



Environmental Policy

Legal and Economic Instruments

**Børge Klemmensen, Sofie Pedersen,
Kasper R. Dirckinck-Holmfeld, Anneli Marklund, and Lars Rydén**

Book 1 in a series on Environmental Management

The Baltic University
Environmental Management
book series

1. Environmental Policy – Legal and Economic Instruments
2. Cleaner Production – Technologies and Tools for Resource Efficient Production
3. Product Design and Life Cycle Assessment
4. Environmental Management Systems and Certification

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Preface

This text is part of a series of textbooks on Environmental Management. The theme of the text is the interrelation between company management and environmental regulation with the requirements and instruments formulated there. The approach is to start from management responsibility and options for action and proceed to investigate the role that regulation can play in making companies take on their responsibility and, as a minimum, comply with current regulation.

Environmental management means having accepted the company's impact on the environment as a management responsibility and subsequently made control of and action on this impact a part of management duties. Making environmental impact part of top-level management responsibilities is crucial for taking company intentions on this issue seriously. This responsibility has been increasingly accepted by management over the last 15 – 20 years, with the 1992-Summit in Rio de Janeiro and the “Brundtland Report” from 1987 as focal points for initiating that development. We find this development of great importance, and the text addresses it in some detail.

Schmidheiny's book on ‘Changing Course’ and the notion of “Shared Responsibilities” represented that growing understanding. During the 1990's the environmental codes and standards ‘Responsible Care’, ‘EMAS’ and ‘ISO 14000’ operationalized the plea, and product-oriented standards like LCA, Eco-labelling and Eco-design came into effect. Recently leading multinational companies have embarked on business responsibility also for the climate change issue, with the CO₂ emissions as the main problem, declaring readiness to set up binding medium- and long-term reduction targets. This is most likely going to be implemented by a ‘cap and trading’ system of permit trading along the lines of the EU-ETS-system.

Environmental regulation is the formal formulation or transformation of the political interpretation of environmen-

tal problems as it results from the political policy process. It authorizes actions to be taken and empowers the public administration to require these actions or steps to be taken by companies and other economic entities causing the negative impact on the environment. The main development in policy and subsequent regulation has been the shift of focus from ‘End of Pipe’ regulation to demands for ‘Prevention and at-source-Intervention’ to prevent pollution from originating in the first place. This approach means increasing interference with internal company affairs and therefore needs a mechanism to ameliorate the interplay between (external) demands on the production activities and (internal) company decision-making on economic optimization of its production process.

This instrument is the Environmental Licence or Permit. Applying for the permit means describing and quantifying technology and material flow and documenting steps taken to prevent pollution originating and to limit impact where zero emission is not feasible. In assessing the application, the notion of Best Available Technique, BAT, is important and all emission issue handled by allocating Emission Limit Values. The key backup of the permit represents the Environmental Inspection by the Competent Environmental Authority. At its best the inspection combines checks on compliance and dialogue and advice to management on improvements, promoting a constant reduction of impact and thereby preparation for the permit review. In recent years, economic and other market-oriented instruments have become increasingly important, with the EU-ETS as the latest market oriented instrument. Applied within the area of climate change and dealing with CO₂ emissions, this system will attract considerable interest in coming years.

This text deals with these developments as well as the main elements of environmental regulation and related instruments.

The presentation and analysis are based on EU Environmental Regulation, as the EU today includes as members all Baltic Sea States excl. Russia and Belarus. Further, EU regulation influences regulation in a wider, global context as the EU countries via the permanent EU institutions operate as one in all global assemblies of environmental relevance. The presentation, though based on EU regulation, is supplemented by examples and cases from different member countries as well as from non-member countries to illustrate the actual implementation of the EU legislation as well as differences arising from those areas not covered by EU legislation – above all the economic instruments. The implementation can be quite different from country to country as the directives demand compliance with the principles but allows national discretion as to how and by what national regulation.

Finally, a number of case studies provide very concrete illustrations of the interplay between company and authority and the role that use of voluntary instruments and other company initiatives play in the permitting process and the consequent inspection and control of compliance.

The author team hopes that this way of presenting and dealing with the environmental issues including the potentials of and need for company-authority cooperation on sound environmental management will inspire teachers and students to include and confront the text with the situation in their national context. That includes the company level of environmental management initiatives and implementation of relevant environmental standards, the content and structure of the national legislation on permitting and inspection as well as the structure and competence of the Competent Public Authority on environmental regulation. The case studies will be of help when interpreting the national legislation and the interaction between company and authority as well as for the preparation and conduct of own company case studies.

At the Baltic University Programme web page the teacher will find further support for planning and conducting courses based on this text.

Roskilde, June 2007
Børge Klemmensen

INTRODUCTION

Heading for Sustainability

Business Accountability and Public Policy

Business Accountability and Public Policy

The relation between business and environment is at the core of this text. The ultimate goal is to examine the possibility of a working concept for sustainable industrial production. The question is in particular what role politics and policy instruments may have in bridging the relation between production and environment. That bridging is necessary to create and further more sustainable capitalist or market economies.

The task for politics – and the demand on policy and policy instruments – is huge, difficult and delicate. It is a task of bridging, a task of inspiring the industrial actors and a task of compensating. It is also a task of showing the negative consequences, a task of inducing change and a task of pointing at prospective paths to be followed. Environmental Accountability is the core challenge. The role for politics in and for the environment resembles that of politics in its role in creating the “welfare society” for social security. It should compensate and modify the damage and other problems caused by economic actors, while trying to keep the notion of a sustainable society firmly on the agenda.

Self-regulation or enforced rules?

It is obvious that some rules are necessary to protect the environment from the negative consequences of extraction of natural resources and emissions of pollution. Is this a concern for the producers, that is, the companies, or for society? For a long time industry regarded environmental issues as something “out there”, not their concern, and they acted accordingly. This was the start of environmental regulation enforced by society, either as absolute laws – you may not emit such a substance – or as fines – if you do that you will have to pay a fine.

Later on business started to understand that environmental impact was not something “out there”. It was actually a sign

that something was not working properly in production. Today it may seem obvious that it is better for business to be careful with resources and make salable products from waste rather than to let it disappear through the smokestack as pollutants, and incur big fines. These insights have led to a number of business initiatives for better environmental management.

Today we thus have two kinds of regulations: Firstly rules which authorities enforce on any activity to protect the environment for the general interest of society. Secondly, self-regulation, that is, management rules that business itself has introduced mostly

“If everything is working well with self-imposed rules it is best. However, in real life, self-regulation is not enough, and authority control is needed.”

for the reason that it is good business. Through the entire book we will study and analyse the relation between these two approaches. The first one is concerned with environmental regulation, with permits and control, with environmental taxes and fees, and with a concern that nature and people not be hurt by any activity that an organisation, commercial or not, is pursuing. The second one is a set of management rules developed within the private sector itself. It includes the management standards for environment, for quality as well as for social responsibility. It includes labels on products and business charters.

Obviously it is better if authorities do not see any need for regulation, that is, stay away from the so-called “command and control” approach. If everything is working well with self-imposed rules it is best. However, in real life, self-regulation is not enough, and both approaches are needed.

Today we see a third line developing with a culture of cooperation between authorities and business. In this “negotiation culture” authorities and business make agreements on



Figure 1 Industrial production. *Large companies typically have introduced environmental management systems, eco-design of their products (as is the case with Volkswagen) and other forms of self-regulation, which all eases the authority control. The production line for Volkswagen Polo at Volkswagen, Slovakia, a.s., in Bratislava, Slovakia. (Photo: Samuel Kubani. © European Commission)*

how to produce with less and least possible environmental impact through technological and managerial change. On a more general or global scale this has developed into a concept of “shared responsibilities” with industry actively involving itself in sustainability-oriented programs, including public policy regulation. Besides ensuring the profitability of their operations’ business needs regulation to make sure no one can escape from the standard conditions and thereby gain advantages in the market competition.

We will deal with all three aspects or approaches to protecting the environment and, eventually, to aspire to sustainable production and business practices.

Tools for environmental management

The theme of the entire course project is *Environmental Management*. Environmental Management Systems (EMS), will consequently be the starting point for this text. As mentioned above the text will describe the role of politics in helping to promote management that takes responsibility for the impact that the company has on the environment. A management system is an instrument for self-regulation.

An environmental management system, EMS, has two aspects. Firstly it is a managerial tool consisting of certain steps and procedures, which when followed and fulfilled will provide management with a comprehensive grip on a company’s environmental impact. Secondly it provides the procedures needed to have a bearing on improved company-environmental relations. It comes forward most clearly in the EU EMAS Scheme, with its explicit requirement for continuous improvement. This is backed by a demand that the company make its environmental policy public and report annually to the general public on the results.

As of today we have two active environmental management systems standards. One is the ISO 14000 series launched in 1996 and most recently revised in 2004, and the other is the European Union voluntary EMAS Scheme, established in 1993 and revised in 2001.

The first formalized EMS was the British Standard 7750, established by the British Standardization Board and taking effect in 1992. It was effective and used both in Britain and abroad till it was withdrawn and replaced by the ISO 14001 standard in 1996. The changes from BS 7750 to ISO 14001 were not significant. The most important difference is that the ISO system has world-wide coverage.

The ISO 14000 has developed into a Group of Standards concerned with different aspects of economic activity relevant to the environment such as Labelling, Life Cycle Assessment etc. The ISO 14001 standard is the one that includes the Environmental Management System.

The whole idea of organising management of the environment as a “Standard” was brought about by the use of product- and process standards like Total Quality Management (TQM) and the ISO 9000-serie of standards, still very much in use. This development of standards – again – was a product of the surge in international trade and the internationalisation of production and markets with more and more subsidiaries being placed around the globe with easy access to raw materials and cheap labour. The range of products and services covered by standards has for these reasons increased enormously and the number of single standards surged. ISO – the International Standardization Organisation for Standardization – is a private/non-governmental organisation with global wide coverage.

It is based on membership from a Standardization Body in each country (currently some 157 countries have member organ-

isations). The organisation of the national standardization body is often arranged by law or by government decree, whereby representation and distribution of interests are regulated. There can only be one member organization from each country [ISO, 2004]. The actual standards are prepared by working groups, consisting of company, consultancy and government representatives, gathering to set up an (industrial/material – commodity/trade) standard within an area of interest to them. There is therefore no system of securing “balanced representation” in the preparatory process. What is provided then is a standard – a set of guidelines, a set of specified material requirements etc. – that can function as a clear and unbiased reference for business and authorities alike when contracts on deliveries are made.

The EU EMAS Scheme is concerned with environmental management only. It is an EU regulation, i.e. issued by the European Union and is therefore an authority-based regulation of the same order as all other EU regulations. Consequently it is binding for the EU member states, and would be mandatory also for all citizens and legal entities alike, if it was not according to its own ruling made voluntary for them. This means, that the EU member states have to set up the required framework for the EMAS Scheme, first of all the accreditation system for certifiers and a database and registering system for the certifications made. It is then up to the companies that the Regulation targets to decide whether they want to use the system or not.

Business Charters

The Brundtland Commission Report, putting the Sustainability issue firmly on the agenda from 1987, provided a push for systematic approaches. That was reflected in the November 1990 International Chamber of Commerce (ICC) *Business Charter for Sustainable Development – Principles for Environmental Management*. This document was formally launched at the Second World Industry Conference on Environmental Management in April 1991. The objective of the charter is to make the widest possible range of companies commit themselves to the improvement of their environmental performance. The application of the 16 principles of the Charter should make sure to have a comprehensive and integrated management set-up to ensure improvement in environmental performance. The different challenge of comprehensiveness, interdependence and inter-relatedness posed by the sustainability concept was well understood. It was an entire new challenge compared to the, however problematic, nevertheless single-medium or individual-hazard problems in relation to the environment.

That we witnessed a “melting pot” in the years immediately following the launch of the Brundtland Commission report was underlined also by the International Labour Organisation (ILO) Report commissioned by the IL-Conference in 1990 and published in 1992. Being an ILO report, the starting point was integrating and securing training and education for

Table 1. Decision Making Within ISO , International Organisation for Standardization. *As other standards of the ISO, ISO 14001 was developed in a so-called Technical Committee (TC). Technical committee TC 207, prepared the ISO 14001 environmental management standards. The main points of this process are described below. Based on: ISO, 2003. Further reading on P-members (Participating members) and other members (O-members) in ISO/TC207, 2004.*

Stage	Purpose	Key actors
1. Proposal	The decision to develop the standard, in this stage in the form of a Work Item (WI) proposal	P-members (Participating members, i.e. representatives of national organisations) of TC 207 – agreement reached by a majority of the P-members voting for the standard
2. Preparation	Preparation of a Working Draft (WD)	Working groups of subcommittees with experts from national committees agree upon a WD
3. Committee approval	Committee approval of the WD; Agreement upon a Draft International Standard (DIS)	First national hearings, then voting by P-members. Agreement on the basis of minimum 2/3 of the P-members and ¾ of all ISO members (P- and O-members)
4. Enquiry	Ratification of DIS, turning the DIS into a Final Draft International Standard (FDIS)	Ratification by all ISO members within 5 months, agreement reached by 2/3 of the P-members and ¾ of all ISO members
5. Approval	Approval of FDIS	Approval by all ISO members within 2 months, agreement reached by 2/3 of the P-members and ¾ of all ISO members
6. Publication	Publication of the standard in the languages of all the ISO member countries, turning the standard into national standards	Participation of the ISO member countries in the translation of the standard

Box 1 The International Chamber of Commerce ICC Business Charter for Sustainable Development

The following 16 principles make up ICC's Business Charter for Sustainable Development. They provide businesses worldwide with a basis for sound environmental management.

1. Corporate priority

To recognize environmental management as among the highest corporate priorities and as a key determinant to sustainable development; to establish policies, programmes and practices for conducting operations in an environmentally sound manner.

2. Integrated management

To integrate these policies, programmes and practices fully into each business as an essential element of management in all its functions.

3. Process of improvement

To continue to improve corporate policies, programmes and environmental performance, taking into account technical developments, scientific understanding, consumer needs and community expectations, with legal regulations as a starting point; and to apply the same environmental criteria internationally.

4. Employee education

To educate, train and motivate employees to conduct their activities in an environmentally responsible manner.

5. Prior assessment

To assess environmental impacts before starting a new activity or project and before decommissioning a facility or leaving a site.

6. Products and services

To develop and provide products or services that have no undue environmental impact and are safe in their intended use, that are efficient in their consumption of energy and natural resources, and that can be recycled, reused, or disposed of safely.

7. Customer advice

To advise, and where relevant educate, customers, distributors and the public in the safe use, transportation, storage and disposal of products provided; and to apply similar considerations to the provision of services.

8. Facilities and operations

To develop, design and operate facilities and conduct activities taking into consideration the efficient use of energy and materials, the sustainable use of renewable resources, the minimisation of adverse environmental impact and waste generation, and the safe and responsible disposal of residual wastes.

9. Research

To conduct or support research on the environmental impacts of raw materials, products, processes, emissions and wastes associated with the enterprise and on the means of minimizing such adverse impacts.

