EMS accreditation schemes) and some of the EPD schemes have very precise descriptions of the verification process. The Eco-label does not have the same general description, which makes the comparison inexact because some elements existing in the EMAS and EPD schemes might also exist in one or more of the national description of the assessment process in the Eco-label.

With regard to the Eco-label, a missing overall description of the verification process means that many different individual procedures have been developed in each country and this may lead to non-consistent verification in different countries.

The main wish from companies and organisations is to get a less bureaucratic and time-consuming verification process. Some of the main benefits of an integrated verification process are that the companies will save time preparing the audits, they would only have to prepare one documentation file and their presence at the verification audits would not be required.

Many of the elements in a verification process are similar and have the same heading when the verification process in general is described. However, a closer look at the verification task reveals that the requirements for the elements are rather different.

The main benefit is that the verifier (audit team) will have a better understanding of the company having gone through more product-oriented material in relation to the Eco-label and/or the EPD as part of the document review. This knowledge should lead to a more efficient planning of the audit programme and the verification audit.

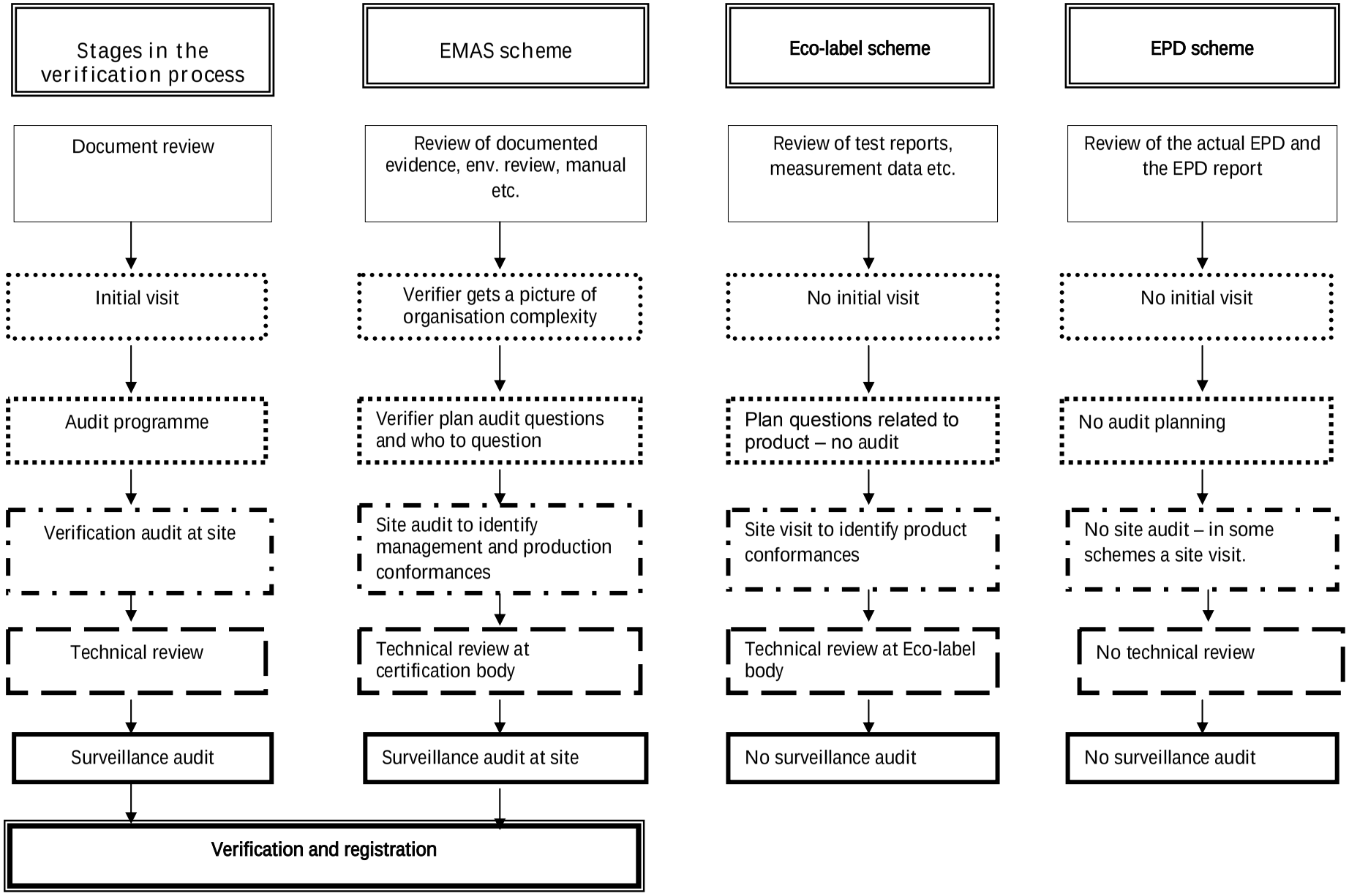
Examples in both the Swedish and the Japanese EPD schemes show that they use the same verifier – person or body – as in EMAS. In addition, some countries use an EMAS verifier or EMS auditor (ISO 14001) for the Eco-label assessment visits. These experiences could be exploited further.

However, the benefits might still depend on how the audit team is set up and on the personal skills of each auditor, who should be able to understand both the idea of a management system audit and a performance audit and be able to create trust and confidence in the relationship with the client.

As stated in ISO19011, p. 21-23, “it is a matter of trust and confidence to be an auditor or controller and be able to pass the right questions to get a trustworthy answer. Trust and confidence in relation to a customer is created on the basis of the auditor/controllers personal skill and attitude.”

It has not been part of the framework of this study to look into the pricing of an integrated verification, but it seems possible that the initial costs of starting one verification rather than two or three should lower the costs.

