



European  
Commission

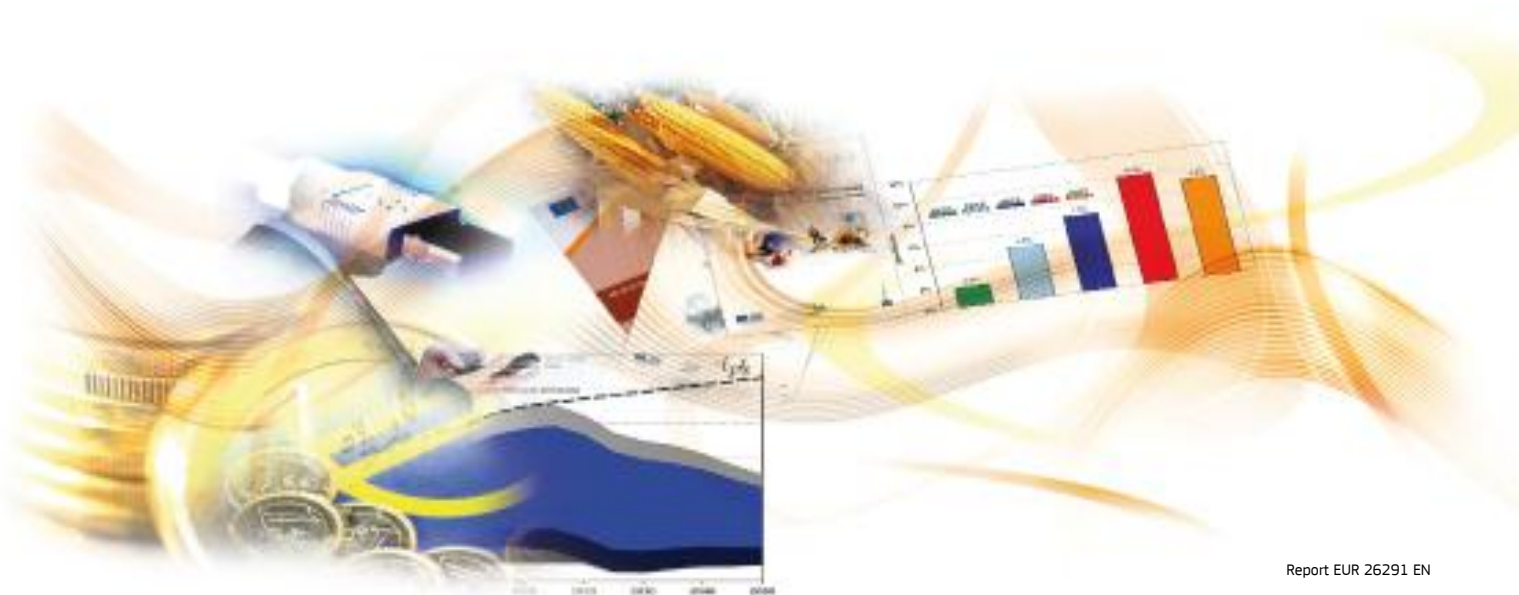
JRC SCIENTIFIC AND POLICY REPORTS

# Development of the EMAS Sectoral Reference Documents on Best Environmental Management Practice

Learning from frontrunners  
Promoting best practice

Harald Schoenberger  
Paolo Canfora  
Marco Dri  
Jose Luis Galvez-Martos  
David Styles  
Ioannis Sofoklis Antonopoulos

2014



Report EUR 26291 EN

Joint  
Research  
Centre

European Commission  
Joint Research Centre  
Institute for Prospective Technological Studies

Contact information

Address: European Commission, Joint Research Centre, IPTS, Edificio Expo, c/ Inca Garcilaso 3, E-41092 Seville, Spain  
E-mail: [jrc-ipts-emas@ec.europa.eu](mailto:jrc-ipts-emas@ec.europa.eu)  
Tel.: +34 9544 88318  
Fax: +34 9544 88300

<http://ipts.jrc.ec.europa.eu/>  
<http://www.jrc.ec.europa.eu/>

Legal Notice

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of this publication.

Disclaimer

The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.

Europe Direct is a service to help you find answers to your questions about the European Union  
Freephone number (\*): 00 800 6 7 8 9 10 11

(\*): Certain mobile telephone operators do not allow access to 00 800 numbers or these calls may be billed.

A great deal of additional information on the European Union is available on the Internet.  
It can be accessed through the Europa server <http://europa.eu/>.

JRC84966

EUR 26291 EN

ISBN 978-92-79-34532-6 (pdf)

ISSN 1831-9424 (online)

doi:10.2791/43526

Luxembourg: Publications Office of the European Union, 2014

© European Union, 2014

Reproduction is authorised provided the source is acknowledged.

Printed in Spain.

---

## Table of Contents

|     |   |    |
|-----|---|----|
| 1   | INTRODUCTION.....   | 3  |
| 2   | BACKGROUND OF THE SECTORAL REFERENCE DOCUMENTS.....                                 | 3  |
| 3   | MAIN ELEMENTS OF THE SECTORAL REFERENCE DOCUMENTS.....                              | 4  |
| 4   | THE DIFFERENT ACTORS INVOLVED.....  | 7  |
| 4.1 | The EMAS Committee.....   | 8  |
| 4.2 | The JRC-IPTS.....   | 8  |
| 4.3 | Technical Working Groups (TWGs).....  | 9  |
| 5   | TWO FINAL OUTPUTS.....  | 10 |
| 5.1 | The JRC Scientific and Policy Report on Best Environmental Management Practice..... | 10 |
| 5.2 | The Sectoral Reference Document.....  | 12 |
| 6   | APPROACH AND METHODOLOGY FOR THE DRAFTING OF THE SECTORAL REFERENCE DOCUMENTS.....  | 13 |
| 6.1 | The frontrunner approach.....   | 13 |
| 6.2 | The methodology.....  | 14 |
| 6.3 | The drafting process.....   | 16 |
| 6.4 | The information sources.....  | 18 |
| 6.5 | Deriving sector-specific benchmarks of excellence.....                              | 18 |
| 7   | LESSONS LEARNT.....   | 19 |
| 7.1 | Approach.....   | 20 |
| 7.2 | Procedure.....  | 20 |
| 7.3 | Value of the reference documents beyond EMAS.....                                   | 21 |
| 8   | AVAILABLE SECTORAL REFERENCE DOCUMENTS AND DISSEMINATION.....                       | 21 |
| 9   | ACKNOWLEDGEMENTS.....   | 22 |
| 10  | REFERENCES.....   | 22 |

---

---

## 1 INTRODUCTION

In the framework of the European Union (EU) Eco-Management and Audit Scheme (EMAS) regulation, the European Commission has been developing Sectoral Reference Documents (SRDs) on Best Environmental Management Practice.

This report describes the background of this work, the main elements of the SRDs, the actors involved in the development process, and the approach and methodology used. It is based on the lessons learnt during the development of the first four documents (which are considered a pilot phase). This report also explains the character of these documents to all interested stakeholders and serves as a general guidance for the development of future SRDs.

## 2 BACKGROUND OF THE SECTORAL REFERENCE DOCUMENTS

The European Union (EU) Eco-Management and Audit Scheme (hereafter EMAS) is a management tool for companies and other organisations to evaluate, report and improve their environmental performance. It is a voluntary scheme and its provisions are laid down in EU regulation. It was originally established in 1993 by Regulation (EEC) 1836/93 (known as EMAS I) and has been revised twice: in 2001 by Regulation (EC) 761/2001 (known as EMAS II) and in 2009 by Regulation (EC) 1221/2009 (known as EMAS III).