10. Precautionary approach

To modify the manufacture, marketing or use of products or services or the conduct of activities, consistent with scientific and technical understanding, to prevent serious or irreversible environmental degradation.

11. Contractors and suppliers

To promote the adoption of these principles by contractors acting on behalf of the enterprise, encouraging and, where appropriate, requiring improvements in their practices to make them consistent with those of the enterprise; and to encourage the wider adoption of these principles by suppliers.

12. Emergency preparedness

To develop and maintain, where significant hazards exist, emergency preparedness plans in conjunction with the emergency services, relevant authorities and the local community, recognizing potential transboundary impacts.

13. Transfer of technology

To contribute to the transfer of environmentally sound technology and management methods throughout the industrial and public sectors.

14. Contributing to the common effort

To contribute to the development of public policy and to business, governmental and intergovernmental programmes and educational initiatives that will enhance environmental awareness and protection.

15. Openness to concerns

To foster openness and dialogue with employees and the public, anticipating and responding to their concerns about the potential hazards and impacts of operations, products, wastes or services, including those of transboundary or global significance.

16. Compliance and reporting

To measure environmental performance; to conduct regular environmental audits and assessments of compliance with company requirements, legal requirements and these principles; and periodically to provide appropriate information to the Board of Directors, shareholders, employees, the authorities and the public.

<http://www.iccwbo.org/home/environment/charter.asp>

Table 2 Regulatory Approaches to Environmental Management. *The regulatory instruments are divided into four categories, (Abbreviations: Integrated Pollution Prevention and Control, IPPC Directive, Environmental Impact Assessment EIA Directive; Environmental Management Systems EMS, EMAS Environmental Management and Auditing System, LCA Life Cycle Assessment)*

	Normative based	Market based
Mandatory	IPPC Directive Waste Directive Product Liability Green Reporting Green Accounting Standard Setting EIA Directive	Charges Tradeable Permits Product Taxes Effluent Taxes/Charges User Fees Deposit Refunds
Voluntary	EMAS Scheme Life Cycle Assessment, LCA	Voluntary Agreements ISO 14.001 (EMS) ISO 14.031 (performance) Total Quality Management Eco-labeling "Code of Conduct" Supplier Demands

all employees to have them involved in management efforts for environmental protection. The report takes its departure in the ICC Charter principles and provides a wide and thorough coverage on management issues related to controlling and improving company environmental performance. But it has no mention of Environmental Management SYSTEMS and no mention of using the Standard-concept for this purpose. Only later in 1992 was the BS 7750 released.

Politics and regulation within the European Union

Let us start with a short categorization of the policy "tool box" as it looks after the approximately 30 years since environmental regulation took off.

Regulatory approaches are grouped in the two categories, depending on the legal background (mandatory or voluntary), and the regulatory motor behind the policy instrument (normative or market).

If we relate this overview of instruments in use to the EU-level, which is now steering the environmental regulations of the 27 member countries and influencing also others, we will see, that important parts of these instruments are not in use at the EU-level. This is true for most of the mandatory, market based instruments. The reason is, that fiscal political decisions are exempt from the majority decision-making procedures in the EU, which on the other hand is the norm concerning envi-

ronmental regulations. Coordination and joint decision-making on tax- and fiscal issues is still practically non-existent within the EU and is, if so, normally covered by the "unanimous vote"-regime. These instruments are therefore in the hands of the member states, and they use them, but very differently. Clarification of this section of instruments for environmental regulations will therefore need to look at the member state level to see the EU-perspective on this policy section.

For the remaining body of regulation of relevance to our concern in this text, there was a lot of activity at the EU level in the 90's, and it now seems as if priorities and focus are moved to other areas for a while. Let us briefly picture the current situation.

The EMAS-Scheme was established by EU Regulation (EEC) No 1836/93 and a second, and improved, version (EMAS II) was issued with Regulation (EC) No 761/2001 of the European Parliament and of the Council of 19 March 2001. Together with a Commission decision on recognition of the ISO 14001-standard as largely compatible with the EMAS-Scheme, which renders extra credibility to the ISO standard, the EU-regulation on EMS will probably remain unchanged for some time to come (Table 1).

EU main mandatory regulation related to industry

The Integrated Pollution Prevention and Control (IPPC) directive, issued in 1996, was the largest EU reform in the 90's in relation to industry's impact on the environment. The directive provides an integrated approach to licensing of industrial

Box 2 The Seveso II Directive

Scope: To prevent – if possible, otherwise reduce the consequences of – the occurrence of major-accident hazards involving dangerous substances.

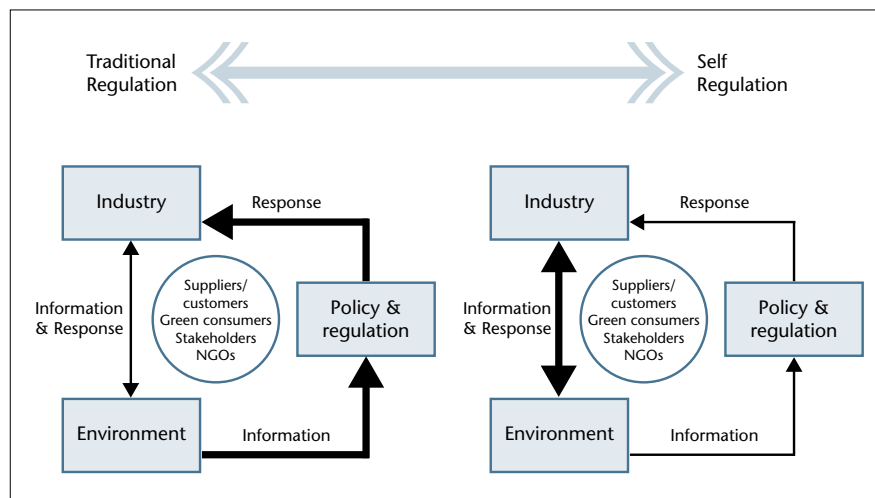
The companies covered by the directive must establish the following (companies covered by the specific requirement in brackets):

- Major Accident Prevention Policy (all companies).
- Safety Report (only certain companies).
- Safety Management System (only certain companies).
- Emergency Plan (only certain companies).

The provisions in the directive concerning safety management systems and emergency plans are very similar to the demands of environmental management systems like ISO 14001 and could beneficially be combined.

Source: <http://ec.europa.eu/environment/seveso/index.htm>

Figure 2 A shift towards self-regulation. In traditional regulation, often called a *Command and Control Culture* (left), the policy level (authorities) monitors the environment and is the main determinant for industrial adaptation. In a self-regulatory situation (right) sometimes called a *Negotiation Culture*, industry responds directly to the environment in agreement with the authorities.



installations, singles out the potentially most dangerous for special attention and leads to major reforms of environmental authorities in many of the member states, due to the integrated approach. The directive should have been implemented by the end of 1999, and although problems occurred for some countries, leading to delays in the transposition and implementation, the directive is now in use in all countries. There is no reason to believe, that this key piece of EU regulation on industries will be revised profoundly, if at all, in the foreseeable future.

Later in 1996 the EU Council adopted the directive on control of major accident hazards involving dangerous substances – (labelled *the Seveso II Directive*) and in March 1997 the Council adopted Directive 97/11/EC, amending and up-dating the Environmental Impact Assessment, EIA Directive, first issued in 1985.

With these four pieces of EU legislation during the late 90s, the broader framework and process-oriented regulation of industrial activity is updated and put in place. We will still see in the near future a new, more content- or quality-oriented, EU regulation for the industrial sector. This will be a major reshuffle of the regulation on chemicals, REACH, the Registration, Evaluation and Authorisation of CHemicals. This is in line with the priorities of the 1992 EU 5th Environmental Action Programme (EAP) *Towards Sustainability*, where industry as a sector of the economy was one of the selected target groups for EU intervention. The programme was revised in 1996 and prolonged until 2001.

Public-private Agreements

EU's 6th Environmental Action Programme, *Environment 2010: Our Future, Our Choice* was launched in July 2002 and covers the period till 2010. This EAP has broader, more global and more quality-based environmental issues as priority areas.

Highlighting the word “choice” in the title means focusing on implementation and the widest possible societal involvement to make the vision come true. The approach to problem identification and solving is strategic and very process-conscious.

The EU is governed by legislation. Regulations and directives, and the subsequent national legislation based on these legal instruments, will continue to be the base for the actions taken to implement the objectives of the 6th EAP. A strategic approach and focus on implementation and stakeholder involvement leads to cooperative and participatory practices at the national level, where all implementation of EU legislation takes place. Member states, already have wide-spread and varied experiences of these approaches.

While the 6th EAP points out new themes, new approaches will also apply to the implementation of regulations like the IPPC Directive on environmental licensing and other regulations from the 1990's. For the industrial sector the call for increased stakeholder involvement in the implementation of environmental regulations creates opportunities for more influence as a group and as individual companies. This involvement is not new for the European industrial sector, which has long pledged responsibility in various groupings for the impact their operations have on the environment. At the same time they lobby the European Commission to reduce the requirements in proposed environmental regulations. This is not contradictory. It only reflects the divisions within environmental regulations between private and public interests.

In most of the EU-15 member countries, different kinds of agreements between industry and government have been tested, and some of these agreements are still active and in force. The Netherlands has developed the most elaborated use of these agreements or *covenants*. The principle behind the agreement system is that the government renounces unilateral regulations

and instead regulates these same issues in an agreement for as long as the agreement is implemented by the industry. The agreements have become attractive also for governments as input-oriented environmental regulations have developed and more resources and a wider range of qualifications are needed on the government side for licensing and for enforcement. The experiences with the environmental agreements, which are normally not legally binding for industry, are mixed. Under the 6th EAP it will be necessary to look for alternatives, or at least supplementary ways, of industry involvement. One possible option is to try to develop and exploit a possible synergy between the IPPC licensing and the EMAS Scheme and/or the ISO 14001 standard and expand that also to other fields of environmental regulation. We will address this further below, primarily in Chapters 3 and 4.

National legislation

We shall close this initial “snapshot” of the current status of environmental regulations and environmental management and the role of EMS for industry by pointing to the paramount importance of the national implementation of the EU-regulation. Implementation is – and has always been – in the hands of the member states in all EU regulation areas. Many of the directives (IPPC, EIA and many others) are so-called *minimum directives*, which means, that they provide a “floor”, below which the member states cannot go. At the same time they do not have any “ceiling”, i.e. the member states can go further than what is prescribed in the directive if they so wish. We will address the implementation and enforcement of EU environmental policies in Chapters 5 and 6.

Further, a very important part of the market-based instruments listed in Table 1, is completely absent in the EU regulation on the environment. We are talking here of the set of economic instruments, which are needed to make the *Polluter Pays Principle (PPP)* take effect. The Polluter Pays Principle is a core environmental policy principle, promoted by many stakeholders, including (part of) business (e.g. Schmidheiny and the World Business Council, WBCSD), academics (e.g. von Weizsäcker 1992 and 1994), as well as a number of economists.

Economic instruments are popular in particular with economists belonging to the neo-classical school, for whom the market as a self-regulating, economic institution, is the core. To be taken into account on the market, all costs must be included in the price. This is not automatically the case for a number of natural resources, as no general ownership can be claimed. Political intervention to levy the use of these resources is therefore

needed. How, and at what level of cost, for different types of resources is needed to make the PPP work is very much debated politically and within the academic world. While this discussion is ongoing, *green taxes* have been around for at least 30 years, and are a well-established element of national environmental policy-making. They have also proved to be viable. We will address these economic instruments in Chapters 10 and 11.

In recent years green taxes are increasingly seen as a popular way to get some of the tax burden off the shoulders of working people without compromising the tax-financed social welfare system in the Scandinavian – and increasingly also in other West European – social welfare states.

The framework is set at the EU level in key areas while the economic instruments can only be formulated at the member state level, where all implementation has to take place anyway.

As clearly stated in the 6th EAP, stakeholder involvement should be at the centre of implementation. Ever since the Brundtland Commission Report in 1987 there has been a move towards making industry (and other economic actors with adverse impact on the environment) more accountable to the environment for the impact of their activities. This is also understood in a wider sense, which is necessary in the perspective of sustainable production. This request has been taken up by industry, which at the same time has been asking for more flexibility and room to manoeuvre. If this request for wider involvement is not met and does not lead to tangible evidence of being on the track for (more) sustainable production, the question must be raised about whether we have come into a stage of aftermath of the “environmental 1990’s”. This could be the return to top-down, rationalist pollution control with business and other economic actors waiting for the control to arrive and in the meantime doing as little as possible.

In Figure 2 we summarize ways how to consider the relationship between industry, regulation and environmental accountability in a dynamic perspective. We will keep this view of the over-all development in mind throughout the text as a sort of compass to help understand the possible wider implications of what we see and analyse. This model can be used for the evaluation of the direction the interrelationship between industry, regulation and environmental accountability has taken in a particular country.

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“the broader framework and process-oriented regulation of industrial activity is now updated and put in place.”

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Boerge serves on Project Evaluation Panels for EU-research Programmes and for Institutional Restructuring Programmes, including the TEMPUS Programme and at CBSS. He was a member of the founding committee for his university, Roskilde University Centre, RUC, in the early 70's and has been connected to RUC since. Recent years he has had part of his time in the private sector.

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Abbreviations

BS	British Standard
EAP	Environmental Action Programme
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
EMAS	Environmental Management and Auditing System
ICC	International Chamber of Commerce
ILO	International Labour Organisation
IPPC	Integrated Pollution Prevention and Control
ISO	International Organisation for Standardization
LCA	Life Cycle Assessment
PPP	Polluter Pays Principle
REACH	Registration, Evaluation and Authorisation of Chemicals
SD	Sustainable Development
TQM	Total Quality Management
WBC	World Business Council

Internet Resources

ICC Business Charter for Sustainable Development
<http://www.iccwbo.org/home/environment/charter.asp>

ILO International Labour Organization
<http://www.ilo.org/global/lang--en/index.htm>

The Eco-Management and Audit Scheme (EMAS)
http://ec.europa.eu/environment/emas/index_en.htm

International Organization for Standardization (ISO)
<http://www.iso.org/iso/en/ISOOnline.frontpage>

ISO 9000-14000 Management Systems
<http://www.iso.org/iso/en/iso9000-14000/index.html>

ISO Technical Committee 207 (ISO/TC207) on Environmental Management
<http://www.tc207.org/>

INEM, the International Network for Environmental Management
<http://www.inem.org/>

IPPC Directive 96/61/EC concerning Integrated Pollution Prevention and Control
<http://ec.europa.eu/environment/ippc/index.htm>

EIA Directive (97/11/EC) on Environmental Impact Assessment
<http://ec.europa.eu/environment/eia/home.htm>

Seveso II Directive 96/82/EC on Chemical Accidents - Prevention, Preparedness and Response
<http://ec.europa.eu/environment/seveso/index.htm>

REACH Directive 2006/121/EC on Registration, Evaluation and Authorisation of Chemicals
http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm

The Sixth Environment Action Programme of the European Community 2002-2012 Environment 2010: Our Future, Our Choice
<http://ec.europa.eu/environment/newprg/index.htm>

Phases in Environmental Protection

1.1 The Road Towards Regulation

1.1.1 The Conflict Between Nature and Economy

Economic activities generate pressures on the environment. This is true for activities as diverse as millennia-old agriculture and hunting and modern industrial production. Economic activities with severe environmental consequences include lumbering, causing deforestation of large areas, mining, causing disastrous pollution of surroundings, and more recently industrial production using nearby waters as recipients of pollutants. The environmental consequences have been serious not only for Nature and biodiversity but also for the society and its people. But still, much of this has passed unchallenged over history. In short, someone had to pay for a destroyed environment, in money or in severely reduced wellbeing, reduced health or even life. In general it has been the victim who paid, not those who caused it. As the price increased, the authorities stepped in to control the situation and protect its citizens. The first environmental legislation is often considered to be the British Alkali Act from 1863. However, more wide-reaching environmental regulation had to wait another 100 years, to the 1960's, as we will see below.