Figure 6: Stage 1 and 2 in the verification process of EMAS and similarities in the Eco-label and EPD scheme



9 Conclusion and recommendations

9.1 The Framework

1. An integrated environmental and health communication system should be developed and agreed upon in EU. The Commission should therefore take initiative to elaborate a strategy for how to implement an "Integrated product chain environmental and health communication system".

The results of the analysis clearly document the need for a stronger coordination of information systems that have similar target groups and objectives. Highest priority should be given to Eco-labels, EMAS and EPD's, but also the IPPC data collection and the Safety Data Sheet have many aspects, which should be co-ordinated with the 3 other schemes. The primary elements to be targeted are: 1) framework and guidelines, 2) data collection, management and reporting and 3) verification.

There are obvious benefits for the stakeholders – both those who apply the schemes (enterprises) and those who receive the information (down stream users, authorities and consumers). Perhaps one of the most important benefits is the maintenance of credibility and thus the future applicability and success of the systems.

2. Commission should initiate work for the preparation of an EU regulation for environmental product declarations (EPDs) based on the eco-label and EMAS framework

A prerequisite for the establishment of a coherent product (value) chain information system is the existence of an EPD system. An EPD may deliver LCA based data from the company to its suppliers and professional customers. EPD may therefore link together Eco-labels (target group: the consumers) and EMAS (target group: enterprises) and may be the system needed for EMAS to further develop into an environmental product management system (EMAS II).

3. The Competent bodies for EMAS, Eco-labels and EPD should merge into one single body to promote coherence between the schemes

The present management of the schemes is often governed by competent bodies from different agencies or sectors. To achieve a coherent EMAS, Eco-label and EPD system, one competent body should be given the responsibility for the maintenance and promotion of the schemes.

4. A common life cycle analysis (LCA) framework should be established at the community level.

A second prerequisite for a coherent system is the establishment of common data collection framework. Presently, the background documents for the

elaboration of Eco-label criteria are based on life cycle thinking – although the present analysis documents that this is not the case for all product groups partly due to the lack of appropriate requirements and guidelines. Some member countries are in the process of establishing their own LCA based national EPD schemes (e.g. Italy, Sweden and Denmark) which to some extend is informal co-ordinated. If no initiative is taken by the Commission to elaborate a common understanding of life cycle analysis there will soon be a number of more or less different national schemes which to some extend may interfere with one of the most important objectives of the EU: The free movement of goods and services. The work for a common EU LCA framework should be based on the relevant ISO standard and should ideally be co-ordinated with related product policy areas.

5. A common framework for verification of environmental and health information systems should be established.

A third prerequisite is that the extent and quality of the third party verification of the various systems are coherent. Systems with a weak independent verification may not be viewed as credible. Presently, the SDS scheme is presumably the weakest verified system as only a retrospective spot-check is performed. But also the third party verification system of Eco-labels is problematic as there has been established no common requirements and guidelines for the verification performed by the various verification bodies. The basis for the establishment of a credible common third party verification system may be EMAS, as all needed requirements and guidelines for certification and accreditation have been established.
An accredited certification system ensures that the same level of verification is performed in all member countries and thus that the burden for the users are the same to achieve and maintain licences.

6. Guidelines and other background documents elaborated for the purpose of a single scheme should be made available for users of other relevant schemes.

In all schemes a number of documents are elaborated to support the implementation, e.g. background reports and criteria documents for the eco-label; BREF documents for identification of best available cleaner technology (IPPC), guidance documents for environmental management (EMAS), and PCR documents for EPD. These documents - although targeted at a specific scheme - are valuable for all IPPC, EMAS, EPD and eco-label users and should therefore be disseminated to a broader user group, i.e. by elaboration and distribution of easy-to-read summaries of the documents to the users or target groups of all schemes.

9.2 The instruments

9.2.1 IPPC and EMAS

7. The regulatory requirements and guidance regarding EMAS initial review and the application for IPPC should be co-ordinated to facilitate a straightforward reuse of the documents

There are advantages and benefits for companies working with both the IPPC requirements and EMAS in a co-operated manner, because the schemes are site and facility based and both have focus on improving environmental performance of the production site.

Implementing EMAS makes it easier to comply with the requirements of the IPPC Directive, for example regarding the preparation of applications and elaboration of monitoring reports. EMAS brings the company a management system by which the work may be organized and structured in a systematic approach. This is also valid the other way around. Having an IPPC application in place provides a quick start to the initial environmental review in EMAS.

8. The BREF documents should be disseminated in an appropriate way to assist also companies working with EMS, as these documents include valuable information regarding up-front technology.

The idea of the BREF documents describing BAT is useful for EMAS companies defining new targets for environmental performance. The documents should be used more widely and published in a form and a language, which can be applied by a broader audience, in a product chain perspective in relation to supply chain management and dialogue.

9. EPER type information should be applied in downstream product chain communication provided that the data may be converted from emission to product related.

EPER type information (emissions of up to 50 hazardous substances) is a part of the EMAS statement and should be applied in down stream product chain communication tools (EPD, eco-label) as well. The EPER information can be used as an assessment tool to estimate environmental impacts for products e.g. by determination of toxicity scores for the 50 substances and conversion of EPER site specific data to product specific data. The procedures for converting the data may be collected from existing guidelines for life cycle assessments.

9.2.2 EMAS and Eco-label

10. As complementary schemes with similar objectives, EMAS and the Eco-label should be strongly co-ordinated and anchored in the same competent body forum. A strong co-ordination will be efficient, as it will prevent the duplication of work and ease interpretation by the users of both schemes

EMAS and the various eco-label schemes are in the principle complementary tools.

- EMAS serves as an instrument to ensure that the environmental data are collected and managed according to established procedures and to ensure a process towards continual improvement of the environmental performance.
- The Eco-label criteria assist companies identifying significant environmental aspects, setting targets for the environmental improvements and – by the product label - communicating the achievements to the end-user.