One of the new elements of EMAS III is the development of so-called EMAS Reference Documents on Best Environmental Management Practice for certain sectors (Article 46). These documents are known as the EMAS Sectoral Reference Documents (SRDs).

SRDs aim to promote best environmental practice and support organisations<sup>1</sup> that wish to improve their environmental performance by providing them with information on how to do so, how to measure/monitor the progress made, and how to benchmark their environmental performance.

The indicative list of priority sectors for which SRDs have to be developed was published at the end of 2011 (European Commission, 2011). The main criteria for selecting the sectors were:

- the environmental impact of the sector within the EU,
- the level of EMAS uptake in the sector,
- the potential for environmental improvements in the 'value chain' of the sector.

The identified priority sectors were:

- Wholesale and Retail trade,
- Tourism,
- Construction,
- Public Administration,
- Agriculture - Crop production and Animal production,
- Manufacture of electrical and electronic equipment,
- Car manufacturing,
- Manufacture of fabricated metal products, except machinery and equipment,
- Food and beverage manufacturing,
- Waste management,
- Telecommunications.

---

<sup>1</sup> The word "organisation", in the context of the EMAS regulation and throughout this report, refers to any "company, corporation, firm, enterprise, authority or institution, located inside or outside the Community, or part or combination thereof, whether incorporated or not, public or private, which has its own functions and administration" (Regulation (EC) 1221/2009, Art.2(21)).

---

When the development of the SRDs started, it was decided that one of the aims would have been to maximise their potential use and thus their impact in terms of improvement of environmental performance. For this reason, it was decided to build on the experience gained with the Best Available Techniques Reference Documents (BREFs) for industrial sectors, developed under the IPPC and then IED<sup>(2)</sup> Directives. To a certain extent these documents were used as a model for the development of the SRDs.

It was also decided that the information on best environmental management practice, which would be collected for this document, would not be relevant only to organisations that had implemented EMAS as an environmental management system. The SRDs would thus not only be relevant for EMAS registered organisations but also for organisations with other environmental management systems (such as ISO 14001) or those without a formal environmental management system, but which intend to reduce their environmental impact in one or several environmental areas.

Finally, the SRDs would have to be ambitious and represent best performance, since the words “best” and “excellence” were used to define their content.

### **3 MAIN ELEMENTS OF THE SECTORAL REFERENCE DOCUMENTS**

According to Article 46(1) of the EMAS regulation<sup>3</sup>, the SRDs must contain the three following elements: best environmental management practices, environmental performance indicators and benchmarks of excellence.

Best environmental management practices (BEMPs) are those techniques, measures or actions that allow organisations in a given sector to minimise their impact on the environment related to all the aspects under their direct control (direct aspects) or on which they have a considerable influence (indirect aspects).

BEMPs can be of a technical or technological nature, such as improving the energy efficiency of a certain process, or of a more management or organisational type, such as providing training to employees or engaging in environmental improvement actions with suppliers.

BEMPs are identified not only within the physical site boundaries of the organisations of the sector concerned but, based on the scope defined, across the whole value chain of their products and services, and considering environmental impacts over the whole life cycle.

The concept of BEMP is linked to two key criteria: the best practice is already fully implemented by a number of organisations in the sector or at least by one organisation if replicable/applicable by others; and the best practice is technically feasible and economically viable.

In order to structure the document and make the information more easily accessible, all the BEMPs are described according to the structure reported in the following table.

---

<sup>(2)</sup> The Industrial Emission Directive (IED – Directive 2010/75/EU) replaces the Integrated Pollution Prevention Control (IPPC) Directive (Council Directive 96/61/EC, then codified as Directive 2008/1/EC) with effect from January 2014. More information on the IED directive and on the development of BREFs can be found on the web-site of the European IPPC Bureau (<http://eippcb.jrc.ec.europa.eu>) and on DG Environment web-site at: <http://ec.europa.eu/environment/air/pollutants/stationary>.

<sup>(3)</sup> This and all further references to the “EMAS regulation” refer to Regulation (EC) 1221/2009, as that is the set of rules currently in force.

|   |   |
|---|---|
| 1. Description                          | A description of the BEMP including some background and details on how it is implemented                            |
| 2. Achieved environmental benefits      | What benefits in environmental terms are achieved by implementing such a BEMP                                       |
| 3. Appropriate environmental indicators | Which environmental indicators are used to monitor the implementation of the BEMP and/or its environmental benefits |
| 4. Cross-media effects                  | What are the impacts that the BEMP has on other environmental aspects   |
| 5. Operational data                     | Operational data that can help understand the implementation of a BEMP  |
| 6. Applicability                        | What are the conditions under which such a BEMP is applicable   |
| 7. Economics                            | The cost and benefits of the implementation of a certain BEMP in economic terms                                     |
| 8. Driving force for implementation     | What was the driving force or rationale for the implementation of such a BEMP                                       |
| 9. Reference organisations              | Examples of organisations that have successfully implemented the BEMP   |
| 10. Reference literature                | Reports, scientific articles, publications  |

This is similar to the structure used in the Best Available Techniques Reference Documents (BREFs), developed according to Article 13 of the IED.

An environmental performance indicator is a "specific expression that allows measurement of an organisation's environmental performance" (EMAS Regulation, Art.2) and "shall: give an accurate appraisal of the organisation's environmental performance; be understandable and unambiguous; allow for a year on year comparison to assess the development of the environmental performance of the organisation; allow for comparison with sector, national or regional benchmarks as appropriate; allow for comparison with regulatory requirements as appropriate" (EMAS Regulation, Annex IV). Indicators can be absolute or relative (or normalised), specific or aggregated (or weighted).

The SRDs focus on sector-specific environmental performance indicators, i.e. indicators that go beyond the six general core indicators described in the EMAS Regulation, which can apply to all kinds of organisations. They deal with the following key environmental areas (defined for the core indicators in the EMAS regulation): energy efficiency; material efficiency; water; waste; biodiversity and emissions.

Sector-specific environmental performance indicators can be defined at different levels: at the level of the whole organisation or company, at the level of a certain site or at the level of a specific process or activity (Figure 1).

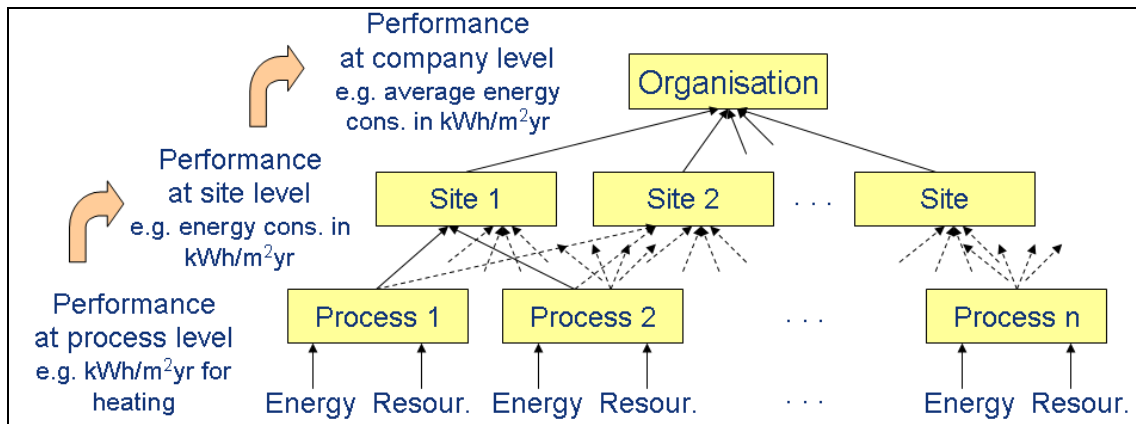


Figure 1: Bottom-up approach for environmental performance indicators and benchmarks of excellence

Indicators can be relevant and useful at all these levels, but the main focus is on the process level since this level allows for better and more meaningful comparability across organisations and against benchmarks. This is also the level where indicators can provide useful guidance on which areas/activities/processes within a certain organisation show the poorest performance or offer the most potential for improvement. As shown in Figure 1, this corresponds to taking a bottom-up approach to environmental performance indicators, where the environmental performance at higher levels is a result or, to some extent, a weighted average of the environmental performance at process level.