The other side of uncontrolled exploitation of the environment is the use of resources. Fishing, hunting, mining, foresting were possible for everyone as seas and forests were seen as commons. Uncontrolled use again had disastrous consequences. The complete eradication of a common resource has happened from early on, and many times. The extinction of the European megafauna was due to uncontrolled hunting. The disappearance of fish species, for instance wild salmon in Baltic rivers, is another example.

Not everyone saw this eradication of resources without acting. The control of common resources has a long history. Spe-

cific areas or specific animals, such as deer or bison, have been protected by king and nobilities since medieval times. Agreements in villages and local societies in general on how to use a common resource are age-old. It is interesting to note that uncontrolled lumbering in the early 18th century in Saxonia – today's Germany – started the thinking about long-term use of resources and resulted in the first publications on strategies for sustainable development.

In this Chapter

1. The Road Towards Regulation.
 - The Conflict Between Nature and Economy.
 - The Environment Enters the Political Agenda.
 - Control of Industrial Chemicals.
 - Smoke and Wastewater.
 - The Cost of Pollution.
2. The Conflict Between Growth and Environmental Regulation.
 - The Public-Private Dichotomy.
 - The Origin of Regulation.
 - From Control to Prevention.
 - Overcoming the Dilemma – the Win-Win Option.
3. Innovation and Technological Change.
 - The Eco-Efficiency Credo – Environment by Competitiveness.
 - The EU Solution – Decoupling.
 - The UNEP Solution – Cleaner Production.
4. The Fourth Era of Environmentalism – Sustainability.
 - The Climate Issue.
 - Sustainable Production and Consumption.
5. Managing Hazardous Production Facilities.
 - Responsible Care.
 - The Seveso Directive.

Thus from the very beginning we have the two sides of the relationship between man and nature: Nature, that is the environment, as a resource and as a recipient of our waste. Man and his/her activities has a sensitive middle place in this cycle of material flows, a position that needs to be well understood and carefully regulated not to be destructive.

1.1.2 The Environment Enters the Political Agenda

In the 1950's, 1960's and 1970's alarms on an ongoing and accelerated serious impacts on the environment reached the general public. Well-known whistle blowers include Rachel Carson's publication *Silent Spring* from 1962, and the *Limits to Growth* report of Club of Rome in 1972, as well as *A Blueprint for Survival* as an ecological manifesto and others. As a consequence, protection of the environment entered the political agenda. The results were regulations decided by the parliaments and the creation of institutions, including environmental protection agencies and ministries of environment, with authority to control them.

The modern area of regulation, however, did not start with regulating pollution. It was motivated by the discovery that many of the chemicals that were legally produced and sold with the intention to control pests and weeds, were harmful to many more than they intended to control, entire ecosystems. Rachel Carson's book mostly (although not entirely) dealt with the indiscriminate use of biocides. The regulations in the 1960's and 1970's started by the control of, or even a complete ban on, mercury-containing anti-moulding substances, such as methyl mercury, and the insecticide DDT. Soon after several other biocides followed.

Of course industries, which produced and sold these substances, protested. They lost their markets for a profitable product. Quite a few users of biocides were also among the protesters. The alternative means to control pests and weeds were less efficient and less comfortable. A conflict between economic interests and environmental concerns was again obvious.

1.1.3 Control of Industrial Chemicals

The next alarms dealt with common chemicals often used in large amounts, which turned out to be extremely toxic, persistent and bioaccumulating. Best known in this group may be the PCBs, but it included many other chlorinated compounds as well as many mercury-containing chemicals.

These chemicals were often difficult to identify and it was equally hard to prove that they were harmful. The discoveries of PCB in the biota of the Stockholm archipelago or methyl mercury in Minamata Bay in Japan, and their effects, are detective stories. Environmental chemists are the detectives and heroes, while the industrial companies have a less glorious role



Figure 1.1 Environmental disasters paved the way for regulations. In the 1960's it became obvious that biocides and industrial pollutants could cause great harm to nature and ecosystems. The white-tailed eagle almost became extinct in the Baltic Sea region. Books such as *Silent Spring* became whistleblowers and regulations of environmental impact entered the political arena. (Photo: Björn Helander, © Svenska naturskyddsförningen)

as culprits. When the environmental effects of the chemicals were discovered, industry protested and had to be convinced about their guilt. The traces leading to the final proof included dead white-tailed eagles in Sweden, and cats in Japan.

Later the freons, CFCs, were added to this list of harmful industrial chemicals. This time the detective story featured American, British and Dutch researchers in Antarctica discovering the increased UV radiation connected to the ozone hole and the ozone-destroying capacity of chlorine and the CFCs.

Requests were voiced for much better control and analysis of chemicals used in society. Among the first concrete action was a complete ban on PCB in many countries. PCB was up to then a very extensively used chemical, appreciated for its stability and un-reactivity, exactly the same properties which made it harmful in the environment. PCB is still present in large quantities in infrastructure, and will leak out from buildings and equipment for many decades ahead. A second step was the gradual ban on CFC which led to the Montreal protocol in 1987. Today, in the fall of 2006, we face the implementation of the European Union REACH Regulation. This directive has been slightly curtailed after forceful efforts from the industrial side to limit their responsibilities to analyse and document the properties of the chemicals they are using, and be liable for their negative environmental impacts.

1.1.4 Smoke and Wastewater

That reeking smokestacks and fouled wastewater were harmful to nature was much less obvious than we think. It took a long time to find out, and society was slow to limit it. The very

early regulations in this area were British, not surprisingly considering that England is the origin of industrialism. They were made to protect people's health, not the environment. Industries and cities as such became places with terrible smells, terrible air and polluted soil. The so-called pits, a sort of bad smelling garbage dumps, were outlawed. The handling of water, toilet waste, and solid waste were slowly set under rules.

One of the origins of the modern area of emission control is the Swedish acid rain debate. It began with consistent argumentation by researchers that sulphur in oil was the origin of acidifying sulphur oxides in the rain. By 1967 it had led to an intense debate in the general media and the parliament on the causes of acidification and a will to do something about it. A reason that this became a good start was that regulation was rather easy. The sulphur content for all oil to be used for heating in Stockholm's residential areas was limited already from 1968. The acid rain debate was one of the reasons for establishing the Environmental Protection Agency, EPA, in Sweden in 1969. In parallel there was a disastrous acidification of the forests in the so-called black triangle, the forested area where Poland, Czechoslovakia and DDR met, combated much later.

The regulation of acid rain continued with efforts to limit far away sources from where a major part of airborne sulphur oxides had their origin. For the case of Sweden, British and German industry was a main source. It took ten years for a general acceptance of the role of sulphur in fossil fuels, especially coal, and led in 1979 to the Convention of Long Range Transboundary Pollution and successful international cooperation to limit sulphur exhausts.

1.1.5 The Cost of Pollution

The acid rain story may also illustrate the costs that other partners have for pollution caused by industry. Acid rain results in acidified water and soil. The more sensitive areas in Norway and Sweden have tens of thousands of lakes and rivers devoid of higher life because of acid rain. No fish can survive at low enough pH values. Thousands of km² of forests have decreased productivity because of acidification of soil. In cities polluted air is harmful foremost for children, but also for adults, and leads to increased lung and breathing disorders. Material damages are also important. Corrosion on metal surfaces, not least cars, is great, and the destruction of stone especially calcite structures used for many cultural objects is great. The total costs for acid rain in Europe was estimated, in a 1996 study, to be 91 billion euros annually, including costs of human health, damage on material structure and decreased crops. The costs for abatement of sulphur emission were then estimated to 73 billion euros, that is, a positive balance of almost 20 billion euros annually.

The economic side of pollution can also be illustrated by remediation costs. As an example, Swedish EPA today uses several tens of million euros annually to lime acidified waters. The remediation of polluted soil is even more costly. So-called brownfields, polluted industrial areas, are increasingly remediated, since they often have a central place in cities and are attractive for other uses. But it is expensive. The largest American foundation, the Superfund, several hundreds of billions dollars' worth, was created by industry to take care of such costs. In Europe the cost for remediation of brownfields is mostly met by public funding as the company that caused the pollution is often not there any more and, if so, usually had a permit or operated within the then effective environmental regulations and therefore is not to blame. This in turn means no liability and no obligation to share the costs of the remediation. If private actors participate in the cost-sharing, it's more often the project developer, the buyer of a former industrial site, which he wants to develop into office facilities or housing.

Still, it is in general the victim who pays for environmental degradation in our time. The Polluter Pays Principle is still on standby, waiting for effective implementation.

1.2 The Conflict Between Growth and Environmental Regulation

1.2.1 The Public-Private Dichotomy

As we have seen above, the conflict between nature and economy is as old as the production of commodities on some scale for the market. Gradually the general public have turned against large negative impacts from economic growth on the environment, and support for tougher and more comprehensive regulation has become stronger and stronger. When the requirement of a certain pollution limit is set, and it is met solely by abatement measures – so-called end-of-pipe solutions – it means additional cost for the company. We have then a pure conflict between a private economic interest – the profit of the company – and a public interest, a clean environment. Thus even today at the core of the topic of environmental regulation lies a tension or conflict between doing business for profit and the protection of the environment and natural resources [Norberg-Bohm, OECD 2001]. That very tension is what brings in the state and its politics. The state is where exertion of political power resides (also) in a market economy, i.e. it has the role of mediator of this tension. Political tools or instruments are designed to regulate, and influence management to minimise the environmental impact from its business activities.

The role of politics in the regulation of private economic activity in a liberal market economy is particularly difficult. It means crossing the conceptual "border line" between public

and private, stirring up ideological stands and attacking what business may perceive as “well-deserved privileges”.

This type of intervention is intermingling with property rights, which in most countries is secured by the constitution and considered a prerequisite to all private economic activity. The more ideological formulation is “freedom of man to the extent, he is not harming the freedom of others” [Bentham, 1789; J.S. Mill, 1859]. The market economy emanates from and refers in more direct sense to the early nineteenth century economic creed of unregulated “laissez faire” capitalism [Heywood 1997, p 41]. It is still based on the same principle division of private economic interest and a public or political sphere for the handling of common interests, including the protection of private interests and private property. The discussion about demands on the CEE countries to put legislation in place, securing (foreign) private investments as a precondition for getting a market economy under way, underlines the relevance of this for today.

1.2.2 The Origin of Regulation

In a societal – and now more and more global – context of market economy domination, the freedom to pursue one’s own economic interests is seen as a guarantee for continued economic growth. This in turn leads to a higher impact on the environment and increased resource use. Regulation became necessary to protect the public interest, and often to control direct threats to public health and environment.

The regulations to protect the environment, were and are, however, generally seen as putting a brake on, or creating obstacles to economic growth. It may even risk, nationally and locally the forcing of companies to close or lay-off workers. The principal tension or conflict between business and the environment turns into a historical conflict, not only between business and the environment, but, because the creation of wealth ends up in private hands, also between economic growth as such and the environment. This position of being in principle and historically adverse to growth, progress and new opportunities places environmental regulation on the defensive.

Even worse, this very principal position or role for environmental politics and regulation as control and containment of the negative impact of business activities on the environment leads structurally, to “containment” of environmental politics and regulation itself. Regulation is tied up, or locked up, in a position of doing reactive control measures to minimize upcoming negative impact from business activities on the environment. It’s a position for politics and regulation of a permanent defensive stand and being placed in a role of being constantly understood as setting up restrictions for growth and prosperity. However positive that might be evalu-

Box 1.1 A Philosophical Root for Regulation of Business

A philosophical root of regulations originates in the late 1700’s. Jeremy Bentham’s “freedom of man to the extent, he is not harming the freedom of others”, and Immanuel Kant’s “act so that you could make it into a general rule” motivates protection of society and individual welfare. Human population was then not so large that protecting nature was considered.

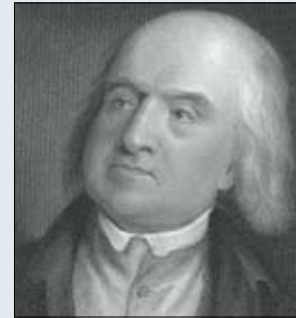


Figure 1.2 Jeremy Bentham, 1748-1832. (Engraving by W.H. Worthington, Courtesy: National Portrait Gallery)

ated from certain, more “fundamentalist” environmental perspectives, that is a defeatist and untenable position. It makes regulations support societal standstill and backwardness. And it means a “suicidal” burden of control and bureaucracy that nobody is willing to fund. Are there ways to untie this deadlock?

1.2.3 From Control to Prevention

The principal relation between private business and politics remains. There will still be a strong element of control and containment of environmentally damaging output from industrial and other economic activities. Still, gradually a shift in focus in relation to dealing with – and regulating – environmental issues has developed in many countries. The shift is from the output-side to the input-side of industrial production. Instead of fighting with and trying to contain ever-growing amounts of waste, wastewater and toxic exhaust, the focus was turned to investigating the options of avoiding the problems in the first place. The focus shifted from control to prevention, from end-of-pipe to the source.

This took industry into the “third era of corporate environmentalism” [Fraenkel, 1998]. All of a sudden the *win-win* option was at hand, i.e. the possibility that business and the environment can both benefit from changes in technology, raw materials and/or auxiliary materials, regardless of whether these changes take place solely on the initiative of management or to comply with regulations. The first enterprise to make that shift and getting the win-win-benefits, even substantial economic benefits, was the American company 3M, launching as early as

1975 their now famous *Pollution Prevention Pays*-programme. They used the same three PPP, which is normally used to refer to the *Polluter Pays Principle*. This may contain the 3M-understanding – and results – but it first of all points back at the control and containment-perspective, elaborated above. The initiative was followed by some of the chemical multi-nationals with Dow Chemicals Co as another well-known example. The 3M results of very substantial and documented pollution reductions and equally considerable cost savings paved the way for the pollution prevention drive.