Both schemes require that the participant collect data on its environmental aspects. In EMAS, the participants must identify their significant environmental aspects and document and how they were identified. The eco-label criteria as well as the background document for establishing the criteria point out several issues that could be significant for environmental improvement for any company, within the product group. Therefore, the

Eco-label assists the EMAS company (or other enterprises working with environmental improvements) identifying the significant aspects.

The criteria is regarded as highly credible as they are stringent and set by an authority competent body. Therefore, the criteria are valuable bench markers for the product group in question.

Many criteria documents refer to Environmental Management System as helpful for complying with an Eco-label. EMAS does not yet have the same recommendation regarding the Eco-label, although the product dimension is included in EMAS II. EMAS has a set of guidelines on several issues of building up a management system but still not a guide on how to incorporate the product dimension. On this item, a reference to the EU-Eco-label should be made.

11. The elaboration of documents defining the requirements under both EMAS and the Eco-label should be strongly coordinated.

There are many examples of EMAS and Eco-labels setting similar requirement for the same issues. The requirements may not be expressed in precisely the same manner, but there is a clear correspondence. For example, some Eco-label criteria documents have requirements for compliance monitoring procedure, training and awareness among employees – aspects that are covered by the EMAS requirements as well.

For other product groups there is a complete overlap in requirements (although in different wording). These are found in service oriented product groups e.g. the tourist accommodation sector. In other sectors the requirements are very far from each other.

9.2.3 Environmental Product Declaration (EPD) and the EU Eco-label

12. The EU Eco-label should be based on a strong LCA framework and should Commission decide to establish an EPD scheme, the LCA framework should apply for the EPD as well.

It is absolutely essential to establish common procedures and guidelines for the LCA-foundation of the EU Eco-label. For some of the Eco-label criterion documents today, the recentness and the quality of the applied lifecycle investigations may be questioned. An example is the background document for indoor paints and varnishes. The criteria are reviewed every 6 years, latest 2002. Although product innovation has been high within this product group, the categories are identified from an LCA conducted in 1991.

Eco-labels and EPD should make use of the same LCA framework for developing background documentation and for the Product Category Rules (PCR) respectively.
A common well-defined LCA fundament facilitates the use of PCR for the elaboration of eco-label criteria and eco-label background documentation for PCR.

13. A future EU-EPD scheme should build upon the present EU Eco-label organisational framework.

If the Commission decides to implement an EPD scheme, it is strongly recommended that the Eco-label and the EPD schemes be merged to provide a coordination of technical tools, activities and procedures.

The two schemes should share a common product sector PCR foundation. This relative broad PCR may be further specified to cover the need for establishing Eco-label criteria for sub-categories of a product area. An example is the Swedish EPD scheme PCR for chemical products. The PCR is relatively broad covering chemical products in general. This PCR may be subdivided into narrower product categories in order to define EU Eco-label criteria for chemical/technical products.

9.2.4 Safety Data Sheets and the EU Eco-label

14. Verification of SDS should be strengthened by the EU member countries to reach a similar stringency and credibility as other EU based information schemes.

The present authority control of SDS is in the form of infrequent spot check of compliance. This compliance control should be strengthened to be at the same level as Eco-labels and EMAS, e.g. either by establishing a 3rd party verification system or to follow the authority verification system applied for IPPC. The reported high frequent non-compliance for SDS is a barrier for making direct use of the included information by other schemes like EMAS and Eco-labels.

15. Requirements in Eco-label criteria documents regarding chemicals should as far as possible reuse the information included in SDS. This would ease the possibility for the applier to collect data.

The information needed in order to prepare a SDS and to examine whether a product is in compliance with Eco-label criteria is basically the same (detailed information on the chemical composition). The criteria for chemicals are often defined in a way, which is not in accordance with the requirements for the SDS, e.g. lower limit values for reporting the concentration of dangerous substances in SDS compared to the limit values required by Eco-labels.

Some information has to be added to the SDS, if it is to be used as bearer of information relating to Eco-label criteria. Guidance should be given regarding which type of information may be requested by the supplier as a part of the Safety Data Sheet, including how and where to incorporate this information

16. SDS and the requirements in the coming new EU chemical legislation (REACH)

According to REACH, SDS' are to be the core communication tool regarding safe handling of chemicals (chemical substances, chemical preparations) and articles liberating chemical substances during use and disposal. As the aim of both REACH and the Eco-label is to promote the market mechanism to increase the use of products giving rise to less environmental and health impact, the role of SDS as a tool for documentation of products' compliance

with Eco-labels may therefore be strengthened in the future. Competent authorities for Eco-labels and EMAS should analyse the need for input in relation to the preparation of the new chemicals regulation

9.2.5 Verification of EMAS, Eco-labels (and EPD)

17. A coordinated verification practice should be established between the 3rd party verified voluntary schemes.

Most companies are interested in a coherent verification system, especially the SMEs. In the SMEs it is often one single person who is in charge of and carries out all the work in relation to environmental management, including dialogue with authorities, application for Eco-label, internal audits in the EMS etc. etc. When it comes to verification by the authorities, the Eco-label controller and the EMAS verifier have their site visits at different times and the environmental manager must prepare each meeting individually although they are looking for more or less the same issues and the same documentation.

A common and integrated verification process of the voluntary information schemes could be established and would create benefits especially for SME's. A coordinated process may lead to an increased credibility of the individual schemes, especially the Eco-label scheme, which today have no common European verification framework, which may lead to different procedures in member countries.

There are no formal restrictions in EMAS regarding an integrated verification process. On the contrary, EMAS already provides for inclusion of the product-oriented issues.

Many elements in a verification process are identical and have the same headings. A closer look reveals a number of differences, however:

- Document review is a significant part in all three schemes – but the verifier has to look through different documents
- Validation of data is included in all three schemes – but it is not the same data. EMAS requires data at an annual basis as well as total volume at the site, the Eco-label and the EPD require data related to the product and the two latter have different functional units
- Site and control visits are elements in EMAS and the Eco-label and an option in the EPD.
- Only EMAS has surveillance audits

The benefits might still depend on how the audit team is set up and on the personal skills of each auditor: That he is able to understand both the idea of a management system audit and a performance audit in relation to a product and able to create trust and confidence in the relationship with the client. This requires focus on both technical qualifications and personal skill.