Environmental performance indicators are always given in relation to a specific BEMP. First, this makes clear which indicators can be used to monitor progress in the implementation of that technique. Second, if an organisation can use a certain indicator and would like to improve its performance in that area, it can implement the related BEMPs.

It should also be noted that an environmental performance indicator may be appropriate for a certain organization but not for others. If an indicator can be applied to many organization in a certain sector, a benchmark of excellence may be derived from it.

When the work on the SRDs started, no official definition of benchmark of excellence existed. Therefore, an appropriate understanding and interpretation of the meaning of this term had to be developed. The understanding is that this term reflects exemplary environmental performance. Benchmarks of excellence, however, do not simply mean the best of the best but, as a rule of thumb, the ten or the 10% to 20% best performers within the sector overall, or within a good or best performing organisation within the sector. Where there are sufficient data (which is often not the case), frequency distributions of a quantified environmental performance indicator can be used to illustrate the approach. Moreover, the term has to be seen in connection with best environmental management practice, which takes also economic considerations into account.

For the sake of clarity, a number of examples from the first SRD produced, in the retail trade sector, are presented. Figure 2 shows an example for the commercial refrigeration of food by a remote system in retail stores. In this case, the most appropriate environmental performance indicator is the annual energy consumption per metre of display case, and the benchmark of excellence was concluded to be 3000 kWh/m yr. The data in the graph stem from a frontrunner retailer and each bar corresponds to the measured performance of a specific store. However, the benchmark was also checked against other data sets and experts' judgement.



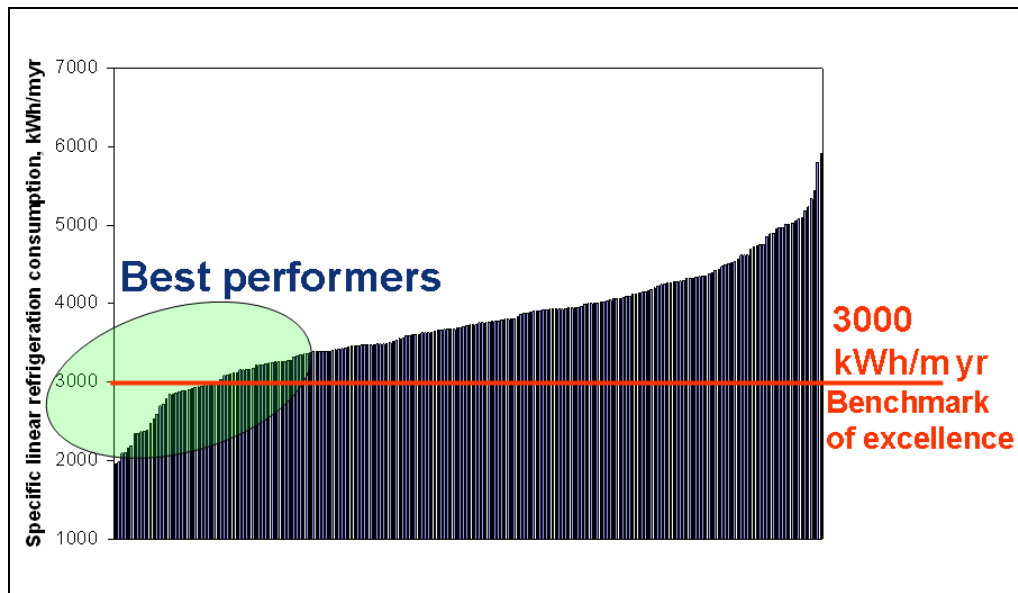


Figure 2: Example for the definition of a benchmark of excellence – specific energy consumption for commercial refrigeration of food in retail stores

The benchmark of excellence can also simply be a yes or no criterion, such as whether natural refrigerants are used in refrigeration systems in retail stores or whether a retailer implements systematical supply chain improvement programmes across priority product groups. It can also be a percentage of stores applying a certain technique, such as the percentage of stores of a retailer monitoring the energy consumption across specific processes, or the percentage of sales within a product group certified to a specified third party environmental standard.

As for the environmental performance indicators, each benchmark of excellence is associated with a technique or measure that can be applied by most/many installations in the sector concerned, or by a certain sub-sector of a sector, e.g. the benchmarks of excellence concerning commercial refrigeration only concern the food retailers, a sub-sector of the retail trade sector. The fact that a benchmark of excellence is linked with a certain described technique or measure does not mean that the specific technique or measure is recommended; i.e. the benchmark of excellence may be achieved by applying another technique.

Benchmarks of excellence represent a high and ambitious environmental performance level, well above good or average performance. It is also possible for a benchmark of excellence to be derived from a few cases, if the technical feasibility and the economic viability are given.

As discussed for the environmental performance indicators, benchmarks of excellence are usually derived at the process level, where the comparability is best.

Benchmarks of excellence are reference points for organisations to compare their environmental performance and identify improvement potential.

#### 4 THE DIFFERENT ACTORS INVOLVED

The basic concept of the development of the SRDs consists of an information exchange process similar to the Sevilla Process used for the BREFs, which has proved to be efficient and successful (Schoenberger, 2009). Figure 3 shows the set-up in terms of actors involved. The main ones are the

EMAS Committee, the JRC-IPTS<sup>4</sup> and the sector-specific Technical Working Groups (TWGs), comprising a broad spectrum of experts from relevant institutions and organisations.