1.2.4 Overcoming the Dilemma – the Win-Win Option

The potential seem enormous – and new examples are frequently surfacing all over the industrialized world [Weizäcker et al., 1997], also, since the turning point in 1990-1991, often in the CEE countries. Being quite well established in a particular company, the easy targets – phrased as “picking the low-hanging fruits” – were reached. It is getting harder to prove the pay-back of the prevention initiatives taken, especially difficult with the very short pay-back periods of 2-4 years, which most corporate investment decisions are based upon. The key problem for the source-oriented win-win concept is that it is based on savings which will have to be quite substantial to return an investment within a short span of time, although the installation might go on delivering the benefits for years on. There is little or no room for the long-term perspective on environmentally oriented investments – and return – in most private company’s decision making.

This issue on pay back and – more generally – the influence of environmental protection measures on company competitiveness was addressed by Porter and Van der Linde (1995), making the case for what they called the *double dividend*, i.e. a win for both the environment and for competitiveness. The point made by these authors was that the potential of environmental regulations increased competitiveness, while the established wisdom said exactly the opposite – tightened environmental regulations meant economic burdens and thereby made industry less competitive. We shall return to the issue of regulation further below. In relation to industry, the point for the double dividend was innovation, including technical innovation, which would improve productivity of the resources allocated, named *innovation offsets*. This could influence – and enhance – the production output, reduce downtime and save material, reduce energy consumption etc. That is, it covers the same issues as the source oriented savings in the win-win concept. It is the need for innovation that is added and thereby a more comprehensive and strategic response from management than the “first generation” of win-win. What is added on is what in the innovation-oriented writings is called “radical

Box 1.2 Pollution Prevention Pays

The 3M, a worldwide technology company, in 1975 launched the concept *Pollution Prevention Pays*, also referred to as the 3P.

Philosophy of the 3P programme:

- It is possible to reduce environmental impact and still increase financial payoffs, derived from the use of less raw materials and resources.
- It is, in the long run, cheaper to prevent than to minimize emissions.
- Anticipating regulatory initiatives that could be expected to be imposed on the companies in the future, lowers costs, since it is cheaper for a company to develop a technology in line with the investment cycle of the company.
- Developing technologies before they are mandatory could actually improve competitiveness.

Source: 3M Worldwide, 2004.

changes”, i.e. more profound changes as opposed to “incremental changes” [Clayton et al., 1999].

1.3 Innovation and Technological Change

1.3.1 The Eco-Efficiency Credo – Environment by Competitiveness

In general, innovation and technological change represents a more dynamic approach to pollution prevention and protection of the environment from the corporate side, and indeed from academia and regulators alike, gradually gaining momentum over the 1980’s and continuing to do even more so in the 1990’s and into the new millennium. The 1992 Global Environmental Summit in Rio de Janeiro asked its Secretary General Maurice Strong to request the Swiss billionaire and industrialist, Stephan Schmidheiny, to write a book, titled *Changing Course – A Global Business Perspective on Development and the Environment*. The book was published just after the summit in 1992. It was written on behalf of the Business Council for Sustainable Development, BCSD (after mergers the World Business Council for Sustainable Development, WBCSD). *Eco-Efficiency* was the key concept launched in this book for business’ involvement in protecting the environment and – ultimately – embarking on a course set for sustainability. The concept was further elaborated upon at the first eco-efficiency Workshop in Antwerpen in 1993. The core of the concept is delivering competitively priced goods

and services while progressively reducing ecological impacts and resource intensity.

It is clear, that eco-efficiency focuses on the economic side of the “equation” while putting that in a perspective of delivering benefits for the environment. Including the word *progressively* is a pledge for making these benefits continuous and thereby also increasing or accumulating, i.e. steadily reducing the negative impact of industrial activities on the environment and resources. The eco-efficiency concept has had tremendous influence on corporate and other business thinking acting in relation to environment and sustainable development. It takes its departure in the inevitable fact for business, at least medium term if not every year, of a positive financial “bottom line”, which makes the environmental benefits conditional upon company competitiveness and thereby economic viability. It makes “no fuss” about the limits to its environmental credo. The strength in this approach to the environment is its outright compatibility with core business thinking and a clear and openly stated stance in the discussion on growth and the environment.

1.3.2 The EU Solution – Decoupling

EU has linked the eco-efficiency concept with the *Decoupling* concept, based on a decision at the European Council (the EU heads of states) endorsing a strategy for sustainable development by decoupling economic growth from use of resources. In continuation, the EU-commission links the two concepts as a combined way of assessing the environmental performance of European industry.

For WBCSD, only growth is thinkable, and it becomes clear that the membership of the organisation is made up of some 160 of the world’s biggest multinational companies. At the core of the eco-efficiency concept is embedded a drive for, or a destined concentration and centralisation of market influence, and economic power in the world market, and thereby huge potentials for wider global industrial restructuring. The WBCSD members will, of course, consider themselves as on the winning side in this restructuring. And the resulting environmental benefits have to be delivered by or via this restructuring, which is inherent in, and therefore an ongoing thing under market economic conditions. It should be underlined,

Box 1.3 Approaches to Resource-efficient Industrial Production

Eco-Efficiency

Eco-efficiency is a concept developed by the World Business Council for Sustainable Development (WBCSD) in 1992.

Objectives:

- To combine the realization of economic and environmental objectives, by focusing on producing best possible products, in terms of functionality and quality, with the least possible materials, thereby preventing unnecessary generation of waste.
- To reach a level of resource intensity which equals a sustainable production, i.e. not exceeding the carrying capacity of nature.

Means:

- Prevention instead of end-of-pipe solutions.
- Increasing resource-efficiency in production and usage, by technological innovation or by building networks with shared resources.
- Recycling of waste, by using waste for raw materials from other industries.
- Alternative distribution methods, e.g. leasing instead of selling, with the intention to improve quality and durability of products and to make products recyclable.

Sources: WBCSD, 2004a; WBCSD, 2004b.

Cleaner Production

The concept of Cleaner Production was developed by The United Nations Environment Program (UNEP) in 1989.

Definition:

- “The continuous application of an integrated preventive environmental strategy applied to processes, products and services to increase eco-efficiency and reduce risks to humans and the environment”.

Objectives:

- To prevent pollution.
- To reduce the environmental impact of each stage in the lives of products, including the disposal stage.
- To make closed circular production processes instead of linear, so that ideally no waste is generated without being reused in the cycle. (The ideal is the eco-systems of nature in which even the waste is an important factor, since it the condition for further production, as the waste is reused in another cycle.)

Means:

- Minimizing input.
- Replacing toxic chemicals with less toxic substances.
- Changing production processes.
- Reuse and recycling.

Source: BSD Global, 2004.

Table 1.1 Strategies for environmental improvements. Four strategies (out of many) are shown in the table. Several of them have developed over the years, such as BAT originally Best Available (Cleaning) Technology used for abatement of pollution, which today stands for Best Available Technique in a more general sense. Pollution Prevention (also P2), Cleaner Production, CP and Zero Emissions are developing strongly. The elements addressed by these strategies run from particular, such as end-of-pipe measures, to integrated. [Source: Baas, 1996 in Clayton et al. 1999, p 15., Book 2 in this series]

Strategy <i>Elements</i>	Best Available Technique BAT	Cleaner Technologies	Pollution Prevention and waste minimization	Eco-Efficiency	Cleaner Production	Zero Emission
Pollution control	x					
Prevention		x	x	x	x	
Technological	x	x	x	x	x	x
Non-technological			x	x	x	x
Process oriented		x		x	x	x
Product oriented			x	x	x	x
Strategic management			x	x	x	x
Society oriented					x	x

that the WBCSD has documented a number of concrete cases on environmental benefits from eco-efficiency projects in a number of the member companies e.g. *Walking the Talk* by Schmidheiny, Holliday and Watts [Schmidheiny et al., 2002]. The book was published targeting the 2002 World Summit in Johannesburg. Just like – the then – BCSD and Schmidheiny’s first book, *Changing Course*, was published targeting the Earth Summit in Rio in 1992. Timing is important.

1.3.3 The UNEP Solution – Cleaner Production

UNEP, the UN Development Programme launched the concept of *Cleaner Production (CP)* in 1989, i.e. a couple of years before the launch of the eco-efficiency programme by the (then) BCSD and after the report from the World Commission on Environment and Development (Brundtland Commission) was published in 1987. Cleaner Production has the continuous application of an integrated, preventative environmental strategy on production processes, services and products for the benefit of man and nature as the core concern. CP puts environmental benefits first, which is the key difference to the eco-efficiency concept. It is the same industry and the same production, material use, products and services they target. Many of the same practical steps and solutions, including awareness raising, training and communication, which are needed for bringing about the targeted outputs, are involved in both concepts.

UNEP declared in 1995 a joint effort with WBCSD on the promotion of the two concepts as they were seen as complementary or as “two sides of the same coin”. They were targeting different audiences, however, but that was in line with the different role and background these organisations have. WBC-

SD was targeting industry on its home ground, predominantly USA and Europe, and focused here on the bigger companies. But in projects in e.g. CEE-countries, they were also targeting SMEs, as that is the dominant size for new, up-coming private companies in these countries, seen as crucial to the economic development. UNEP focuses on the less developed part of the world in accordance with its background and mission. In cooperation with UNEP UNIDO, the UN’s International Development Organisation, established national CP Centres in quite a few countries, including China, India and the Czech Republic. The joint forces with the WBCSD could be seen as an effort from UNEP to get more direct backing from the business community in its work with industrialists in the target countries as well as achieving American and European business backing for UNEP itself. The lack of support of UNEP’s programmes was criticised by its US members in the UNEP’s governing body.

In the 80’s, after starting to focus on limiting the impact on the environment at the source, other technology-related concepts were introduced. First of these is the *Cleaner Technology (CT)* concept today valid and active, first of all in Europe. The idea is here to focus on the production process and spot improvements at hand and then aim at altering a part of the processes. This may concern, e.g., a machine or a cluster of machines and related processes, such as re-circulating cooling and rinsing water, simplifying or avoiding completely an operation on the material by combining them in one machine. The key difference to CP is the scope and the nature of the intervention and the technological development aimed at.

The classification of the different technology oriented initiatives and concepts is summarised in Table 1.1.

Box 1.4 Sustainable Production and Consumption

From the Chairman's summary report of the Oslo Roundtable conference in 1995.

"Making the transition to sustainable production and consumption patterns will require courage, determination and a strong political will. Our final document reflects the need to make progress. I would like to highlight the following priority areas:

- First, sustainable production and consumption will involve long-term structural change to our economies and our lifestyles. Together we must address the volumes, patterns and distribution of consumption.
- Second, governments must take responsibility for putting the necessary framework in place: ecological tax reform is essential to reduce environmental damage and stimulate employment.
- Third, governments and business should use their purchasing power to influence the overall pattern of demand for goods and services through the introduction of environmental strategies for procurement.
- Fourth, strengthened international cooperation is vital for fair and sustainable production and consumption on a global basis. We need to reverse the trend of declining aid flows, accelerate the transfer of green technologies and establish trade preferences for environmentally friendly goods and services from the developing world.
- Fifth, business must bear its full share of the responsibility for change: in future, all goods and services should be made, used and disposed of within the limits of nature.
- And finally, people themselves are a force for positive change. They need practical tools that are attractive and cheap to enable them to live sustainably. In particular, citizens have a right to know the environmental impact of the goods and services they consume."

Source: Berntsen, 1995.

1.4 The Fourth Era of Environmentalism – Sustainability

1.4.1 The Climate Issue

The 1992 Earth Summit in Rio de Janeiro was a major event and a major step forward for the protection of the environment, nature and natural resources. The most important outcome from a business and environmental management point of view was probably the endorsement of the notion of – or the concept of – *sustainability* itself. This meant first of all a commitment to run private business in a way that keeps it within the carrying capacity of the Globe, and doing so in a way that does not limit the opportunities for coming generations compared to our living conditions [Brundtland Commission, 1987].

The second outcome of profound influence on private business is the Convention on Climate Change in 1992, followed by the Kyoto Protocol from December 1997 and the subsequent international agreements and treaties on the climate change issue. This sets limits on the combustion of fossil fuels to reduce the discharge of CO₂, and put constraints also on a few other so-called "greenhouse-gases".

While the climate issue is allocated immense attention, although the concrete results at the global level in terms of firm and accepted limitations are until now very limited, less effort and resources are assigned to the issue of sustainability and achieving sustainable production in all sectors. That probably has to do with the very wideranging consequences of sustainability in combination with the widespread uncertainty and confusion about what sustainability really means – to a company and to a sector. The very significant amount of literature and discussions on the issue is therefore not yet reflected in concrete and substantial initiatives that are beyond the concepts of eco-efficiency, Decoupling and Cleaner Production mentioned above. They are seen as representing the entrance to the *fourth era of environmentalism*, and they are embracing more of the elements, characterising this fourth Era. This includes elements like *Zero Waste* ambitions, *Holistic/System thinking*, *Industrial Ecology and Technology Transfer* and *Vision on Sustainability*. This goes hand in hand with or implies that environmental issues are increasingly becoming an integrated part of corporate strategic management.

1.4.2 Sustainable Production and Consumption

A vision of *Sustainable Production and Consumption* was agreed on at the Ministerial Round Table in Oslo in 1995. The "add on" compared to CP and eco-efficiency is the comprehensiveness and the encompassing of the entire commercial system and its interrelations.



Figure 1.3 The World Summit on Sustainable Development (WSSD) in Johannesburg 2002. At the conference sustainable production and consumption became a main topic, and was part of the Plan of Implementation, the main document from the final session, shown here. (Photo: IISD/ENB Leila Mead)

The 2002 Earth Summit in Johannesburg confirmed the commitment to sustainability, but did not add much to that part of the global dialogue and mutual obligations. It seems, however, that it has boosted the activity on corporate *Sustainable Development Reporting* for the enterprises. It can be seen partly in relation to the *Social Responsibility Reporting* and partly as a continuation of the reporting in relation to an EMAS version of EMS and the *Green Accounting* report, which is mandatory in some EU-countries.

1.5 Managing Hazardous Production Facilities

1.5.1 Responsible Care

At the close of the section focusing on the business side – and business side constraints – of the protection of the environment, the *Risk Management* Issue related to hazardous production sites should be mentioned. It is an important issue, first of all for people and neighbourhoods, often in third world countries, but sometimes also with a much more wide-ranging impact. It is a different type of issue compared to that of sustainable industrial development. Where the latter is dynamic, process-oriented and revolving, hazardousness is a one-off, static event, even if it might have long-term effects.

A decisive event in getting this issue on the agenda was the Bhopal catastrophe. The US Chemical Giant *Union Carbide* had placed a chemical factory in Bhopal in India, producing methyl isocyanate as an intermediate in a biocide production. In December 1984 some 60,000 litres of this very dangerous compound was accidentally released into the air over the town, causing immediate death of some 1,500 people and injuring thousands more, including blinding a huge number of people. It was a wake-up call regarding the risks and corporate negligence, of the magnitude of what Pearl Harbor was for the US in the Second World War. There had to be immediate and profound changes in corporate environmental practices and risk management.