18. Verification stringency and procedures should be similar for both voluntary and mandatory schemes having similar focus.

All 5 schemes analysed in the present study share the same overall objectives: To promote a reduction of loads influencing environmental and health quality. The efficiency of the schemes is among others dependent on the stringency of the applied verification systems. To increase the general understanding and the results of the effort in relation to the overall objectives,

the verification systems of both mandatory (authority controlled) and voluntary schemes should be coordinated to achieve a similar stringency.

Establishing Eco-label criteria

Procedure

The procedure for establishing the eco-label criteria, including mapping and selection of the most important environmental aspects, comprise the following steps, schematically presented in figure 1.

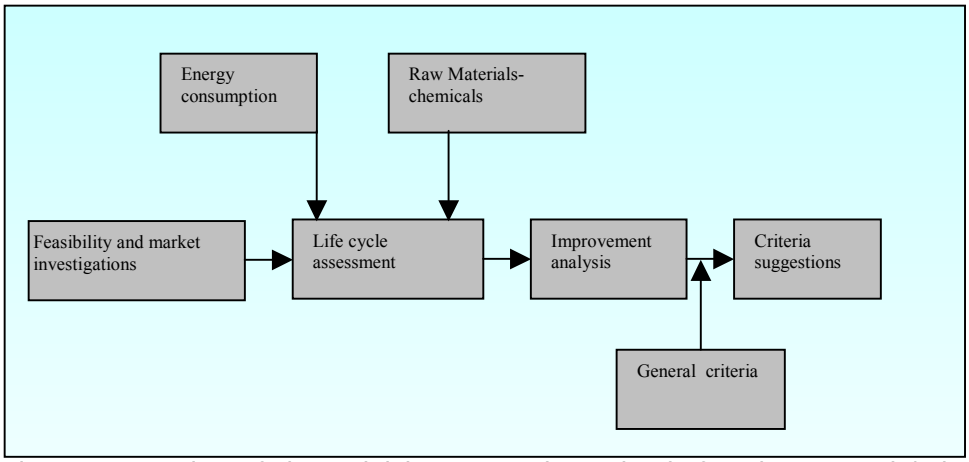


Figure 1: Overview of the activities suggesting criteria for the EU Eco-label.

Feasibility and market investigations

Feasibility and market investigations map the various types of products within the product group in question on the common market, the amounts produced, imported and sold as well as the market structure in the member states. Trade inside and outside the Union is also considered.

Consumer perceptions, functional differences between the product types and the need to establish sub-groups are mapped and evaluated.

Lifecycle evaluations

The most important environmental conditions for which criteria are to be prepared are defined using lifecycle evaluations. This work is carried out according to internationally recognized methods and standards. Resource consumption, chemical consumption, packaging consumption, transport contribution as well as various removal and emission scenarios are all considered.

Improvement analysis

Improvement considerations primarily include the following aspects:

- The theoretical potential for environmental improvements compared with the possible changes in market structures. This is based on an improvement evaluation on the basis of the lifecycle considerations.
- The technical, industrial and financial feasibility and market changes.

- Consumer behaviour, perceptions and preferences that can influence the efficiency of the eco-label.

Suggestions for eco-label criteria

The final suggestion for environmental criteria includes the relevant environmental conditions for the product group. Criteria to be included in the final criteria and to be omitted are a political decision. The criteria agreed upon are prepared on the basis of lifecycle evaluations. The centralized organ has established which factors are so significantly potentially damaging to the environment that they are to be included in the criteria.

The most essential environmental conditions are established by identifying the categories of environmental influences where the product investigated offers the biggest contribution seen from a lifecycle perspective and among these conditions, those for which there is a substantial potential for improvements.

The result of this selection is a number of criteria clearly defining boundaries for the acceptable. These limit values are established as well-defined acceptance criteria to be met in order to obtain the EU eco-label. The criteria are established by the authorities along with the different interest groups within the product type in question.