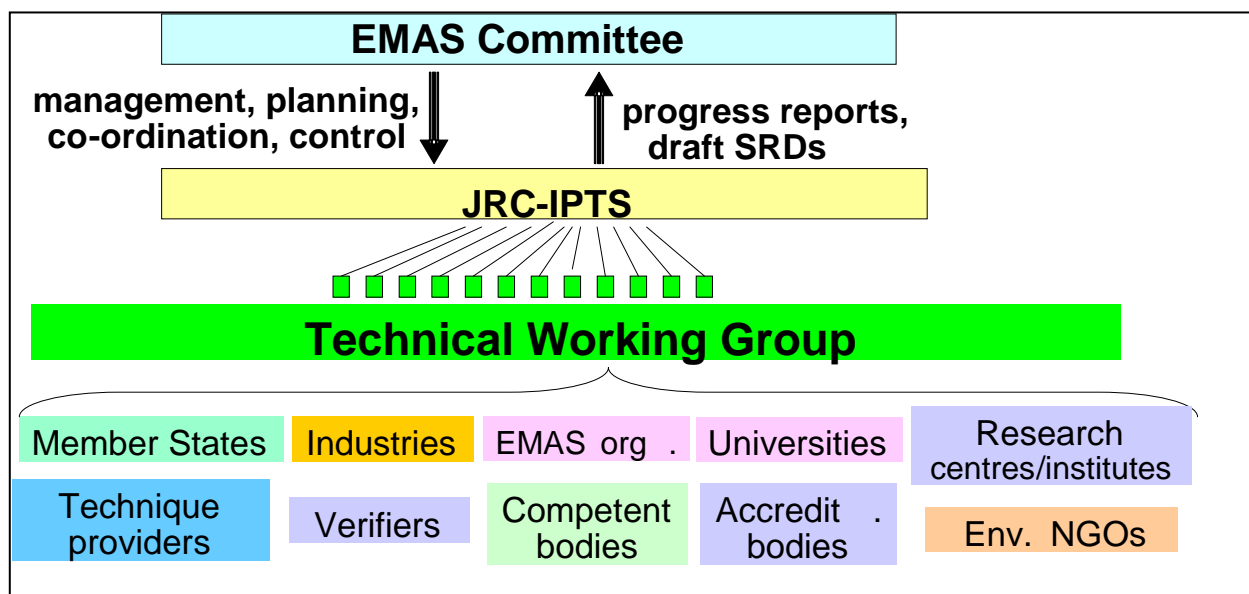


Figure 3: The actors involved in the development of the EMAS sectoral reference documents

#### 4.1 The EMAS Committee

The EMAS regulatory committee<sup>5</sup> (also known as Article 49 Committee) assists the European Commission with the implementation of the EMAS Regulation. It is composed of Member States representatives.

According to the EMAS Regulation (Art. 46(6)), the SRDs shall be submitted for adoption and approval to the EMAS Committee.

Before the final approval, however, the Committee is regularly consulted by the European Commission to provide comments and guidance for the development of the SRDs.

#### 4.2 The JRC-IPTS

Implementing the provision contained in Article 46 of the EMAS regulation, DG Environment of the European Commission entrusted the European Commission's in-house science service, the Joint Research Centre (JRC) with the development of the SRDs. The JRC-IPTS is the institute responsible for this work.

<sup>(4)</sup> The Institute for Prospective Technological Studies (JRC-IPTS) is one of the seven institutes of the Joint Research Centre (JRC), which is one of the Directorates General of the European Commission (see <http://ipts.jrc.ec.europa.eu/>)

<sup>(5)</sup> Further information on the "comitology" procedure under which the Commission is assisted by representatives of the Member States through committees in exercising its implementing powers is available at: [http://europa.eu/legislation\\_summaries/glossary/comitology\\_en.htm](http://europa.eu/legislation_summaries/glossary/comitology_en.htm)

---

The JRC-IPTS:

- compiles information on best practices and identifies relevant environmental performance indicators, as well as specific environmental performance levels, as the basis for the development of benchmarks of excellence;
- establishes, manages and chairs the TWGs and collects information from the TWG members and other sources;
- analyses, synthesizes and validates the information provided and compiles it into draft documents to be iteratively assessed by the TWGs;
- assists DG Environment in informing the EMAS Committee about the progress and findings within the development of the SRDs and in presenting the draft SRDs to them;
- disseminates the findings of the research carried out through publications, contributions to conferences and workshops and a dedicated website, which also ensures the transparency of the whole development process (see <http://susproc.jrc.ec.europa.eu/activities/emas>)
- assists and advises DG Environment with respect to technical and scientific issues in relation to the development of SRDs.

### **4.3 Technical Working Groups (TWGs)**

For the development of each SRD, a Technical Working Group (TWG) is established (see Section 6.3). Its role is to provide information and expertise and to comment on the draft text, as well as to draw conclusions. The TWG comprises a broad spectrum of experts. Moreover, any actor with relevant experience in the sector concerned is invited to contribute. This allows a wide range of views and a high level of expertise to be obtained. The experts are identified during the analysis of the sector by literature review, internet research and discussion with identified experts. So far, the number of members of each TWG varies between 30 and 40.

Very importantly, the TWG grants indirect access to a much wider network of knowledge, expertise and contacts because its members are invited to refer to projects, documents and people they know.

During the development of each document, two meetings with the sector-specific TWG are usually convened: a kick-off meeting to start the information exchange and a final meeting to validate the final draft and to draw conclusions, especially on environmental performance indicators and benchmarks of excellence. The TWG also interacts constantly with the JRC-IPTS to provide information and comments on the drafts that are shared with them.

The composition of a TWG can change during the drafting of the document as new experts can be identified and it may be useful to involve them. At the same time, some TWG members may become unavailable or fail to show interest in contributing.

In general, the experience with the TWGs has been very positive, as they are generally constructive and supportive towards the development of the document. Of course the contribution intensities vary across the TWG members. Very often, those TWG members representing organisations implementing best practices contribute more actively.

---

## 5 TWO FINAL OUTPUTS

Two documents are produced describing the BEMPs for each sector: a detailed technical report, called JRC Scientific and Policy Report on Best Environmental Management Practice, and a concise Sectoral Reference Document (SRD).

The SRD is the official document according to Article 46(1) of the EMAS regulation and it shall be submitted for adoption according to a regulatory procedure with scrutiny, i.e. subject to the approval of the EMAS Committee, before it can become an official Commission Decision.

The JRC Scientific and Policy Report, which is much more comprehensive and detailed, is a publication of the European Commission's Joint Research Centre. It contains the full results of the research carried out and represents the most complete source of information for those organisations looking to improve their environmental performance.

### 5.1 The JRC Scientific and Policy Report on Best Environmental Management Practice

The JRC Scientific and Policy Reports on Best Environmental Management Practice are comprehensive documents containing all the information collected during the drafting of the SRDs. The conclusions are all based on information available in the same documents.

These are the direct result of all the research work carried out and contain all the information that an organisation willing to improve its environmental performance may need. They are published by the European Commission's Joint Research Centre (JRC) in its series "JRC Scientific and Policy Reports".

These documents are very comprehensive and the information they contain is readily available thanks to a clear structure which is common to all of them and a detailed table of contents located at the very beginning of the document.

The main sections of the common structure that has been adopted in the documents are:

- Executive summary

This is a very concise summary of the background, structure and content of the document. Its most important part is a table listing all the benchmarks of excellence identified and the related BEMPs and environmental performance indicators. In this way, the reader can obtain a quick overview of the levels of environmental performance that can be achieved and how. For each BEMP, a reference to its full description in the document is given.

- Preface

The preface explains the background, objective and character of the document as well as its three main elements (BEMPs, environmental performance indicators and benchmarks of excellence) and the approach used for its development. It also contains a section on how to use the document, which explains that this is not conceived to be read from beginning to end, but as a working tool for professionals willing to improve the environmental performance of their organisation. The section thus suggests different ways to find relevant information for different readers.

---

- Scope

This section describes the activities covered by the document.

- Structure

This section explains the structure of the report, providing guidance on the content of the different parts and chapters of the document.