The chemical industry reacted quickly with the Canadian Chemical Producers Organisation moving first and launching a *Responsible Care* programme, which is still in existence and now comprises chemical industries in more than 40 countries, including all major producers. The programme has been developed and expanded and matters like the application of the precautionary principle to the chemical industry have been taken up in recent years. At the heart of the Responsible Care programme is still the risk management issue, which the Bhopal disaster exposed was lacking in 1984.

Box 1.5 The Responsible Care Initiative

The Guiding Principles of the Responsible Care Programme

Our industry creates products and services that make life better for people around the world — both today and tomorrow. The benefits of our industry are accompanied by enduring commitments to Responsible Care® in the management of chemicals worldwide. We will make continuous progress toward the vision of no accidents, injuries or harm to the environment and will publicly report our global health, safety and environmental performance. We will lead our companies in ethical ways that increasingly benefit society, the economy and the environment while adhering to the following principles:

- To seek and incorporate public input regarding our products and operations.
- To provide chemicals that can be manufactured, transported, used and disposed of safely.
- To make health, safety, the environment and resource conservation critical considerations for all new and existing products and processes.
- To provide information on health or environmental risks and pursue protective measures for employees, the public and other key stakeholders.
- To work with customers, carriers, suppliers, distributors and contractors to foster the safe use, transport and disposal of chemicals.
- To operate our facilities in a manner that protects the environment and the health and safety of our employees and the public.
- To support education and research on the health, safety and environmental effects of our products and processes.
- To work with others to resolve problems associated with past handling and disposal practices.
- To lead in the development of responsible laws, regulations and standards that safeguard the community, workplace and environment.
- To practice Responsible Care® by encouraging and assisting others to adhere to these principles and practices.

Source: American Chemistry Council, 2004.

A key element of the programme is a *Code of Practice*, which in a few points, comprising all stages in the life cycle of a chemical product, gives the directions and the type of preparedness and precautions to be taken in relation to emergency situations, whether they occur during the production, during transportation or during the wholesaler/distributor's handling of the product. They require every facility to have detailed and elaborated instructions, procedures and emergency plans for all stages. The protective aspect is in the forefront throughout the Code, including the relation to the neighbourhood with which Community Awareness Programmes must be established.

1.5.2 The Seveso Directive

However important these measures are, the Responsible Care programme is first and foremost a programme for managing and protecting against risks to people, society and nature which poisonous and dangerous production can represent. As mentioned before, the perspective is thereby different compared to the CP, Eco-Efficient and Sustainability programmes, discussed above.

Problems with accidents in chemical factories, leading to dangerous discharges of chemical compounds or products had been experienced in Europe eight years earlier than the Bhopal event. Here it was an accident in which extremely toxic dioxin was released from the Icmesa factory in the town of Seveso in Northern Italy. No deaths were recorded, at least not immediately, but many people were affected, and vegetables and animals destroyed. It led to the so-called *Seveso Directive*, issued by the European Union in 1982, and therefore binding for all member states. A revised version of the directive, the *Seveso II Directive*, was issued in 1996.

The directive focuses on the chemical plant and its preparedness in case of emergencies and has a number of precautionary measures to be observed. It also establishes limits to the amount of the most dangerous chemical products or compounds at the site at any time. In Europe the Seveso accident led to a political intervention, setting compulsory or mandatory standards for that type of hazardous installations. In Canada and the US, the Responsible Care Programme and its Code of Conduct continues to be an important instrument for the chemical industry. These are different approaches, and represent a good set-off for taking a look at the historical development of environmental regulations.

Study Questions

1. Give some examples of how an uncontrolled use of limited resources has led to disastrous consequences such as destruction of the resource in old times and the present.
2. List a few early (around 1960's) environmental impacts and describe the first regulations implemented to deal with them.
3. Describe the shift from control of pollution to prevention and how it was motivated.
4. Explain the concept of the double dividend and how it was interpreted in a business context
5. Describe the origin, content and use of the eco-efficiency concept.
6. Describe the origin, content and use of the Cleaner Production concept.
7. Find out what decoupling means and how it can be measured.
8. What is the fourth era of environmentalism?
9. The Sustainable Consumption and Production concept was a key concern at the Johannesburg Conference. Describe its origin and what it stands for.
10. Risk management became a key issue after several serious industrial accidents. Explain what accidents and what measures were implemented to deal with each of them.

Abbreviations

BCSD	Business Council for Sustainable Development
BSD	Business and Sustainable Development
CEE	Central and Eastern Europe
CFC	Chloro Fluoro Carbon
CP	Cleaner Production
CT	Cleaner Technology
DDR	Deutsche Demokratische Republik (former East Germany)
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management Systems
EPA	Environmental Protection Agency
OECD	Organisation for Economic Co-operation and Development
PCB	Polychlorinated biphenyls
PPP	Pollution Prevention Pays (more often Polluter Pays Principle)
REACH	Registration, Evaluation and Authorisation of Chemicals
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
WBCSD	World Business Council for Sustainable Development

Internet Resources

[Pollution Prevention Pays programme of 3M](http://solutions.3m.com/wps/portal/3M/en_US/global/sustainability/s/governance-systems/management-systems/pollution-prevention-pays)

http://solutions.3m.com/wps/portal/3M/en_US/global/sustainability/s/governance-systems/management-systems/pollution-prevention-pays

[World Business Council for Sustainable Development](http://www.wbcds.ch/templates/TemplateWBCSD5/layout.asp?MenuID=1)

<http://www.wbcds.ch/templates/TemplateWBCSD5/layout.asp?MenuID=1>

[Industry Canada's Business and Consumer Site on eco-efficiency](http://strategis.ic.gc.ca/epic/site/ee-ee.nsf/en/Home)

<http://strategis.ic.gc.ca/epic/site/ee-ee.nsf/en/Home>

[UNIDO's Cleaner Production Homepage](http://www.unido.org/doc/4460)

<http://www.unido.org/doc/4460>

[UNEP Division of Technology, Industry and Economics \(DTIE\) Cleaner Production Activities](http://www.uneptie.org/pc/cp/home.htm)

<http://www.uneptie.org/pc/cp/home.htm>

The Eco-Management and Audit Scheme (EMAS)
http://ec.europa.eu/environment/emas/index_en.htm

Bhopal Information Centre
<http://www.bhopal.com/>

The Bhopal Medical Appeal
<http://www.bhopal.org/whathappened.html>

Seveso II Directive 96/82/EC on Chemical Accidents -
Prevention, Preparedness and Response
<http://ec.europa.eu/environment/seveso/index.htm>

Responsible Care® Programme
<http://www.responsiblecare.org/>

The BSD Global Guide: helping business to do better by
doing good
<http://www.bsddlobal.com>

Development of EU Environmental Regulation

2.1 European Environmental Cooperation

2.1.1 The Origins

Today the European Union plays a major role in environmental legislation in its member states. Many even consider this a main reason for the existence of the Union: Environmental concerns do not stop at national borders and thus requires international cooperation. At its beginning in 1957 the original constellation of states were, however, not at all concerned with the environment. This was typical for the first post WWII years. The early awareness of environmental impacts was about neighbourhood problems, and focussed on health, or some local nuisance upsetting people. What went beyond this, the notion of “environmental problems” as a complex and inherent issue in our societies, was not developed until the 1960’s.

In the US the start is dated to 1962, the year Rachel Carsons published her pioneering book, *Silent Spring*, documenting the environmental damage caused by early agricultural chemicals. The late 60’s and early 70’s saw the first USA environmental legislation starting with the National Environmental Policy Act in 1969. The establishment of the Federal Environmental Protection Agency in 1970 belongs to the legacy of that book [Fraenkel, 1998]. In Europe environmental concerns were widespread and established by end of the 60’s [McCormick, 2001; Gouldson and Murphy, 1998]. Several countries organised their governmental administrations to work with environmental protection around 1970. The Swedish Environmental Protection Agency (EPA) and the corresponding unit at the governmental office have been working since 1969. Poland created its Ministry for Territorial Management and Environmental Protection in 1972. But in most European countries such reforms came later. In Germany for example the corresponding Ministry was not created until 1986.

2.1.2 The First Pieces of Legislation

The original European Economic Community (EEC) was deeply rooted in the post Second World War military-strategic situation in Europe. Its creation should be seen as an effort to reduce the risk of war caused by division of economic power and weapons production. The so-called Common Market was thus a peace project among its original six members Belgium, the Federal Republic of Germany, France, Italy, Luxembourg and the Netherlands, all countries that had suffered from the

In this Chapter

1. European Environmental Cooperation
 - The Origins
 - The First Pieces of Legislation
 - The Paris Declaration
 - The First Environmental Action Programmes
 - A Formal Base for European Environmental Legislation
2. The European Union Environmental Policies
 - The Third and Fourth Environmental Action Programmes
 - The Single Market
 - Towards Sustainability – the Fifth EAP
 - Assessing the Fifth EAP
 - The Sixth EAP from 2002-2012
 - The Lisbon Agenda and the Strategy on Sustainable Development
3. EU Policies and the Surrounding World
 - EU and External Trade
 - EU Policies
 - EU in International Negotiations
 - The EU Enlargement to the East

war. French-German hostilities had caused the major European wars for more than two centuries.

The EEC thus did not have a mandate for environmental legislation, and the first pieces of legislation in the area had quite a different background and platform. The first legislation dealing with an environmental issue was a Euroatom directive from 1959 on protection of employees and the general public from radiation. The next actions were two directives on vehicle emissions and noise in 1970 and in 1972. The Union was at that time focusing on the creation of a larger common market, and the reason behind these first two pieces of legislation was efforts to prevent Germany and France from making a tougher regulation of their own, which might have created problems for Italian and Dutch car producers.

The tricky matter for EU in these early years of environmental regulation was the lack of any formal authorization in the Treaty of Rome for the EC/EU to act on environmental issues. Environmental regulation in the EU was then often referring to the “sweep all”- clause in the Rome Treaty, Article 235. Another reference was to Article 100, which gave the Council the right to issue directives to bring contradicting legislation in member states in line. Already then, therefore, the reasoning was, that environmental regulation could be used as a “hidden” protection against competition and therefore a barrier to free trade in the European market. The European Court supported the right for the Council of Ministers to use Article 100 as the base for harmonizing environmental law in the interest of the common market. Article 100 in the Rome

Box 2.1 Principles of EU Environmental Regulation

The European Union Treaty adopted in Nice (article 174 EC) has listed the basic principles of EC legislation. They are summarised here and further discussed in the chapters.

The Principle of Prevention:

“The best environment policy consists in preventing the creation of pollution or nuisances at source, rather than subsequently trying to counteract their effects. To this end, technical progress must be conceived and devised so as to take into account the concern for protection of the environment and for the improvement of the quality of life, at the lowest cost to the Community. This environment policy can and must go hand in hand with economic and social development, and also with technical progress.” (2nd EAP, but already mentioned in the 1st EA)

The Principle of Early Consideration of Possible Environmental impacts:

“The effects on the environment of all the technical planning and decision-making processes should be taken into account at the earliest possible stage. The environment cannot be considered as an external medium which harasses and assails man; it must rather be considered as an essential factor in the organization and promotion of human progress. It is therefore necessary to evaluate the effects on the quality of life and on the natural environment of any measure that is adopted or contemplated at national or Community level and is liable to affect these factors.” (2nd EAP, but expressed already in the 1st EAP. This principle later developed into the Environmental Impact Assessment, EIA, Directive))

The Polluter Pays Principle:

“The cost of preventing and eliminating nuisances must, as a matter of principle, be borne by the polluter. Howev-

er, there may be certain exceptions and special arrangements, in particular for transitional periods, provided that they cause no significant distortion to international trade and investment. Without prejudice to the application of the provisions of the Treaties, this principle should be stated explicitly and the arrangements for its application, including the exceptions thereto, should be defined at Community level. Where exceptions are granted, the need for the progressive elimination of regional imbalances in the Community should also be taken into account.” (2nd EAP, already mentioned in the 1st EAP)

The Subsidiarity Principle

“In each category of pollution, it is necessary to establish the level of action (local, regional, national, Community, international) best suited to the type of pollution and to the geographical zone to be protected. Actions likely to be most effective at community level should be concentrated at that level; priorities should be determined with special care.” (2nd EAP, already mentioned in the 1st EAP, Title II)

The Subsidiarity and Proportionality Principles

“The subsidiarity principle is intended to ensure that decisions are taken as closely as possible to the citizen and that constant checks are made as to whether action at Community level is justified in the light of the possibilities available at national, regional or local level. Specifically, it is the principle whereby the Union does not take action (except in the areas which fall within its exclusive competence) unless it is more effective than action taken at national, regional or local level. It is closely bound up with the principles of proportionality and necessity, which require that any action by the Union should not go beyond what is necessary to achieve the objectives of the Treaty. (Article 5 in the EU Treaty – referred to in EUROPA 2004)

Treaty thus remained as the platform for environmental legislation up to 1981.

2.1.3 The Paris Declaration

In the wake of the 1972 UN-Stockholm Conference on the Human Environment, the European Community Summit in Paris in October 1972, also including the three coming new member states, Denmark, Ireland and the UK, agreed on a statement which took cooperation between the member states beyond the economic and political spheres. It said:

“Economic expansion should be accompanied by environmental protection so as to achieve a genuine improvement of the quality of life.”

This statement recognises that the main aim of the EC – economic development – was not an end in itself and that the protection of the environment should be given more attention. The Commission was therefore asked to develop an environmental policy for the Community. In practical terms, the decision led to the establishment of a minor unit within the

Box 2.2 The First Environmental Action Programme, 1973-1976

Objectives:

- Prevent, reduce and as far as possible eliminate pollution and nuisances.
- Maintain a satisfactory ecological balance and ensure the protection of the biosphere.
- Ensure the sound management of and avoid any exploitation of resources or of nature which cause significant damage to the ecological balance.
- Guide development in accordance with quality requirements, especially by improving working conditions and the settings of life.
- Ensure that more account is taken of environmental aspects in town planning and land use.
- Seek common solutions to environmental problems with States outside the Community, particularly in international organizations.

Three categories of action:

- Action to reduce and prevent pollution and nuisances.
- Action to improve the environment and setting of life.
- Community action or, where applicable, common action by the Member States, in international organizations dealing with the environment.

Source: Council of the European Communities, 1973.

Commissions DG III to work on environmental issues, a Committee on the Environment in the European Parliament and a decision to ask the Commission to draft an EC Environmental Action Programme (EAP) [McCormick, 2001].

The Paris declaration thus constitutes the birth of a European-wide environmental policy.

2.1.4 The First Environmental Action Programmes

This first EC-EAP was ready and endorsed in November 1973 and the second EAP drawn up and adopted in 1977.

The problems with the Treaty’s legal authorization to actually turn the EAP into legislation persisted. A number of principles, still central to EU environmental policy, were reformulated from the first EAP and made more precise and operable, a version which has been standing ever since. Among these were the principle of early consideration of possible environmental impact to make prevention easier (a forerunner for the Environmental Impact Assessment, EIA, directive), the Polluter Pays Principle, Joint action by the EC-countries on the international scene, and application of the subsidiarity principle in applying pollution control.