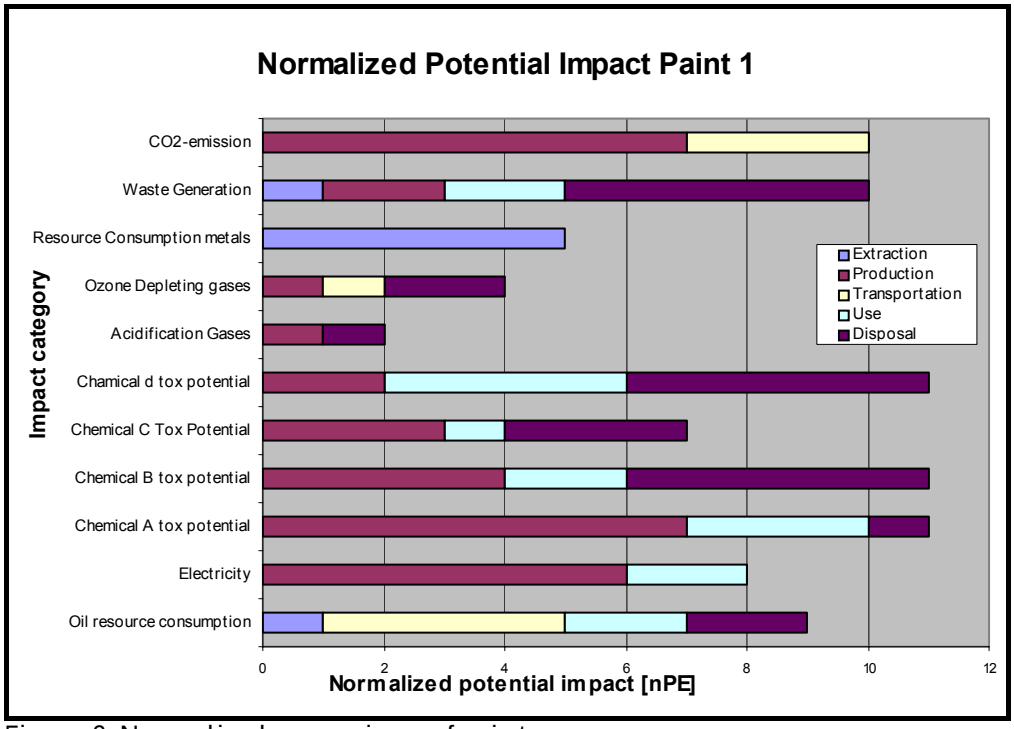


Figure 2: Normalised comparison of paint

The selection of criteria can be decided using various figures and tables. A normalization[1] of the various environmental impact categories can be used to compare the environmental impact potentials across categories by means of which the categories with the greatest environmental impact potential can be identified.

[1] During normalization, the environmental impact potentials and resource consumption of a product is seen in relation to a common reference impact in order to evaluate which impacts are big and which are small. This makes it easier to compare the categories directly.

An example of such a graphic presentation for a lifecycle screening of paint is given in figure 2.

Criteria will be established for a number of different paints in order to create a reliable standard of comparison. Whenever possible, the paint types must come from a representative number of countries in the Union.
The different categories can of course be divided further and categories with a big environmental impact can be identified.

The final step in the selection of environmental impact categories is to find those categories, which have the greatest potential for being lowered. The categories which make up the largest environmental impact are listen in a form as shown below in table 1.

Flows/Effects	Main Contribu-tion Stage	Paints Compariso n	How to reduce environmental impact
Consumptions			
Non renewable resource depletion	Crude oil, Ti	a>b,c>d	Optimise TiO_2 use, electricity reduction
Renewable resour-ce consumption	Wood	b,c>a,d	No possibility
Water Discharge			
COD	Ti emission	.	Optimise Ti use
BOD		.	
Euthrofication		.	
Toxicity Potential		.	Decrease chemical discharge
Air Emissions		.	
VOC	Paint Application	.	
Global Warming	TiO_2		
Particles			
Solid Waste			
Total Waste	Paint application		

Table 1 Example of a segment of a scheme identifying categories of importance for eco labelling criteria.

The criteria, for which there is a possibility of reducing the environmental impact potential, are identified in the right column of the table above. If it is realistic to obtain the reduction potential without overwhelming expenses, the category in question will be included in the criteria.

In practice, the criteria are worked out as a ban on specific ingredients, a limitation in the allowed content in the goods or a demand for declaration of certain ingredients.

The limits for the individual parameters must be reasonable and agreement must be reached about the values.

Thus, a number of environmental criteria are listed. The number of criteria listed varies greatly among the different product categories.

The purpose of the established criteria is that *no more* than 1/3 of the existing products on the market are able to meet the criteria[2] but that the criteria must be obtainable for the remaining products within the category.

Other criteria

As mentioned previously, consumer products carrying the eco-label, must fulfil a number of environmental demands, which have been defined based on lifecycle evaluations.

In addition to the criteria, which are established based on the lifecycle analysis, the criteria include demands for health and for handling the product, i.e. manuals, noise, return declaration among others.

These criteria are included since the order dictates that the eco-label must contribute to consumer protection.

The aim has been to protect both the environment and the consumers' health when preparing the criteria for the various product types.

Health criteria

The criteria illustrated in figure 3 below include certain considerations relating directly to the health aspect.

Regulation EC No. 1980/2000 of 17 July 2000 (extract)

Article 2 section 4:
"The eco-label may not be awarded to substances or preparations classified as very toxic, toxic, dangerous to the environment, carcinogenic, toxic for reproduction, or mutagenic (...) nor to goods manufactured by processes which are likely to significantly harm man and/or the environment, or in their normal application could be harmful to the consumer."

Article 3, section. 2:
"(...) In evaluating the comparative improvements, consideration shall be given to (...) **health** and safety aspects (...)".

Figure 3 Health aspects in the order.

The health criteria are often indirectly included due to bans against substances with particular classifications (typically chronic effects such as cancer and reproduction toxicity), limitations in the allowed amount of substances with less severe effects as well as declarations of ingredients for general consumer guidance.

Criteria concerning consumer behaviour

As the EU eco-label is based on lifecycle evaluations there is often, particularly for criteria for electronic products, a demand for a reuse declaration describing how dangerous parts and resource-scarce components in a given apparatus may be safely disassembled or removed.

[2] Regulation (EC) No 1980/2000 of the european parliament and of the council of 17 July 2000 on a revised Community eco-label award scheme

The chosen criteria will be submitted for hearing before a final approval can be made.

When the consumers buy a product labelled with the eco-label the product is environmentally sound compared to other products within the same category and that there is an agreement that these criteria are generally acceptable.

Type III EPD systems

Sweden (EPD)

In Sweden, an official system for type III environmental product declarations called EPD (Environmental Product Declaration)[1] has been developed and established. The system is voluntary and can be used worldwide by all interested companies and organizations. At the moment, interested parties from 7 other countries have joined the EPD system at various levels[2] . The Swedish EPD system is the most developed type III product declaration type in the world.

In Sweden, EPDs have primarily been developed for energy-heavy products such as refrigerators, washing machines, pumps etc.

At the moment, environmental product declarations have been prepared for the following products and services:

Existing EPDs
Freezers
Refrigerators
Washing machines
Frequency converters
Circuit breakers
Transformers
Waste collection services
Landfills
Production chemicals
Ink
Sink mixer taps
District heating
Galvanising processes
Steel production
Pumps
Copy- and fax machines
Hydro Power
Nuclear Power
Under preparation
Packaging products (Tetra pak)
Clay Bricks
Print Toner

Table 2 Overview of existing and scheduled EPDs

[1] www.environdec.com

[2] Countries with existing EPD programs: Sweden, Belgium, Poland, Finland, Italy, Japan, Denmark and South Korea. In Norway, an EPD program is underway

Other countries have developed type III product declarations as well. The systems used outside Sweden are typically used and developed within specific trades. One of the most extensively developed type III declarations is the Canadian, which is briefly described below.