- General information about the sector

This chapter provides an introduction to the sector covered by the document. Firstly, it briefly describes the sector from an economic point of view. To this aim, it describes the sector in terms of its relevance, competitiveness, innovation and market structure by providing economic data (annual turnover, employment, etc.) and information on the composition of the sector, albeit in a rather short form as these data quickly become outdated. Then, it focuses on environment-relevant information, including what the main direct and indirect environmental aspects for the sector are, its environmental relevance (i.e. the share of contribution to the main environmental issues stemming from this sector), the current environmental performance of the sector, what initiatives have been carried out within this sector to improve its environmental performance (initiatives by companies and/or organisations of the sector, initiatives by local or national governments and/or by the EU, initiatives by national or European industry associations, etc.), and the improvement potential in terms of environmental performance for this sector (if this information is available from any study already carried out).

For complex or non-homogeneous sectors, which are analysed at a sub-sector level for the identification of the BEMPs, the "general information about the sector" chapter also includes which sub-sectors are covered in the document and how/why they were selected.

- Best environmental management practices

The heart of the document is the chapter on best environmental management practices, which contains the detailed sound technical data for each of the techniques described. Available techniques are considered BEMPs only if they meet the requirements detailed in Section 3.

Within this chapter, the different BEMPs are grouped together in order to improve the user-friendliness of the document. In complex sectors, where applicable, the structure follows the mass flow of input materials, which helps to locate the desired information. In other sectors, BEMPs are grouped by the actor(s) concerned.

In the JRC Scientific and Policy Reports on Best Environmental Management Practice, the BEMPs are described in detail according to the common structure presented in Section 3.

- Emerging techniques/approaches

This section presents those techniques and/or approaches that can achieve very high levels of environmental performance but cannot be considered BEMPs because they are not (yet) fully implemented on an industrial scale or are only implemented in research or demonstration projects or lighthouse examples. Some of these techniques might become BEMPs in the near future while others may prove to be technically unfeasible and economically unviable or may just be

---

overshadowed by other techniques. The reason why the most promising emerging techniques are presented in the document is to allow future readers to have an indication of which new techniques may have reached a degree of maturity in the few years following the publication of the document.

- Applicability to micro, small and medium-sized enterprises

In order to make it simpler for SMEs to identify which BEMPs can be implemented in micro, small and medium-sized organisations, a special chapter is dedicated to the applicability to SMEs of the techniques described. In some instances, such as in the construction document, this chapter also distinguishes between different types of small organisations (such as small construction companies, small building operations and maintenance companies, small building deconstructors).

- Conclusions

The conclusions chapter starts by elucidating the approach followed to draw the conclusions (process, sources of information, role of the Technical Working Group - See sections 4.3 and 6.3). This is followed by the actual conclusions: the BEMPs, environmental performance indicators and benchmarks of excellence.

The BEMPs are presented in a list with a short description for each of them and a reference to the relevant section where the full description can be found. The environmental performance indicators are shown in their totality in a table. This table also includes for each indicator: the most common units used, a short description of what/how to measure, the recommended minimum level of monitoring (e.g. process level, site level, organisation level), the key environmental area<sup>6</sup> each indicator refers to, and what alternative equivalent indicators can be used.

A separate table presents the benchmarks of excellence. It shows for each of them: which BEMPs allow the given level of environmental performance to be achieved, the recommended indicators for monitoring performance in the specific area, and relevant remarks on applicability (e.g. only new installations, only small organisations) and economics (e.g. level of cost, payback time) related to that benchmark.

Finally, a third table presents a shorter list of recommended indicators and the related benchmarks of excellence. This list corresponds to the indicators that all organisations of the sector are recommended to use in order to monitor their environmental performance in a satisfactory way.

## **5.2 The Sectoral Reference Document**

The Sectoral Reference Document is the document mentioned in Article 46(1) of the EMAS regulation. It is what is officially approved by the EMAS Committee and adopted by the European Commission.

This document briefly describes all the BEMPs identified for the given sector and under which conditions they can be applied, with special mention to the needs of SMEs. For each BEMP, it also lists the environmental indicators that can be used to monitor its implementation, and the related benchmarks of excellence.

---

<sup>6</sup> As defined for core environmental performance indicators in Annex IV of the 1221/2009 EMAS regulation (Section C.2.)

---

The SRD is a concise version of the results of the research carried out and is fully based on the comprehensive and detailed technical report described in Section 5.1.

## **6 APPROACH AND METHODOLOGY FOR THE DRAFTING OF THE SECTORAL REFERENCE DOCUMENTS**

### **6.1 The frontrunner approach**

Given the focus of the Sectoral Reference Documents on best practices and benchmarks of excellence, the so-called frontrunner approach was developed by the JRC for the first documents. This approach has proven to be useful and effective.

For other purposes, it is often sufficient and appropriate to describe average or good performance, but in this case, given the focus on "best" practice and benchmarks of "excellence", pinpointing best environmental performance is essential.

As a consequence, the research carried out in the development of the SRDs does not cover in detail the status quo (the current or common performance, consumption and emission levels, or commonly implemented techniques) and how many organisations achieve certain levels of environmental performance. Such a task would be too time-consuming and require too many resources. Moreover, it is not needed for identifying best practices. As the SRDs need to promote best performance, it is possible and most efficient and effective to focus on studying frontrunner organisations and the techniques they apply.

Frontrunners are those organisations implementing, at full scale, innovative solutions that allow best environmental performance to be achieved and which do so ahead of their peers. The essence of the SRDs is thus learning from frontrunners.

Frontrunners are identified through the contacts and network of the sectoral experts involved and by desk research (looking at available sustainability reports of companies, environmental statements, case studies, literature review, information on environmental indicators, correspondence with sector experts, consultancy firms, non-governmental organisations, technology providers, etc.).

This allows identification of relevant techniques and permits them to be described in detail whilst defining suitable environmental performance indicators. The reasons for choosing a specific technique are always clearly described. The frontrunners identified (most commonly organisations of the sectors but sometimes also service providers, technology providers, consultancy firms, etc.) are contacted to obtain all requested information (if this is not publicly available). Where required, visits of sites operated by frontrunners are carried out to complete the understanding of frontrunner techniques and to obtain specific information for their description.

In addition, preliminary ideas concerning possible benchmarks of excellence are derived. The benchmarks are determined in such a way to:

- inform on what is potentially achievable under certain circumstances;
- allow an opinion on the performance of the organisation to be formed;
- be meaningful with respect to the environmental impact.

The information collected and elaborated is presented under the fixed structure common to all the best practices described, which was presented in Section 3.

---

## 6.2 The methodology

The methodology for the elaboration of the EMAS reference documents can be described in seven steps:

1. Define the scope and identify relevant actors

For each of the sectors covered by SRDs, the first step is defining the scope for the sector. In principle, this is done by analysing what is included in the NACE<sup>7</sup> codes corresponding to the name of the sector to be covered. For instance, the tourism sector can be identified by NACE codes 55 ('Accommodation and Food Service Activities') and 79 ('Travel agency, tour operator reservation service and related activities'). In some instances, when a sector is very large and diverse, it is necessary to identify only some of the activities covered within the relevant NACE codes, e.g. by considering a certain number of subsectors rather than the whole sector. An example is the Food and Drink Manufacturing sector where ten sub-sectors (corresponding to lower level NACE codes) were selected, ensuring that the most important activities, as well as a good cross-sectoral representation, are covered.

Since the SRDs use life-cycle thinking and the best practices to identify are not limited to the physical or organisational boundaries of the organisations belonging to the sector, the definition of the scope also needs to tackle which upstream and downstream areas of the value chain of the activities of the sector should be considered. Indeed, it is almost impossible to cover all of them (many sectors have a large number of other sectors upstream or downstream in their value chains) and it is crucial to identify the most relevant. This is ensured by selecting the activities with the highest relevance in terms of environmental impact and those where the organisations of the sector in question have the largest degree of influence.