Some of these principles were applied in the first directives, which were created in the period under the second EAP. Thus directives were issued on water quality, air quality (directive on limits to SO₂ and particulates, as well as a directive on lead concentration in the air), waste handling, labelling and packaging of dangerous substances, as well as regulating discharge of dangerous substances into surface waters.

2.1.5 A Formal Base for European Environmental Legislation

The first signs of change to a proper formal base for environmental legislation were seen in the early 1980’s. The first step came with some institutional changes within the European Commission in connection with Greece taking up EU-membership in 1981. On that occasion, the previous “environmental unit” got the status of a Directorate General in its own right, named DG XI and covering “Environment, Nuclear Safety and Civil Protection”.

Next step took place at the level of the EU-Treaty. The change of the treaty in 1986, *the Single European Act*, taking effect on 1st July 1987, gave the environment its “own” chapter in the Treaty, placed as Article 130R-T. This laid down the Community competence “to preserve, protect and improve the quality of the environment” as long it could be done better on the community level than on the level of member states (the so-called subsidiarity principle).

The 4th EAP was adopted in 1987 after the Single European Act with the *Chapter on the Environment* was agreed

upon. Now the Community institutions, the Council, the Commission and the Parliament for the first time had a specific and direct legal authority to act. This gave the Commission, which has the power to propose new EU-legislation, a clear and strong base for environmental policy-making, which it had lacked so far. Finally, from 1989 the DG XI had a portfolio, only on *Environment*, while until then, the portfolio also had included *Transport*.

Box 2.3 Important Dates in European Union History

1957	Belgium, (West) Germany, France, Italy, Luxembourg, the Netherlands of the European Coal and Steel Community decide to form an economic community (EU-6).
1957	Adoption of the Treaty of Rome; the European Economic Community, EEC, is formed.
1972	Declaration of Paris including the importance of environmental protection.
1973	Entry of Denmark, Ireland and the UK (EU-9).
1973	First EC-Environmental Action Programme (EAP).
1981	Directorate General of Environment, DG XI, formed.
1981	Entry of Greece (EU-10).
1986	Entry of Spain and Portugal (EU-12).
1987	Single European Market Treaty adopted.
1989	The fall of the Berlin Wall
1990	German Unification, Unified Germany in the Union.
1992	Single European Market into force.
1993	Maastricht treaty into force; this establishes the European Union.
1993	The Fifth EAP – Towards Sustainability
1995	Entry of Austria, Finland and Sweden (EU-15).
1997	Amsterdam treaty adopted.
1999	The European Single Monetary policy begins and the Euro is introduced.
2000	The Lisbon agenda for modernising the European economy is adopted.
2001	Adoption of the Treaty of Nice.
2001	A EU Strategy on Sustainable Development.
2001	The Sixth EAP – Our Future, Our Choice
2004	Entry of Estonia, Latvia, Lithuania, Poland, Slovakia, Czech Republic, Hungary, Slovenia, Cyprus, Malta (EU-25).
2005	Carbon Emission Trading Scheme starts
2007	Entry of Romania and Bulgaria (EU-27)
2007	The REACH Regulation implemented

See further: *The history of the European Union*
http://europa.eu/abc/history/index_en.htm

With these measures the platform for a common environmental policy and regulation had been created. In 1990 the European Environment Agency was established and, finally, placed in Copenhagen. The main purpose of the agency was to provide the Commission with systematic and reliable information on the European environment as a base for the Commission's policy making and prioritizing.

2.2 The European Union Environmental Policies

2.2.1 The Third and Fourth Environmental Action Programmes

The third EAP was adopted in 1983 and in this period the character of the regulation decided on started to show a more preventative and source-oriented approach. A more distinct feature was the notion of the need to make environmental concerns an integral part of all European Community policies. Lack of proper control in 1982 of hazardous waste from the Seveso-accident some years earlier made control of member state implementation a priority.

A directive of major importance from this period – and still in force as amended in 1997 – is the EIA-Directive, Directive 85/337/EEC of 27th June 1985. It is aimed at securing a comprehensive and holistic assessment of the likely or possible impact on the environment of major public and private projects as a precondition for authority acceptance of the project. A key element in the directive is the involvement of the general public by mandatory public hearing procedures prior to decision-making.

2.2.2 The Single Market

The changes in the 1987 treaty on the Single European Market were, of course, mostly concerned with the provisions needed for establishing the single market for goods, service, capital and people. The major new element to that end was the introduction of the Qualified Majority Voting (QMV), included in Article 100 A (now Article 95), to be used on all issues, related to making the single market work. This had major influence also on the environmental policy making in EU. Article 100 A in section 3 stated that all Commission proposals on measures to further the internal market related should be based upon a "high level of protection" of health, safety, environment and the consumer. It meant a high degree of integration of environmental concerns into all important policy areas. The QMV-system was introduced into environmental policy with the Environmental Chapter of the Treaty only with the Maastricht Treaty of 1992.

The purpose of the Single Market project and the use of Article 100 A was to promote trade, competition and economic growth within the EU. This raised mixed feelings on the side

of environmentalists. A clash between environmental concerns and trade promotion was inevitable on many occasions. The trade and economic perspective prevailed as the single market was top-priority these years. Although the problem and the contradictions in many cases were not solved, Section 3 of Article 100 A was still an important element in this process of substantial policy development within the EU. It combined the integration principle with a demand for a high level of environmental protection.

The relative success on the side of the environment of this concept is indicated by the fact, that the “opt-out clause”, established in Article 100 A, section 4 never played any major role and today is hardly referred to. The clause made it possible for a country to “opt out” of a piece of policy-making related to the internal market, with environmental policy implications. If the country cannot accept the EU regulation due to higher environmental standards in that country in this particular area they can refuse. The key requisite to use the

clause is the provision of scientific evidence, supporting the national policy. It has become clear over the years that the EU, compared to the national level, actually is an environmentally “progressive” forum for policy making. The integration in the Union has gone very far due to the internal market. This makes separate, more environmentally advanced or progressive policies in one or two countries difficult, as trade organisations will point to loss of competitive strength.

In an introductory note, the Commission presents the new (4th) EAP with the following reflections:

“It is no longer seriously contested that environmental protection policy has a central part to play in the whole corpus of Community policies and that environmental protection needs to be taken into account as a fundamental factor when economic decisions are taken. Continuing – and in many cases growing – problems of environmental deterioration have convinced the Commission that the establishment of strict standards for environmental protection is no longer merely

Box 2.4 The Third Environmental Action Programme, 1982-1986

Objectives:

Integration of the environmental dimension into other policies.

Environmental impact assessment procedure

Reduction of pollution and nuisance if possible at source, in the context of an approach to prevent the transfer of pollution from one part of the environment to another.

Combating atmospheric pollution

Reduction of NO_x, heavy metals and SO₂ inter alia by implementing council directive 80/779/EEC of 15 July 1980 on air quality limit values and guide values for sulphur dioxide and suspended particulates (5)

Combating fresh-water and marine pollution

Implementing council directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the community (6) and council directive 78/176/EEC of 20 February 1978 on waste from the titanium dioxide industry (7).

The action programme of the European Communities of 26 June 1978 on the control and reduction of pollution caused by hydrocarbons discharged at sea (8).

Combating pollution of the soil

Environmental protection in the Mediterranean region, paying particular attention to the specific aspects of that region when giving practical application to the action programme.

Combating Noise pollution

Reduction of noise pollution caused by means of transport.

Combating transfrontier pollution

Dangerous chemical substances and preparations; e.g. the supplementing and application of council directive 79/831/EEC of 18 September 1979 amending for the sixth time directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances (9).

Waste management

including treatment, recycling and re-use and in particular toxic and dangerous waste, including transfrontier transport of such waste and the review of the list of toxic or dangerous substances and materials in the annex to council directive 78/319/EEC of 20 March 1978 on toxic and dangerous waste (10).

Clean technology

Encouraging the development of clean technology, e.g. by improving the exchange of information between member states.

Others

Protection of areas of importance to the community which are particularly sensitive environmentally.

Cooperation with developing countries on environmental matters.

Action specific to certain industrial sectors and to energy production.

Source: EurLex, Official Journal C 46, 17/02/1983.

Box 2.5 The European Union Institutions and EU Environmental Policy

The *institutional structure* of the Union has developed over its entire history, but four institutions have been and are fundamental. These are the European Council, the European Commission, the European Parliament and the Court of Justice. The division of power between these is important for the function of the Union. It has, however, changed considerably over the years. The EU or EEC institutions should not be confused with other European institutions. Of special importance is the Council of Europe, which was formed in 1949 by ten original member states. It has been a forum for political debate and most importantly protection of human rights.

The EU headquarter in Brussels

The *headquarters* of the Union has since its origin been placed in Brussels. This is quite symbolic for a union whose original task was to bridge the Germanic and Roman cultures of Europe. Brussels is bilingual, and half of its population speaks French and the other half Flemish, a fact which has caused many conflicts over the years. An exception is the location of the European Parliament which is divided and the meetings take place partly in Brussels and partly in Strasbourg.

The European Council

The *European Council* is the meeting of the acting and elected heads of government. In most countries this is the Prime Minister, but in France, the constitution makes the President the acting head of government. European Council meetings take place once in each six months period with extra meetings called in between when need may be. These meetings are hosted by the country chairing the council, that is, the member state having the *presidency* of the Union.

The highest, formal decision making body of the Union is *The Council of Ministers*. The so-called general council consists of the ministers of foreign affairs of the members states. All the other ministers, including the ministers of environment, have their own council meetings to discuss and decide on matters in their field of competence.

The Union and its member states

The division of power between the Union and its member states is crucial, and has been debated all along. In practice it is not possible to overrule a member state in important issues. In the 1970's the Council took a decision to this effect, which has continued to be valid. After the enlargement of the Union in the 1990's, unanimity in all issues has not been realistic any longer and the "veto" of individual members is limited to issues of crucial importance to the members. In addition there is a principle of not regulating an issue on the Union level if it is better to do so on the national level. This principle of *subsidiarity* has been practiced since the 1980's.

The *Qualified Majority Voting* system in case of disagreement meant overruling one or more countries within the single market clause. Therefore an "escape" or "opt-out" clause was established for environmental issues within the single market decision-making area. This was used if a country had e.g. a special regulation on use of a certain chemical and that national regulation now was conflicting with a new piece of EU-regulation. Then that state could maintain its regulation, if the Commission could endorse, that the regulation was considered not to be "hidden" restrictions on the "free movement of goods" within the EU. Use of this clause is therefore very restricted and never had any real influence, as member states were very reluctant to test the limits.

The clause is still there but no longer has the same political position, as the QMVoting since 1992 has applied also to environmental policy decisions in the EU.

The Commission

The European Commission is the executive office of the Union. It is run by a President, who presently is the former Portuguese Prime Minister José Manuel Barroso, and the commissioners. From 2004 the Commission has been made up by one commissioner from each member state.

The Commission is assisted by a civil service made up of 17 *Directorates General* (DGs), one for each specific policy area, and 21 *services* (for such issues as budget, translations etc), These are mainly based in Brussels and Luxembourg. The DGs together have several thousand employees.

The DG Environment, DG XI

The DG Environment is based in Brussels and has around 550 employees. The Commissioner for the DG Environment is Stavros Dimas from Greece. The organisation of the DG consists of – in addition to the office for the Director-General – the following seven offices, called directorates:

- Directorate A: Communication, Legal Affairs & Civil Protection.
- Directorate B: Protecting the Natural Environment.
- Directorate C: Climate Change & Air.
- Directorate D: Water, Chemicals & Cohesion.
- Directorate E: International affairs & LIFE.
- Directorate F: Resources.
- Directorate G: Sustainable Development & Integration.

DG Environment has, as the other DGs, a detailed homepage where updated information can be found. See: <http://ec.europa.eu/dgs/environment/directory.htm>

The European Parliament

The *European Parliament* is elected by the inhabitants of the member states in direct elections each five years. Today there are 785 members of parliament representing



Figure 2.1 European Parliament. *First session in Strasbourg.* (Credit © European Community, 2007)

492 million citizens in the 27 member states (in 2007). The election to the parliament takes place every five years. The last election was run in 2004 and the next will be 2009.

The European Parliament has since the dramatic changes in 1999 in the Commission strengthened its status and has the right to review, and has to accept, the legislation of the Union. Its influence thus is important in the field of Environment. It is also taking initiatives to new legislation.

The members of the European Parliament, MEPs, organise themselves in groups according to traditional political divides. The groups are e.g. the European People's Party (Christian Democrats), which presently is the largest group, the Socialist Group, presently the next largest group, the Alliance of Liberals and Democrats for Europe, and so on.

The European Court

The European Court of Justice, ECJ, judges on matters of interpretation of European Union law. ECJ consists of 27 Judges and 8 Advocates General. Most common cases are the Commission's claims that member state has not implemented a EU Directives, and member states' claims that the Commission has exceeded its authority. During 2005, ECJ treated 798 cases on environmental law. A 2007 example is when the Commission took Poland to court over a road construction in a nature-protected area in Augustow in North-east Poland.

European Union agencies

The European Union has a number of institutions for various technical and other purposes. A Community *Agency* is a body governed by European public law set up by an act of secondary legislation. The present 28 EU agencies were set up to accomplish very specific technical, scientific or managerial tasks, such as to promote environmen-

tal protection, transport safety and multilingualism. They span Europe – Dublin to Stockholm, Warsaw to Lisbon – providing services, information and know-how to the general public. With more than 2,500 staff and significant budgetary resources, the agencies and their activities have become central to the operations of the EU and play a key role in the implementation of its policies.

The *European Environment Agency* is the EU body dedicated to providing sound, independent information on the environment. It is the main information source for those involved in developing, adopting, implementing and evaluating environmental policy, and also the general public. It is located in Copenhagen. The EEA provide information and assessments of the state of the environment and trends in it, together with pressures on the environment and the economic and social driving forces behind them. It also covers policies and their effectiveness and possible future trends and problems using scenarios and other techniques (from the EEA website).

To collect information the EEA has created the European environment information and observation network (Eionet). The Eionet works in close cooperation with national environment agencies, environment ministries or corresponding institutions in the member countries. It is responsible for coordinating national networks involving about 300 institutions in all. To support data collection, management and analysis EEA has in addition established and work closely with five European topic centres covering water, air and climate change, nature protection and biodiversity, waste and material flows, and terrestrial environment.

The European research institutions

European Union legislation is developed using a considerable arsenal of research. Some of this is published data but the Union also has its own organizations. The Commission's Directorate-General for Research has established a *Joint Research Centre* (JRC) to support EU policy makers in the conception, development, implementation and monitoring of policies to tackle trans-national and global problems.

The JRC has seven different institutes in five separate sites in Belgium, Germany, Italy, the Netherlands and Spain: Especially relevant for environmental legislation is the Institute for Environment and Sustainability, in Ispra Italy, the Institute for Energy (IE), and the Institute for Prospective Technological Studies (IPTS) both in Seville, Spain. The main centre is in Ispra in north Italy.