Canada (EPDS)

An environmental profile declaration similar to the Swedish EPD is used in the Canadian pulp and paper industry. The declaration is called EPDS, Environmental Profile Data Sheet[3], and is certified by Terra Choice Environmental Services, inc. The EPDS is a standardized reporting form, which offers measurement data and explanatory comments related to a list of environmental attributes that cover the lifecycle of pulp and paper products. It provides pulp and paper producers with a credible and cost-effective way of measuring and reporting on the environmental performance of individual products and the mills that produce them. The data requirements of the EPDS are very similar to what is generally required in an EPD.

Japan (EcoLeaf)

The Japanese eco-label EcoLeaf[4] is designed to present comprehensive information in a quantitative form on lifetime environmental impact by the product or service, without making any judging statement by any set criteria - it is entrusted to the reader. EcoLeaf is run by JEMAI (Japan Environmental Association for Industry).

By encouraging companies to participate, the EcoLeaf program aims at encouraging them to plan and then to develop eco-conscious products and services. This will give consumers a stronger awareness of eco-conscious practices and allow them to choose and use environmentally friendly products. By facilitating communication of environmental information between producers and consumers, EcoLeaf aims at creating a relationship of mutual trust, thereby contributing to the creation of a sustainable society.

The system is very similar to the Swedish EPD system with Product Specific Criteria (PSC) similar to PCR for each product type.

At the moment, PSC has been developed for the product categories listed in table 3.

Title	Issued
Electro-photographic Dry Process Photocopier	6/13/2002
Insulation Material (polystyrene foam type)	6/13/2002
Single-Use Camera	6/13/2002
EP (Electro-photographic Printer) and IJ (Ink Jet) printer	6/13/2002
Analogue Camera (with silver film)	8/29/2002
Digital Printer-Duplicator	8/29/2002
Data Projector	8/29/2002

[3] http://www.terrachoice.com/Home/Certification/Environmental%20Choice%20Program

[4] http://www.jemai.or.jp/english/ecoleaf/outline.cfm

Title	Issued
Thermal Transfer Card Printer	8/29/2002
Facsimile	11/14/2002
Water Meter Box	11/14/2002
Communication Cable	11/14/2002
Bidet Toilet Seat	11/14/2002
Structural Aggregate	1/22/2003
Porcelain products	1/22/2003
Office Desk	1/22/2003
Digital Camera	3/26/2003
Notebook Computer	3/26/2003
Grid Electricity	5/2003
Drain Ditch Cover	5/2003

Table 3 Present PSCs for the Japanese Eco-leaf system /10/

Norway (EPD)

NHO - Confederation of Norwegian Business and Industry has initiated the EPD work in Norway[5]. The system is almost identical to the Swedish EPD-system. The Norwegian EPDs are prepared in co-operation with The Federation of Norwegian Construction Industries, BNL. EPDs are prepared for cement, concrete and other building materials /13/. An overview of existing Norwegian EPD certified product types are presented in table 4.

Product types with Norwegian EPD
Sewage Pipes
Concrete building materials
Cement Materials
Natural Gas
Hydroelectric Power
Chairs
Plastic Jug
Disabled sitting solution
Cardboard Paper

Table 4. Overview of existing Norwegian EPDs /13/

South Korea (EDP)

In 1998, the Korean Ministry of Environment and KELA (Korean Environmental Labelling Association) initiated the type III product declaration, EDP - Environmental Declaration of Products[6]. The system is very similar to the Swedish and the Japanese systems regarding the development of PCR, the lifecycle perspectives etc. At the moment, EDP is mainly prepared for electronic appliances. One EDP is developed for toilet paper as well. An overview of Korean EDPs is presented in table 5 below.

Product Category	Product Model	Manufacturer
Refrigerator	DIOS (87products)	LG Electronics
	ZIPEL(SRS768CC)	Samsung Electronics
TFT-LCD Monitor	SyncMaster(DV17AS)	Samsung Electronics
Glass for TV's and Monitor's	17" Flat Type	Samsung Corning

[5] http://www.epd-norge.no/
[6] http://www.koeco.or.kr/eng/index.asp

Product Category	Product Model	Manufacturer
Toilet Paper	POPEE Plus	Yuhan Kimberly
PDP TV	X-Canvas (MN-60PZ12)	LG Electronics
	PAVV SPD-42P2S1	Samsung Electronics
CD-Rom	CD-RW Drive	Samsung Electronics
Microwave Range	Toast MWO (MD-272-EJ)	LG Electronics
Air-conditioner	Whisen LP-C080AD	LG Electronics
	Whisen LP-C100AD	LG Electronics
	Whisen LP-C150AD	LG Electronics
	AP-W1240	Samsung Electronics
Washing Machine (Drum Type)	TROMM Washing Machines (WD-P070RD et al.)	Samsung Electronics
VCR (Video Cassette Recorder)	VCR (SV-DVD630)	Samsung Electronics

Table 5 Existing Korean EPD /13/

Denmark (MVD)

In Denmark, a project has been initiated to establish a privately organised environmental declaration system[7]. The Danish system will be voluntary and internationally oriented so that if and when EU guidelines and ISO standards are established, the Danish system is already coordinated with these efforts. The construction of the system will take place during the coming three years during which concrete guidelines for the preparation of and control with environmental product declarations will be prepared. A template will also be prepared for the content and layout of an environmental product declaration. An organization will be established along with a business plan for the future running and development of the system, including a suggestion for financing. Finally, the system and its guidelines will be tested by a number of companies within some selected product groups. It has not yet been established which product groups the system will start up with, but the intention is that more and more products and services will be covered by the system. Testing will last approximately one year ending in the fall of 2006. From the turn of the New Year 2006/2007, the system must be up and running and function without support from the EPA. Companies and organizations will then immediately be able to prepare environmental product declarations according to the product specific guidelines developed during testing and begin the development of product specific guidelines for other product groups.