Once the scope has been defined, the different actors within the sector need to be identified. This is especially important for very heterogeneous sectors in terms of actors, such as the construction sector, where some BEMPs target construction companies, while others are aimed at architects or even building occupants.

2. Target processes associated with greatest environmental impact

The identification of the BEMPs to be described in the document starts with an analysis of the different processes or activities carried out within the sector to be covered, and their environmental impact. This analysis aims to assess the environmental impact of the different processes or activities and to identify those with the greatest environmental impact and/or the greatest improvement potential.

For instance, this first analysis of the retail trade sector showed that one of the processes worth addressing was the commercial refrigeration of food in the stores, because this accounts for a large share of the energy consumption.

3. Identify relevant environmental performance indicators for each process

For each of the relevant processes identified, the indicators used within the industry to characterise, describe and monitor the process and its (environmental) performance are

---

<sup>7</sup> Statistical classification of economic activities established with Regulation (EC) 1893/2006.



---

analysed. Very often there will be several indicators to consider and a selection must be made. The indicators are selected according to their representativeness of the environmental performance of the sector as well as their degree of use within the industry and/or how easy they are to calculate. Indeed, simple indicators based on available data are the most useful and are most likely to be used in practice. At the same time the indicators must be as specific as possible in order to allow cross comparisons between organisations, sites and against given benchmarks.

For example, kilograms of waste generated per guest per night is a much more useful indicator for waste prevention for tourist accommodation than the total amount of waste generated.

Conversely, for the energy consumption of commercial refrigeration in food retailers, a complicated indicator taking into account the volume of the area to refrigerate, the amount of refrigerated goods contained, etc. could be built in theory. However, the experience from the sector showed that kilowatt-hours of electricity consumed per linear metre of display cabinet per year was effective enough to allow comparison, while also being much simpler and, more importantly, already in use to monitor this process.

4. Identify frontrunner actors for particular processes

Once the most relevant processes and the related indicators are identified, it is possible to start the identification of the frontrunners in each particular area, according to the approach described in Section 6.1. The frontrunner techniques, i.e. the measures/actions/technologies implemented by the frontrunners, are considered potential BEMPs and are studied in detail. Among these, the actual BEMPs are identified by comparing the level of environmental performance obtained with the different techniques and their replicability. In order to be BEMPs, techniques need to bring about the highest environmental performance improvements while being widely applicable at the same time. In other words, the high environmental performance must be achievable in general and not linked to specific (local, climatic, organisational) conditions.

5. Describe best environmental practices with reference to frontrunner application

Subsequently, the identified BEMPs are described in detail according to the common structure presented in Section 3. Very importantly, the description is not just potential (what could be done) but linked (and with references) to actual implementation by the frontrunners.

6. Derive "benchmarks of excellence" from front-runner performance

The benchmarks of excellence (see Section 3) correspond to the performance levels achieved by frontrunners. As a rule of thumb, they correspond to the performance of the 10-20% best performers, but other strategies can be used to derive the benchmarks of excellence when extensive data sets are not available. The approach to derive the indicators is explained in further detail in Section 6.5.

---

7. Clearly state applicability

The last step is to outline the exact conditions under which the different BEMPs identified can and/or cannot be implemented. These conditions can relate to size, management practices in place, type of services provided, type of facilities. For instance, retailers of all sizes can implement best practices on efficient lighting, whereas mainly large retailers with their own-brand products have the possibility to influence the business practices of their suppliers. Another example is that different BEMPs would apply to different types of tourist accommodation, depending on their facilities and the services offered: in-house laundry, private bathrooms, pool, restaurant, even the kind of accommodation (hotel, hostel, rural accommodation).

The applicability can also influence the benchmarks, as certain performance levels can only be achieved under certain conditions. For instance, the benchmark of excellence for water consumption in accommodation facilities is  $\leq 140$  L per guest per night in fully serviced hotels, but  $\leq 100$  L per guest per night in accommodation where the majority of the bathrooms are shared across rooms, such as hostels.

### **6.3 The drafting process**

The SRDs are developed in a five phase process.

- Pre-study

This first phase is aimed at implementing the whole methodology described in Section 6.2 for the first time and obtaining a preliminary version of the full output. This is referred to as the background report.

The pre-study results in a preliminary list and description of potential BEMPs on which further work can be based. This is very helpful to work more efficiently and effectively with the Technical Working Group.

The pre-study also generates another very important result: a list of sector-specific experts who can be proposed as members of the Technical Working Group.

These sector-specific experts are identified mainly through desk research (authors of papers, representative of companies, sectoral associations, non-governmental organisations, public authorities) and through the network of contacts of the organisation carrying out the pre-study.

For the first report (the retail trade sector), this first phase was carried out internally by the JRC-IPTS in order to understand the tasks to be developed, the difficulties encountered, etc. For the subsequent reports, the pre-study has been contracted to external organisations. The contractors are selected via calls for tender. Using external contractors has the advantage of gaining quick access to specific expertise of the sector in question.

- Establishment and kick-off meeting of the Technical Working Group

Once the pre-study has been completed, the Technical Working Group (TWG) is established. Its members are selected by the JRC-IPTS from the pool of experts identified during the pre-study phase and from other contacts.

The members of the TWG are subsequently invited to a kick-off meeting to start the exchange of information. Prior to the meeting, the TWG members receive a copy of the background report. The

---

meeting itself focuses on explaining the approach and discussing the scope and the provisional list of potential BEMPs. The meeting also aims to identify gaps and confirm if the potential BEMPs selected are indeed to be considered frontrunner techniques.

During the meeting and further to it, the TWG members are encouraged to come forward with additional sources of information for the identification of new BEMPs as well as feedback on the BEMPs described so far.

The kick-off meeting of the TWG usually lasts between one and one-and-a-half days.

- Collecting information and drafting the document

Based on the background report and on the feedback from the TWG members, the JRC-IPTS continues to collect information and put together the final version of the document, thanks to further direct research.

In this phase, the direct contact with frontrunners via e-mail, telephone and meetings, as well as the visits to sites implementing particular techniques, are extremely important for collecting relevant information and data. These are crucial to fully justify the selection of the BEMPs and the related indicators and benchmarks.

During this phase, the members of the TWG are informed of the progress made and consulted by e-mail. It has proven to be more effective to send draft versions of specific parts of the document to specific TWG members rather than sending the complete document to all the members. This improves the chances that the TWG members contribute in the field where they are most experienced.

- Final meeting of the technical working group

When a final draft of the complete scientific and policy report is ready, a second and final meeting of the technical working group is held. This final meeting aims to validate all the information presented, i.e. the described best environmental management practices and the related environmental performance indicators. Very importantly, the final meeting also aims to draw conclusions on the benchmarks of excellence to be adopted.

All TWG members are sent a copy of the final draft document about one month before the meeting together with information on the process to derive the benchmarks of excellence during the meeting.

The final meeting of the TWG lasts usually between one-and-a-half and two days.

- Finalisation and adoption process

The last phase is the finalisation of the document based on the conclusions reached by the TWG during the final meeting. The benchmarks of excellence agreed by the TWG are summarised in the conclusion chapter. The TWG is then offered a last opportunity to comment on the complete report.