The *European IPPC Bureau*, housed in Seville, has the task to catalyse an exchange of technical information on best available techniques under the IPPC Directive 96/61/EC. This information is used to create reference documents (BREFs). These must be taken into account when the competent authorities of Member States determine conditions for IPPC permits.

an option; it has become essential. Moreover, the Commission is also convinced that, when account is taken of the growing public demand for improved standards of environmental protection and for environmentally friendly goods – both within the Community and worldwide – Community industry will not be successful unless it increasingly gears itself towards the meeting of such standards and the production of such goods. High standards of environmental protection have thus become an imperative – and an economic imperative at that.” [Official Journal C 328, 07/12/1987 / P. 01-44]

2.2.3 Towards Sustainability – the Fifth EAP

The title of the 5th EAP, taking effect on the 1st of February 1993, shows yet another shift in the political context and the agenda, set for the environmental policy making. The single most influential factor is the publication in 1987 of the Brundtland Report *Our Common Future*, which was initiated to form the background for the planned 1992 Earth Summit in Rio de Janeiro, Brazil. That summit was planned as the 3rd Summit on the Environment, held every 10 years with the first being held

in Stockholm in 1972. There was an extensive planning process prior to the Rio Summit and the results were by far the most concrete and far reaching yet on the Environmental and nature resource issues. The key concept, stemming from the Brundtland Report and prevailing across all discussions were the notion of “Sustainability/Sustainable Development”.

The relation of the 5th EAP to the Rio Summit is clearly stated:

“The fifth environmental action programme was produced as the Community’s main response to the 1992 Rio Earth Summit which called on the international community to develop new policies as outlined in Agenda 21, to take our society towards a sustainable pattern of development. The programme was to start this process within the Community, identifying objectives which required action at Community, national and local levels. Central to the programme was the recognition that environmental legislation in itself is not sufficient to improve the environment. Developments in areas that create environmental pressures, such as transport, energy or agriculture often outweigh the benefits of new regulations. Economic activities therefore

Box 2.6 The Fourth Environmental Action Programme, 1987-1992

With the 4th EAP the political context changed, to the Treaty of Rome. This changed EU Environmental Policy fundamentally. From the 4th EAP we quote:

The Council of the European Communities

recalls that the Single European Act lays down that:

- action by the Community relating to the environment shall be based on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source, and that the polluter should pay,
- environmental protection requirements shall be a component of the Community’s other policies,
- within their respective spheres of competence, the Community and the Member States shall cooperate with third countries and with the relevant international organizations;

Whereas it is necessary, in accordance with the Treaty as amended by the Single European Act, to avoid the adoption by the Member States of divergent measures likely to bring about economic and competition distortions in the common market;

recalls, finally, that:

- the Commission, in its proposals on health and environmental protection, takes as a basis a high level of protection as laid down in the relevant provisions of the Single European Act;

recognizes that:

- the protection of the environment can help to improve economic growth and facilitate job creation;

welcomes

- the Commission’s intention of working closely with industry, trade unions and interested non-governmental organizations in the drawing-up and implementation of environmental policy and programmes;

underlines

- the particular importance it attaches to the implementation of the Community legislation and

invites

- the Commission to review systematically the application and the practical effects of existing Community policy and to provide regular reports on this to the Council and the European Parliament so that an assessment of the effectiveness of such a policy can be made and, inter alia, useful guidelines for future proposals determined;

declares

- that, in view of the foregoing, and on the basis of past achievements, it is important for Community action to concentrate on the following priority areas while observing the respective powers of the Community and the Member States (a list of areas follows).

Source: European Union, (1987)

have to take better account of environmental objectives in addition to a strengthening of environmental policy. This requires commitment by societal stakeholders and citizens as well as by the Member States and regional and local authorities. A broader range of instruments should provide information, incentives and support with a view to influencing decisions which affect the environment. In order to focus action, the fifth programme identified a number of environmental priority themes and objectives up to the year 2000, and pointed to five key sectors with an important impact on the environment and to which particular attention should be given in terms of integrating environmental concerns.” [Global Assessment, Preface, p. 7]

2.2.4 Assessing the Fifth EAP

A number of very important directives were decided upon during the period of the 5th EAP. In the context of this book first of all the IPPC-directive should be mentioned (Council Directive 96/61), together with the Council Regulation no. 1836/1993 on the EU-EMAS Scheme, amended and updated by Council and Parliament Regulation no. 761/2001 and with the Eco-labelling, Council Regulation no. 880/1992, amended and substantially updated by Council and Parliament Regulation no. 1980/2000.

The 5th EAP was put up for a thorough review by Parliament and Council decision in 1998, reiterating the approach and strategies used so far but underlining the need for more efforts put into the implementation of current regulation. The review should include a global assessment of the 5th EAP as a whole and use the opportunity to put forward proposals and ideas for policy objectives and priorities, relevant to meet the challenges in the – then – upcoming new millennium. In reality this part of the obligation meant a first input to a new, 6th EAP. The review with the global assessment of the 5th EAP *Towards Sustainability* was published in 2000 and the proposal for the 6th EAP in 2001.

The global assessment concludes, that the results have been visible and recognizable, e.g. in areas like reduction of trans-boundary air pollution, better water quality and phase-out of ozone depleting substances. At the same time there is still a lot of concern for the overall situation for the state of the environment and with pressures on the environment expected to grow even further in some areas in the years to come (EEA, State of the Environment Report), despite progress in some sectors like Industrial production:

“Less progress has been made overall in changing economic and societal trends which are harmful to the environment. The commitment by other sectors and by Member States to the programme is partial, and the patterns of production and consumption in our countries prevent us from achieving a clean and safe

environment and protecting the world’s natural resources. The outlook is that new environmental standards will not keep pace with the growing demand, for example, for transport, consumer goods or tourism. The perspectives are particularly bleak for climate change if trends in the main energy-consuming sectors cannot be reversed. At the same time, it is increasingly clear that damages to the environment have costs to society as a whole, and conversely that environmental action can generate benefits in the form of economic growth employment and competitiveness.” [Global Assessment, p. 7, EU, Luxembourg 2000]

Box 2.7 The Fifth Environmental Action Programme, 1993-2000, Towards Sustainability

The objective of the 5th EAP is to set forward suggestions on solutions or prevention of environmental problems in the following areas:

- Climate change.
- Nature and biodiversity.
- Acidification and air quality.
- Urban environment.
- Coastal zones.
- Waste management.
- Management of water resources.

The programme furthermore outlines 5 especially important sectors in which action should be taken to deal with environmental issues in the above-mentioned areas:

- Industry.
- Energy sector.
- Transport.
- Agriculture.
- Tourism.

The suggested policy instruments in the programme could be subdivided into 7 overall instruments:

- Improvement of environmental data.
- Scientific research and technological development.
- Sectoral and spatial planning.
- The economic approach: Getting the prices right.
- Public information and education.
- Professional education and training.
- Financial support mechanisms.

The programme stresses that solutions can only be reached through a holistic approach, with the usage of several instruments, a combination of traditional regulatory instruments and market-based instruments.

Sources: European Commission 2003b; European Commission 2003c.

2.2.5 The Sixth EAP, 2002-2010

The lesson from the 5th EAP is first of all the need to see environmental policy in the wider context of environmental, social and economic objectives. They must be pursued in a coordinated and mutually compatible way. Only a holistic and comprehensive approach can realistically reach out for sustainable development. These will finally imply fundamental societal and economic changes, which cannot be brought about along the lines and within the trends pursued so far.

This is where the dichotomy between economic growth and accompanying increased material consumption, and sustainability surfaces again. Human or anthropogenic activity need to stay within the carrying capacity of nature at large, maintaining bio-diversity and avoiding depletion of crucial

Box 2.8 The Sixth Environmental Action Programme – Our future, our choice

According to the 6th EAP, environmental improvements are mainly needed in four areas:

- Climate change.
- Nature and biodiversity.
- Health and quality of life.
- National resources and waste.

To reach a solution or a minimisation of the environmental problems the European governments are facing, in the above mentioned areas, the programme outlines seven strategies for environmental improvement:

- Clean Air for Europe.
- Soil protection.
- Sustainable use of pesticides.
- Protection and conservation of the marine environment.
- Waste prevention and recycling.
- Sustainable use of natural resources.
- Urban environment.

The programme underlines that environmental problems should be dealt with in a holistic approach, with the focus on cooperation between government, industry and other stakeholders. A holistic approach is necessary, due to the number of stakeholders and the complexity of environmental issues. Continued efforts of integrating environmental concerns into regulation of the economic sectors and the effective application of the “polluter pays” principle and full internalization of environmental costs onto polluters are closely inter-linked and remain key priorities.

Source: European Commission, 2003a.

natural resources. The difficulty is, that demands for changes to make this possible unavoidably become in essence political. Still, short of sustainable development, much improvement in the protection of the environment have been achieved by means of the policy and the regulation based on that.

This holistic or integrated approach to the environmental problems was further developed in the 6th EAP (Box 2.8). According to the 6th EAP, environmental improvements are mainly needed in four areas:

- Climate change.
- Nature and biodiversity.
- Health and quality of life.
- National resources and waste.

In all these areas forceful legislation has developed since it was adopted in 2003. The climate change is pursued through the implementation of the Kyoto protocol, and emission trading introduced in 2005, Concern for biodiversity through the development of the Natura 2000 programme, Health aspects through the REACH Regulation implemented adopted in December 2006 after a long period of negotiation, and Resource and waste management through a series of measures to make the Union a recycling society, especially by improved waste management.

2.2.6 The Lisbon Agenda and the Strategy on Sustainable Development

The development of environmental protection has, however, in the first years of the 21st century, been competing with other policies. Foremost of these is the Lisbon Agenda. In March 2000, EU leaders in Lisbon adopted a ten-year programme aimed at revitalising growth and sustainable development across the Union. The Union “set itself a new strategic goal for the next decade to become the most competitive and dynamic

The EU Environmental Action Programmes

First Environmental Action Programme 1973-1976

Second Environmental Action Programme 1977-1981

Third Environmental Action Programme 1982-1986

Fourth Environmental Action Programme 1987-1992

Fifth Environmental Action Programme 1993-2000
Towards Sustainability

Sixth Environmental Action Programme 2001-2010
Our Future, Our Choice



Figure 2.2 European Commission. *Meeting of the 27 Commissioners.* (Credit © European Community, 2007)

knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.”

The Lisbon agenda had four parts: economic, social, environmental renewal and sustainability. In reality the economic development dimension of the Lisbon Agenda definitely has got the upper hand. In face of a weak economic development in the old EU European Commission President José Manuel Barroso announced in February 2005 a relaunch of the Lisbon Strategy as a “Partnership for Growth and Jobs”, simplifying targets and reporting procedures, and with a single National Reform Programme (NRP) for each country.

Many warned that the targets on social policy and the environment were taking a back seat, in the push to make Europe more business-friendly.

In parallel the Commission worked out a strategy to support the Sustainable Development goal. This was launched in May 2001 in Gothenburg, Sweden, as “A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development”. The strategy identifies six unsustainable trends on which action needs to be taken, in many ways confirming the 6th EAP. The strategy lists a range of specific measures

at EU level to attain these objectives. These measures were updated and developed in the 2005 strategy review. They included measures

- To break the link between economic growth and use of resources.
- To halt the loss of biodiversity by 2010. The EU will have to promote sustainable production and consumption and ensure effective protection of biodiversity, particularly through Natura 2000.
- To break the link between economic growth and transport growth and do more to develop environmentally friendly transport. The share represented by road transport in 2010 should not be higher than in 1998. The strategy envisages, among other measures, infrastructure charging, and promotion of alternatives to road transport and less polluting vehicles.

The revised strategy also covered the combat of social exclusion and poverty and mitigate the effects of an ageing society, fight against world poverty, particularly by increasing the amount of aid provided to less favoured countries, improving the cohesion and quality of development aid policies and promoting better international governance.

2.3 EU Policies and the Surrounding World

2.3.1 EU and External Trade

The 1992 Maastricht treaty now had a separate chapter on the environment (chapter 7), but the single market establishment still had a substantial, although indirect, influence on environmental policy making in the EU. Technical standards and specifications as well as the definition of what is to be considered as goods and what is not, was decided upon under the umbrella of the single market to secure the harmonization of trade conditions for the largest possible amount of goods.

The priority was the single market, and therefore trade considerations would most often prevail over environmental considerations concerning a given type of products, if there was a clash between the two. However an additional interesting aspect is that requirements on material and goods sold in the Union are influenced by requirements established by the Union. This is most clear when a number of major companies in the Union have adopted the policy that providers should be environmentally certified.

The REACH Regulation, which will be implemented in 2007, will also lead to substantial consequences for trade partners outside the Union. All imported chemicals above a certain tonnage will have to be registered and assessed according to the Directive.

2.3.2 EU Policies

The policy comes from EU and takes effect first of all but not only within the EU-member states. The EU influences the whole European region and due to its size and strength also influences the global discussion and rule making on issues like climate change and protection of bio-diversity. The very successful EU environmental policy and legislation was at first seen as “pushing around” private business and other private interests, threatening European competitiveness and thereby economic viability of important companies and whole industrial sectors. Areas here are the IPPC and the EMAS regulation the environmental impact of industrial processes and sectors like automobiles, parts of chemicals (pesticides, biocides and ozone depleting substances), pharmaceuticals in animal production and food etc. Along this way much of this policy has been accepted and turned into economic benefits by improving internal company management of resources and waste.

The policy has also had technology implications. New areas of business have been opened up to serve and supply the technology and the products needed to achieve these aims. We have the so-called “win-win” situation for environmental regulation, paying back for the regulated entities. But that is not – and cannot be made the case – in all areas. There will also be

regulations not able to pay back for the regulated. Prevention as the main approach to reducing environmental impact is then not possible. The discharge-oriented regulation with “end-of-pipe” handling of resulting pollution is crucial in these cases and will also contribute to reducing costs.

2.3.3 EU in International Negotiations

The Union has developed in a world, which has become more and more interdependent on many issues including the protection of the environment. The global environmental issues have been mostly the domains of the United Nations. In relation to the UN the European Union has for quite some time taken a rather proactive role, pushing the development towards better regulated environmental matters and hopefully a better world. Important areas include international conventions, e.g. those on climate change, biodiversity protection, international waste trade, air pollution, etc. Thus the EU Birds Directive has its parallel in the Ramsar Convention. The directive on air pollution and the large power plants has its corresponding regulation in the the United Nations Economic Commission for Europe, UNECE, Convention on Long Range Transboundary Air Pollution, to which EU is a partner.

The European Union has in international negotiations been acting as one partner. In this way the Union has a considerable influence in global contexts. It has been especially clear in the Climate Convention and negotiations on implementation of the Kyoto Protocol.