[7] The parties to solve the task are Erik K. Jørgensen AS (EKJ) (Project management), Instituttet for produktudvikling (IPU) Dansk Standard (DS), AB Svenska Miljostyrningsrådet and Valør & Tinge A/S. In addition, a number of trade organizations and companies participate in the work.

Eco-label criteria and EPD requirements for washing machines

An area, in which a direct comparison between the EU eco label and an environmental product declaration can be made, is washing machines. To compare the two sets of criteria, the EU eco label requirements[1] are listed together with the product specific requirements for washing machines[2]. The main data requirements for the two environmental performance criteria are presented in table 6.

Table 6 Data inventory requirements for the EU eco label and PCR for washing machines.

Category	EU eco-label	EPD
MANUFACTURER INFO		
Manufacturing Company	Yes	Yes
Manufacturing Site	Yes	Yes
Issuer and contact	Yes	Yes
Guarantee statement	Yes	No
ENVIRONMENTAL PERFORMANCE DECLARATION		
Refinement	No	Yes
Resource Consumption	No	Yes
Electricity use	No	Yes
Transportation		
Refinement→ Production	No	Yes
Production → Sale	No	Yes
Sale → Use	No	Yes
Use → Disposal	No	Yes
Production		
Energy Consumption	No	Yes
Use of Chemicals	Yes, detailed	Yes, detailed especially for use of heavy metals as well as halogenated and brominated flame retardants
Material List	Yes, some specific materials, mainly chemicals.	Yes, total list
Emission Estimation to air and water	Yes, name of components	Yes
Greenhouse Emissions	No	Yes
Resource Consumption	No	Yes

[1] Commission decision of 17. December 1999 establishing the ecological criteria for award of the Community eco-label to washing machines, (2000/45/EC)

[2] Product-Specific Requirements. Household washing machines and household dishwashers, PSR 2001:2. The Swedish Environmental Management Council, Version 1.0, 2001-11-21

Use		
Energy Efficiency	Yes[3]	Yes
Water Consumption	Yes	Yes
Spin Drying Efficiency	Yes	Yes
Noise	Yes	Yes
Control of Detergent use	Yes	No (not mandatory)
Criteria for users manual	Yes	No
Washing Performance	Yes	Yes
Estimated Lifetime	No, but a two year guarantee	Yes
Disposal		
Recycling rate	Yes, declaration has to be done	Yes Specification has to be made
Waste amounts	No	Yes
Hazardous waste amounts	Yes	Yes
Separable hazardous materials	Yes, declaration has to be made	No
3: Information from the company and certification body	Data is sent to the Eco-label secretariat. The label is issued, but the data is kept confidential.	Specific data is kept confidential depending of the PCR, but the environmental key figures and conclusion are to be stated in the EPD, which is public accessible.

[3] For the eco-label, only rigid statements are needed in order to fulfil the criteria. For EPDs, quantifiable data is required. Thus sharing of data is not possible if only rigid statements are received, only the other way around.

PCR for Chemical products

The PCR for chemical products[1] is defined for both substances and preparations. Preparations are mixtures or solutions consisting of two or more substances. The PCR is based of the entire lifecycle.

For some product areas within chemical products further clarification could be needed. Principally, it might come into question to make a complement for chemi-cal products with a specific application and long manufacturing chains.

Prerequisites for the PCR:

Functional unit:

The functional unit is set to 1000 kg paint.

System boundaries:

Data to be included in the PCR

- Extraction of resources
- Transport of resources
- Refinement of resources
- Transport of refined resource
- Manufacturing of the chemical product
- Transport to costumer
- Use of the product

Manufacturing phase of the EPD is including the first 5 parts of the system boundaries.

Time limitations:

Inventory data must be given as annual mean values and be representative for the production. The period of time when the LCA is carried out must be stated in the environmental declaration.

[1] Product-Specific Requirements. Chemical Products, PSR 2000:5, The Swedish Environmental Management Council Version 1.0 2000-12-28

Limitations within the lifecycle:

The following is not included:

- environmental impact from manufacture of capital goods as well as building of plants.
- Packages used at deliveries directly to or from the company.

Packages in previous stages can be excluded.

Boundaries towards other products life cycle:

Recovered material is presented as flows out of the system and flows in to the sy-stem respectively. On the contrary refinement and transport of recovered fuel to en-ergy transformation plants must be included as well as environmental impact from combustion of the recovered fuel within the studied life cycle.

Boundaries towards the nature:

Waste, by-products and waste energy generated within the manufacturing phase of chemical products is presented as outflows. An exception is when system expansi-on is used.
Waste management handled by the producer itself must not be included. Inflows not followed from the cradle must be presented. Waste handling in previous stages, not declared as outflows, must also be presented.

Geographic boundaries:

Potential environmental impact from emissions from processes in different stages of the life cycle must be included, no matter geographic location.

Cut-off rule:

Processes/activities estimated to contribute to less than 1 % of the total environ-mental impact of the product, for any impact category, can be omitted.

Use phase:

All declarations must include a presentation of the environmental impact from the transport to costumer.

Most chemical products have many different fields of application and are often intermediate products used in other production processes. In the usage phase a short description of the main applications of the chemical product is given. Branch specific information can be used.

When the chemical product has a predominant field of application, a quantitative description of environmental characteristics must be included, e.g. waste production, energy consumption etc. If the product is commonly used as an inflow waste data does not need to be included.