At this stage, the final SRD is prepared (see Section 5.2) and all Commission services as well as the EMAS Committee (see Section 4.1) can comment on it before it is finalised and officially adopted.

---

Following the official adoption, the SRD becomes a Commission Decision and is translated into all the 24 EU official languages and published in the Official Journal of the European Union.

## **6.4 The information sources**

The main information sources used for the drawing up of the Sectoral Reference Documents are:

- Background report (produced by the JRC-IPTS or by an external contractor)
- Information provided by TWG members during the kick-off meeting, bilateral contacts and subsequent meetings
- Public reporting (e.g. EMAS Declaration, Sustainability Reports, Corporate Social Responsibility Reports)
- Contacts provided by TWG members
- Phone and e-mail information exchange with organisations of the sectors and other experts
- Site visits
- Expert meetings
- Technology providers
- Non-governmental organisations

## **6.5 Deriving sector-specific benchmarks of excellence**

The term "benchmark of excellence" has been introduced in Section 3. Below, the approach for deriving sector-specific benchmarks of excellence is explained in further detail with a few examples for each of the different types of benchmark of excellence. These examples are some of the benchmarks identified in the first three SRDs produced (for the retail trade, tourism and construction sectors).

The first approach for deriving benchmarks of excellence consists of relying on the frequency distribution of a certain environmental performance indicator for a large number of comparable installations or processes. For instance, Figure 2 in Section 3 shows the specific energy consumption for commercial refrigeration of about 140 stores of a frontrunner retailer. Another example is shown in Figure 4 for the water consumption of hotels.

These graphs are an effective way to visualise the approach for deriving benchmarks of excellence and make it easily understandable.

Unfortunately, such extensive data sets are not often available. In those cases, benchmarks of excellence in the form of a 'YES/NO' criterion can be established. For instance, the existence of a scheme for the assessment of the environmental impacts of the supply chain of a retailer can be considered a benchmark of excellence. Other examples for other sectors are: "to have a destination plan implemented that covers the entire destination area, involves coordination across all relevant government and private actors, and addresses key environmental challenges within the destination", or "all construction site foremen are trained on the environmental management system", or "to implement a site-specific water management plan that includes sub-metering and benchmarking all major water-consuming processes and areas as well as regular inspection and maintenance of water system 'leak points' and appliances". In all of these examples no quantification is possible and the benchmark of excellence corresponds to the implementation of a certain best practice.

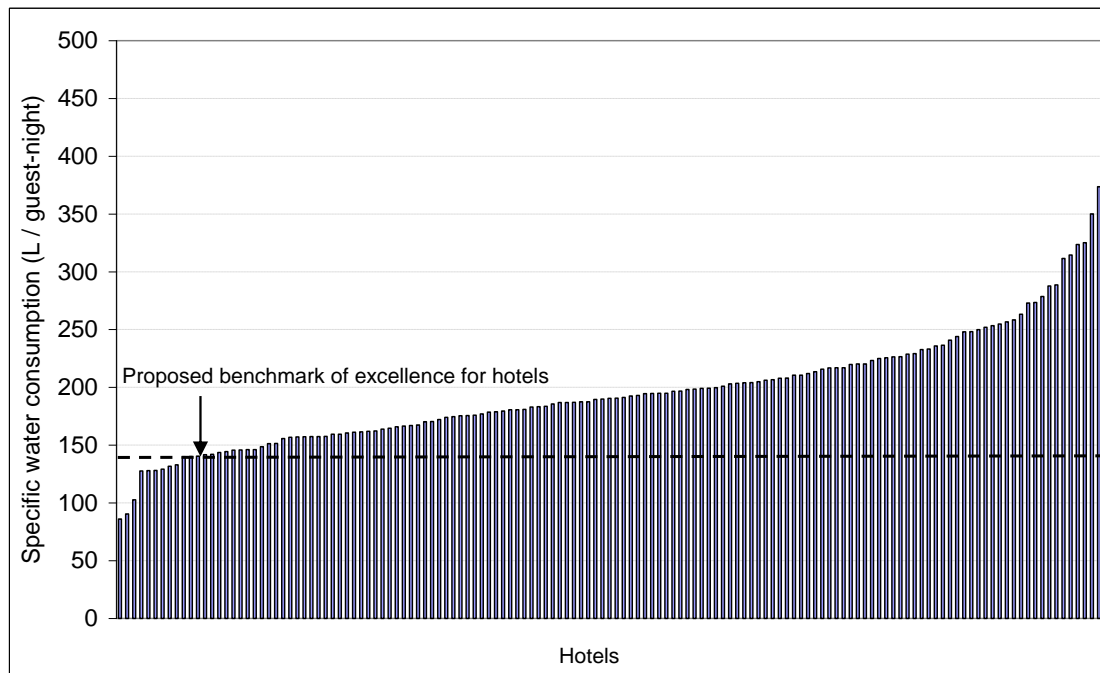


Figure 4: Distribution of water consumption, expressed per guest per night, for individual hotels within a large European hotel chain (above) used to derive the benchmark of excellence

An additional category is where benchmarks of excellence are derived from existing standards that can be considered best practice. In these cases, the value of the benchmark is directly derived from the standard. This also includes design parameters, such as "the food-to-microorganisms ratio of less than 0.15 kg BOD<sub>5</sub> per kg dry matter per day for biological waste water treatment plants", or benchmarks such as "all domestic washing machines have an EU energy label rating of 'A\*\*\*\*'".

In other cases, the benchmark of excellence represents a percentage of installations of an organisation that have implemented a certain measure/technique, such as "100 % of retail stores monitor the energy performance of the different processes operated". It can also be a percentage which can be achieved. Some examples are: "less than 5 % of recyclable construction material is sent to landfill"; "more than 95 % waste water generated in the tourism destination receives at least secondary treatment, or tertiary treatment for discharge to sensitive receiving waters, including during peak tourist season"; "100 % of electricity for accommodation is from traceable renewable electricity sources not already accounted for by another organisation"; "at least 80 % by active-ingredient-weight of laundry detergent shall have been awarded an ISO Type I environmental label (e.g. Nordic Swan, EU Ecolabel)".

It has to be stressed that the conclusions were drawn by the Technical Working Group which means that all benchmarks of excellence were derived by expert judgement.

## 7 LESSONS LEARNT

The development of the first three sectoral reference documents (for the retail trade, tourism, and construction sectors) has been a pilot phase, aimed at developing and testing the methodology. The completion of the technical work for these sectors proved the developed methodology to be successful. Therefore, it has been used for the development of the following sectoral reference documents as well. This paper describes the methodology developed and the lessons learnt during the pilot phase.

---

## 7.1 Approach

Developing appropriate environmental performance indicators and deriving the benchmarks of excellence requires an analysis of the best performers (i.e. frontrunners). Moreover, frontrunners appeared to be more open, pro-active and ready to provide information. For this reason, it is paramount to identify frontrunners by literature review (such as scientific and technical articles and documents, sustainability reports, case studies, environmental statements) as well as by contacting experts in the field. The use of questionnaires for the collection of information or for the identification of frontrunners proved unhelpful.

Environmental performance indicators and benchmarks of excellence are always associated with a technique or measure described. This elucidates on which basis the environmental performance indicators and benchmarks of excellence were derived. Consequently, the documents have a comprehensive character; i.e. all the information supporting the conclusions on environmental performance indicators and benchmarks of excellence is included.

As explained in Section 2, the SRDs build on the positive experience with the Best Available Techniques Reference Documents (known as BREFs) according to the Industrial Emissions Directive. For this reason, the structure of the whole document is similar to the structure of the BREFs. However, it has to be adapted to the characteristics of the sector concerned, following the mass flow thinking, the value chain and the actors addressed.

The structure for the documentation of the BEMPs was also taken from the BREFs. This proven structure allows all the techniques or measures to be presented in the same systematic way. However, the structure was also tailored to the needs of the description of the best environmental management practices by introducing the additional heading 'Environmental performance indicator'.

Given the fact that the JRC Scientific and Policy Reports produced within this exercise are very extensive publications, it proved crucial that the table of contents has a guiding character in order to allow the readers to quickly retrieve the information they are looking for.

The Technical Working Group draws conclusions on the environmental performance indicators and benchmarks of excellence. This ensures that the conclusions reflect proven best practices and increases the trustworthiness of the document. In an additional step, the most important indicators and benchmarks of excellence are identified, selected and further summarised. This helps the reader to focus on the most important techniques and measures.

## 7.2 Procedure

The overall procedure for developing the SRDs is transparent and the drafts of the scientific and policy reports produced are publicly available and can be downloaded from a dedicated section of the JRC-IPTS website<sup>8</sup>.

Comments made are shared with the Technical Working Group members. Comments on the drafts were not collected using a formal commenting system (e.g. templates) as this requires considerable effort from the experts and may reduce the probability of them providing comments. The Technical Working Group members could send their comments in any form and, so far, the numbers of

---

<sup>(8)</sup> <http://susproc.jrc.ec.europa.eu/activities/emas/index.html>

---

comments received have been manageable. Moreover, specific information could be obtained by targeting those TWG members with such specific expertise.

Confidentiality issues were treated with great care. The bilateral communications with stakeholders allowed the exchange of confidential data and, if required, the use of the anonymised information in the documents. However, confidentiality issues existed only in a limited number of cases.

Site visits were also very valuable for developing the scientific and policy reports and helped to fully understand certain techniques and measures. Therefore, site visits are a crucial addition to desk research.

The establishment of the Technical Working Group proved crucial in order to gain access to a wider network of contacts within the sector. The experts were carefully selected according to their expertise and functions. The atmosphere of the Technical Working Groups has always been very open, constructive and supportive towards developing high quality reports.

### **7.3 Value of the reference documents beyond EMAS**

As explained in Section 2, the SRDs developed and especially the longer scientific and policy reports that accompany each of the SRDs are valuable sources of information for all organisations intending to improve their environmental performance (EMAS registered or not). For some of the sectors covered so far, the number of EMAS registered organisations was limited. However, it was noticed that the documents reach a much wider audience.

Furthermore, the documents have also proven useful for other policy instruments or initiatives. For example, the scientific and policy report on the retail trade sector was included in the final report on continuous improvement measures of the European Food SCP Round Table working group. In addition, the European Commission Retail Trade Action Plan and the implementation of the Roadmap to a Resource Efficient Europe also included references to the retail trade report.

## **8 AVAILABLE SECTORAL REFERENCE DOCUMENTS AND DISSEMINATION**

For the first three of the priority sectors defined by the European Commission Communication (listed in Section 2), the technical work has been concluded and the detailed technical report is available in its published version (as is the case for the retail trade sector and the tourism sector) or as a final draft (for the construction sector).

These documents are publicly available on the internet:

- <http://susproc.jrc.ec.europa.eu/activities/emas/documents/RetailTradeSector.pdf>
- <http://susproc.jrc.ec.europa.eu/activities/emas/documents/TourismBEMP.pdf>
- <http://susproc.jrc.ec.europa.eu/activities/emas/documents/ConstructionSector.pdf>

The technical work is about to be completed for the next sector (public administration) and is ongoing, at different stages of development for the following four sectors (agriculture, food and drink manufacturing, car manufacturing, and manufacture of electrical and electronic equipment). As soon as the different documents are produced, their draft and final versions are published on the internet and can be accessed at: <http://susproc.jrc.ec.europa.eu/activities/emas/>

---

In addition to the dedicated website, the findings were also disseminated during conferences (e.g. EMAS Conference and EURO COOP Conference in Brussels, LCM Conference in Berlin) and at other EU initiatives (such as the Retail Forum) as well as through scientific publications.

## **9 ACKNOWLEDGEMENTS**

The contributions of Spyridon Merkurakis and Don Litten were indispensable for the approach developed to produce the sectoral reference documents.

We are very grateful to all the experts who joined the Technical Working Groups and substantially contributed to draft the documents.

## **10 REFERENCES**

Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control; OJ L 257, 10/10/1996, p. 26 – 40

Council Regulation (EEC) No 1836/93 of 29 June 1993 allowing voluntary participation by companies in the industrial sector in a Community eco-management and audit scheme; OJ L 168, 10.7.1993, p. 1.

Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (Codified version), OJ L 24, 29.1.2008, p. 8–29

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control), OJ L 334/17, 17.12.2010

European Commission, 2011, Communication from the Commission — Establishment of the working plan setting out an indicative list of sectors for the adoption of sectoral and cross-sectoral reference documents, under Regulation (EC) No 1221/2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) (2011/C 358/02), OJ C 358, 8.12.2011, pp 2-5.

Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19 March 2001 allowing voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), OJ L 114, 24.4.2001, p. 1.

Regulation (EC) No 1893/2006 of the European Parliament and of the Council of 20 December 2006 establishing the statistical classification of economic activities NACE Revision 2 and amending Council Regulation (EEC) No 3037/90 as well as certain EC Regulations on specific statistical domains, OJ L 393, 30.12.2006.

Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC, OJ L 242/1, 22.12.2009.

Schoenberger, H.; 2009, Integrated pollution prevention and control in large industrial installations on the basis of best available techniques – The Sevilla Process, *Journal of Cleaner Production*, Vol. 7, Issue 16 (2009) 1526-1529.



European Commission

EUR 26291 – Joint Research Centre – Institute for Prospective Technological Studies

Title: Development of the EMAS Sectoral Reference Documents on Best Environmental Management Practice

Authors: Harald Schoenberger, Paolo Canfora, Marco Dri, Jose Luis Galvez-Martos, David Styles, Ioannis Sofoklis Antonopoulos

Luxembourg: Publications Office of the European Union

2014 – 22 pp. – 21.0 x 29.7 cm

EUR – Scientific and Technical Research series – ISSN 1831-9424 (online)

ISBN 978-92-79-34532-6 (pdf)

doi:10.2791/43526

#### Abstract

This report aims to describe how the EMAS Sectoral Reference Documents on best environmental management practise are developed. Firstly, the EMAS regulation and the legal background of the documents are introduced. Afterwards, the main elements included in such documents (best environmental management practices, environmental performance indicators and benchmarks of excellence) are described and some examples are provided. The outputs of the process, namely the Sectoral Reference Documents and the JRC Scientific and Policy Reports on best environmental management practice are then outlined, together with the role played in developing the documents by the different actors involved: JRC/IPTS, the Technical Working Group and the EMAS Committee. An in-depth presentation of the methodology used, introducing the frontrunner approach and how information is gathered and drafted, allows the reader to have a complete picture of the process for developing the EMAS Sectoral Reference Documents. Finally, the report presents the lessons learnt so far, the dissemination activities carried out and the list of reports already available.

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle.

Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.