Common environmental impact categories:

Use of resources [kg/FE],
Use of resources with energy content [MJ/FU]

All energy consumption must be presented in net values
Electricity Consumption [kWh/FU]
Toxic Substances emissions [g/FU]

Calculation of impact categories:

Greenhouse Gases: g CO_2-eq/FU
Ozone depleting gases [g CFC11/FU]
Acidifying Gases [mole H^+/FU]
Contribution to creation of ground water ozone [g ethane equivalents/FU]
Contribution to ozone depletion [O_2-eq/FU]
Resource consumption [nPE/FU]
Eco-Toxic Substances [nPE/FU]
Humane-Toxic Substances [nPE/FU]

Additional environmental impacts:

Emission to air:
CO_2 (fossil), SO_2, CH_4, NO_x, NMVOC alternatively HC, particles

Emission to water:
N total, P total. COD alternatively BOD or TOC.

Emissions of toxic substance:
Selection of toxic substances must be motivated. If no toxic substances are selected, this action must be motivated as well. Toxic substances must be specified as far as possible

Declaration of contents:

To be included in EPD for all chemical products. Must include health- and environ-mentally dangerous substances, categories of danger, symbol letters and risk phrases.

The declaration of content must consist of a list of material nouns according to the SDS (item 2). Categories of danger, symbol letters and risk phrases must be given according to the information from item 15 in the SDS.

Eco-label criteria for paint/varnish and PCR for chemical products

Annex 4 contains a description of the PCR for chemical products. It is much harder to comprehend the inventory data of an EPD for chemical products than that of the criteria for the EU eco label application form, but some of the routines regarding data requirements are identical.

The EU eco label focuses on chemicals in the finished product while the EPD requires data on the entire lifecycle. The EU eco label has data requirements that are very well defined whereas the PCR for chemical products requires individual choices of limitations with thorough explanations for the decisions made.

To some extent, it is possible to share data (PCR and EU eco label) on the chemical contents of the products, since part of the inventory data requirements for EPDs are similar to corresponding requirements for the EU eco label. Sharing of information is possible regarding identification of risk sentences, hazard identification, general company data, emission estimation, etc. Table 7 sums up similarities and differences between the two varieties of environmental labelling.

The EU Eco-label Paint/Varnish[1]	The EPD/PCR Chemical Products
General Information	
Product group well-defined	Product group not specific
Based on finished product	Based on functional unit of 1000 kg
	Definition of product, manufacturing process, manufacturing location etc is needed
Labelling	
A declaration description (SDS or similar) for ingredients has to be handed in to the certification body	Labelling: Health and risk sentences, symbol letters have to be stated according to section 15 in the SDS
Cut-off rule	
Certification has decided which information is required.	The manufacturer can omit information concerning activities assessed to contribute to less than 1% of the total environmental impact. The manufacturer has to explain the reason for omitting data.
Extraction	

1 Commision decision of 3 September 2002 establishing revised ecological criteria for the award of the Communityeco-label to indoor paints and varnishes and amending Decision 1999/10/EC

The EU Eco-label Paint/Varnish[1]	The EPD/PCR Chemical Products
No information required.	Detailed information on extraction and resource consumption, energy use and emission scenarios are required.
Production	
Requirements to emissions of SO_x, sulphate waste and chloride waste from the production of the titanium dioxide pigment used.	Requirements for a detailed description of environmental impact potential in the produc-tion phase, keeping the cut-off rule in mind.
No information required.	Emission information required. Emission to air (CO_2, CH_4, NO_x, CO, VOC and particles) Emission to water: N total, P total, COD. Emission of toxic substances. Selection criteria shall be included
Product requirements	
Declaration of contents required.	Declaration of contents required.
Instruction manual required.	**1.1.1**
Restrictions on the content of white pigment, VOC, VHS, heavy metals and dangerous substances.	General information on chemical content of a product is required.
Ingredients criteria: Restrictions on content of compounds labelled as *dangerous to the environment*", the content of formaldehyde, and izothiazolinone compounds.	General information on the chemical content of a product is required
Any use of alkylphenoletoxylates and Diethylene glycol methyl ether is prohibited	General information of chemical content of a product is required.
Use	
Declarations on covering power, water resistance etc.	Not mandatory. Description of application method needed.
Safety instructions required	No immediate requirements, but if the chemical product has a predominant field of application, a quantitative assessment of environmental performance of this particular scenario should be presented.
Transport	
No requirements	Impact potentials from transport have to be estimated.
Disposal	
Description of recommended disposal procedures has to be declared, if possible through pictograms	Recycling material, hazardous waste and other waste information is mandatory. An explicit recycling declaration is voluntary
Other	
	Name of certification body and reference to homepage of EPD system needed.

Table 7 Comparison of EU eco label criteria for paints and varnishes and the PCR for chemical products.

It would be preferable if a more specific PCR for different types of products were divided into more product-specific groups such as for the EU eco label.

The EU Eco-label has its main focus on chemicals, while the PCR requires data on energy, resources, transportation, electricity, recycling potential etc. Based on the existing requirements, chemical products are not the most ideal "product type" for which to obtain an immediate synergy improvement by integrating the two types of regulations.

An interesting point regarding the PCR is that additional requirements are needed, if the chemical product has "a predominant field of application". If this is the case, a quantitative description of the environmental performance related to the specific use of the product is required. This will make the EPD for different chemical product groups more specific than for the general PCR guideline. However, there is no requirement to the form of this additional information. This lack of criteria can make it difficult to make a direct comparison between two products in the same group.

The possibility of integrating the data collection when applying for the EU Eco-label and preparing an EPD can be beneficial to both tasks, if the planning is elaborated thoroughly. The additional data for the EPD for a specific product type and the product-specific descriptions can be performed relatively easily if consulting the EU Eco-label certification body.

If the guidelines for elaborating an EPD for chemical products were described for a specific product type instead, information and data sharing between the EU Eco-label application and the EPD elaboration activities will become less complicated. To achieve a significant synergy effect by gathering the two types of product declarations, it is preferable if the declarations are performed on well-defined specific product types rather than vague definitions