2.3.4 The EU Enlargement to the East

In addition it should be mentioned, that implementation of – current and future – regulation into the regulation of the member states remains a high-priority area – and should be reinforced with more tough and effective follow up on member state compliance by the Commission. The accession of ten new member states in 2004, and two more in 2007 makes implementation a very important task anyway, as these countries have very substantial changes to make in the field of environmental protection. In addition the three countries of the European Economic Area (EEA) – Iceland, Liechtenstein and Norway – have agreed to implement almost all of the EU legislation.

The implementation of the European Union environmental policies in the new Member States in Central and Eastern Europe have, since 2004, been and still is a major task for the Union. It is supported by very substantial economic programmes. The most important are the structural funds, the LIFE programme and the so-called Norwegian Financial Mechanism – funding from the three EEA countries – together providing several hundred billion Euros for the period up to 2013.

Study Questions

1. Give a short description of the origin of the European Union and describe the motives behind its formation 50 years ago.
2. Explain how the environmental issues entered the agenda of the Union. List a few key dates and policy initiatives.
3. List the most important principles behind environmental legislation in the Union.
4. Describe the policy behind the Single European Market, when it was implemented and its consequences for EU environmental legislation.
5. Describe the enlargement of the Union and give years for the accession of the countries in the Baltic Sea region. How many countries are today adopting EU legislation?
6. Explain the meaning of the connotation 85/337/EEC.
7. Explain how disagreements on environmental legislation are managed in the European Council, especially if or how unequal standards of environment are accepted. What is the QMV and when can it be used.
8. Make a diagram of the European Union institutions and how they related to each other in the field of environmental legislation.
9. Describe the changes and new features introduced in EU environmental policy and legislation in connection with the fifth EAP in the mid 1990s. Describe in particular the Framework Directives and Integrated Permits.
10. Describe the changes and new features introduced in EU environmental policy and legislation in connection with the sixth EAP at the turn of the century 2000. Describe in particular the four priority areas, and how they have been addressed, and the seven strategies for environmental improvements. (See also the Section on European Union Environmental Legislation at the end of the book).
11. Outline how the European Union has become a main partner in a number of global organisations and partner to several global environmental conventions. In what way are these implemented in the Union and its Member States? (See also the Section on European Union Environmental Legislation at the end of the book).

Abbreviations

BREF	Best Available Techniques Reference Document
EAP	Environmental Action Programme
EC	European Community
EEA	European Environment Agency
EEC	European Economic Community
EIA	Environmental Impact Assessment
Eionet	European environment information and observation network
EMAS	Eco-Management and Audit Scheme
EMU	European Monetary Union
EPA	Environmental Protection Agency
DG	Directorate General
IE	Institute for Energy
IPPC	Integrated Pollution Prevention and Control
IPTS	Institute for Prospective Technological Studies
JRC	Joint Research Centre
MEP	Member of the European Parliament
QMV	Qualified Majority Voting
REACH	Registration, Evaluation and Authorisation of Chemicals
WWII	Second World War

Internet Resources

European Union official web portal (English version, all EU languages available)

http://europa.eu/index_en.htm

The History of the European Union

http://europa.eu/abc/history/index_en.htm

Website of the European Parliament

<http://www.europarl.europa.eu/>

Website of the European Commission

http://ec.europa.eu/index_en.htm

Website of DG Environment

http://ec.europa.eu/dgs/environment/index_en.htm

Activities of the European Union environment

http://europa.eu/pol/env/index_en.htm

Title XIX Chapters 174-176 of the European Treaty concerning Environment

http://eur-lex.europa.eu/en/treaties/dat/12002E/htm/C_2002325EN.003301.html#anArt175

EU legislation in force on environment

http://eur-lex.europa.eu/en/repert/index_15.htm

(See also an extensive collection of links in the Section of EU Environmental legislation)

Fifth Environmental Action Programme

<http://ec.europa.eu/environment/actionpr.htm>

Sixth Environment Action Programme

<http://ec.europa.eu/environment/newprg/index.htm>

Are Environmental Management Systems Sufficient?

3.1 Management Systems and Self-regulation

3.1.1 Reasons for Self-regulation

Increased pressure from stakeholders has led to increased company awareness of the environmental impacts of their production activities. Serious incidents in e.g. the chemical and petrochemical industries have underlined the potentially very high risk for the environment of some types of production. In addition it has become clear that an ever increasing production in volume and use of material makes over-exploitation of natural resources likely, and a dramatically increasing waste problem certain. The implications of these trends have been widely understood among company managements and a number of different initiatives have been taken. The introduction of environmental management systems is one of the most important of these voluntary initiatives.

Along with the growing awareness of the environmental impacts of industrial activity, a shift has developed in the understanding of where the solutions were to be sought. In short, that shift can be characterized as a shift from dilution and end-of-pipe treatment, i.e. output-oriented measures, to reduction and prevention of (negative) environmental impacts occurring in the first place, i.e. input-oriented measures. This has happened over the last 15-20 years alongside with intensified discussions on the notion of sustainability.

The shift has at the same time changed focus for the solutions from technical installations to managerial responsibilities. Prevention and reduction of impact imply integration of the measures to be taken into the comprehensive decision-making on production planning and process control. Thereby, it becomes an integrated part of key management responsibilities.

In this Chapter

1. Management Systems and Self-regulation
 - Reasons for Self-regulation
 - A Variety of Environmental Management Systems
 - The Nature of the EMS
2. Steps in Introducing an Environmental Management System
 - Initial Environmental Review
 - Environmental Policy
 - Assessing Potential Environmental Impacts
 - Planning
 - Implementation and Training
 - Checking, Corrective Actions and Management Review
3. Comparing the Management Systems
 - EMAS, ISO 14001 and the Green Network
 - The Objectives of EMAS
 - Environmental Statements
 - A Comparison
4. The Experiences and Effects of Environmental Management Systems
 - The Insufficiencies of EMS
 - Is Continuous Improvement Actually Occurring?
 - External Verification by Independent Auditors
 - Studies on Environmental Performance and EMS
 - Correlations Between EMS and Environmental Performance
 - Environmental Management Systems and Compliance with Legal Regulations
 - The Positive Sides – Improved Overview and Financial Benefits
 - How to Ensure Improved Environmental Performance

3.1.2 A Variety of Environmental Management Systems

During the 1990's different managerial support systems were developed to handle this responsibility. The European Union EMAS scheme and the ISO 14000 series are the two lasting, international environmental management support system standards. In addition, there are environmental management schemes made by local or regional organisations and authorities, e.g. the Green Network in Denmark and the Stockholm City EMS for SME's in the City, as well as sector-oriented schemes like the chemical industry's Responsible Care Programme (Box 1.5, Chapter 1). These all play an important role in current company environmental management across the industrialised world. In 2005 the number of 14001 certificates approached 100,000 in the world, while the number of ISO 9000 certificates was 900,000. In 2004 the growth in the number of certificates was over 30%. It is thus becoming a very significant aspect of environmental work in all kinds

Box 3.1 EMS for Local Authorities and other Non-industrial Organisations

Environmental management system is mainly used in industry, but increasingly so also for local and regional authorities and their partial activities. This is very much needed. A local authority is often a very considerable activity. For example the six largest economies in Sweden are local and regional authorities. Only in 7th place do we find large industrial companies such as Ericsson, or Vattenfall.

Much work in a local authority is in the service sector such as child and elderly care and schools. But those activities also have a considerable environmental impact.

When Lund University carried out a complete environmental review it turned out that the material flows were of the same size as the largest industries in the city. But still these activities are not controlled to the same extent as for industries. There is no EIA, IPPC regulation nor licensing requirements, mostly because they are not generally perceived as environmentally problematic. Nevertheless they must, of course, abide by all applicable environmental regulations and the activities are quite often checked by environmental authorities.

A much more detailed treatment of the same issues is found in Book 4 in this series.

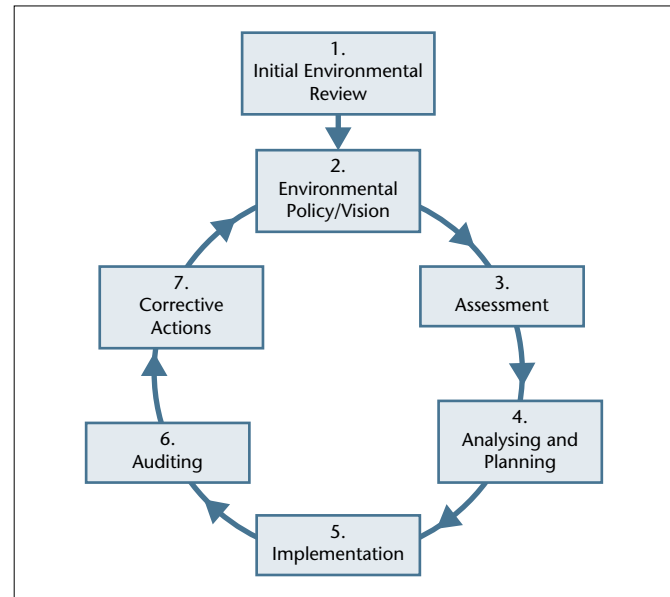


Figure 3.1 Environmental management. An Environmental Management System is a process which is repeated every 1-3 years. It consists of the 6 steps shown. When the system is first put in place an initial review is made.

of organisations, but most significantly in industry. Today it is standard to introduce the two systems together linked with a health and safety management system and make them an Integrated Management System (IMS). At the same time the number of companies having a certified EMAS scheme is going down slightly.

In this chapter we will focus on environmental management systems. We will ask whether these are sufficient to guarantee compliance with environmental law and regulations, or, if not, what role these management systems then might have in supporting legal compliance and good environmental performance. First, there is an introduction to environmental management systems and the elements included in such a system. Secondly, the environmental management schemes EMAS, ISO 14001 and Green Network are compared and discussed. Thirdly, there is an overview of experiences with environmental management systems in Europe – focussing on EMAS.

3.1.3 The Nature of the EMS

An environmental management system is a set of guidelines, which instructs workers and management how to prevent pollution, handle resources, and reduce emissions, waste and wastewater from the production. As shown in Figure 3.1, the equation is simple: Inputs equal outputs including products. In other words, input which is not a part of the produced products is transformed into waste, emission or wastewater, which can have a negative impact on the environment. Furthermore,

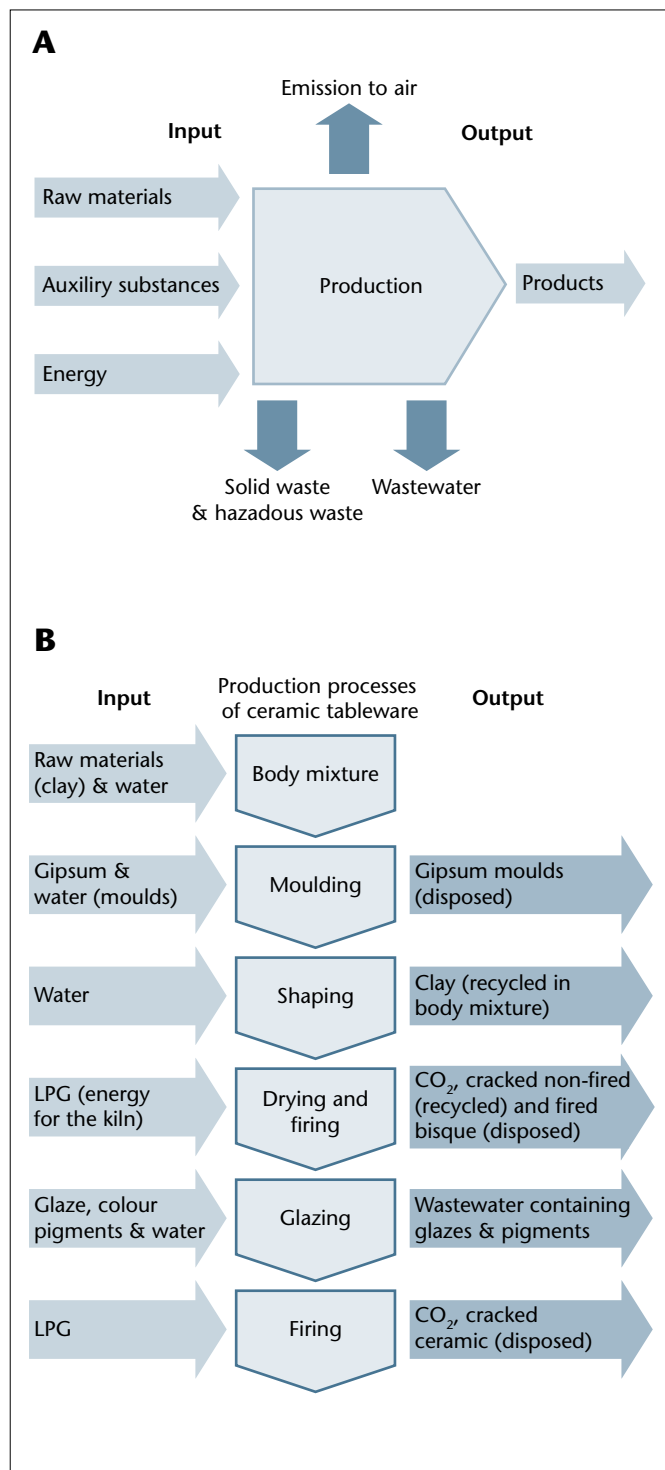


Figure 3.2 Environmental review. A. An environmental review of a company looks at all flows, that is input and output, and lists all emissions and other potential impacts. B. Input and output in ceramic production. Input of natural gas (LPG), gypsum, clay and water is turned into products, emissions (CO₂, wastewater etc), or is recycled. In this production energy use is one of the largest impacts.

reducing inputs by increasing resource efficiency generates cost savings for the company and makes some environmental investments feasible.

Environmental management is a continuing process in which the company sets up objectives, targets and action plans for the company's environmental state followed up by auditing and corrective actions. It should include all parts of the company and involve the whole staff and management to be fully implemented. Environmental management systems are by far most commonly used by industry but can be used by all kind of organisations, including public authorities and state and local government institutions like universities, schools, hospitals and within elderly care. In the following, the main elements and steps in environmental management systems are presented; the exact amount of steps and scope of each step varies from system to system.

3.2 Steps in Introducing an Environmental Management System

3.2.1 Initial Environmental Review

The first step is to make an initial environmental review of the organisation. The environmental review is an extensive accounting of all the environmental aspects concerning the organisation's activities, products and services. The term *environmental aspect* refers to anything, which may result in an actual environmental impact. This is the input and output of the organisation, e.g. the use of natural resources and raw materials (including energy); emissions to air; release to water; impact on surrounding communities (noise etc.); use and contamination of land; solid and other wastes (especially hazardous); transport; and risk of environmental accidents.

Figure 3.2 B shows, as an example, an overview of the input and output of ceramics production, which is a systematic approach to get an overview of the material flow in each process of the production. By adding the figures of the input and the output, the mass balance can be calculated. The mass balance can reveal which processes cause the most spillage. Combined with a screening of the environmental hazards of the output, this is an instrument that is able to point out the targets of the action plan.

The review must also contain information on the indirect environmental impacts of the activities of the organisation and the management structures in place to deal with these impacts. When health and safety aspects are integrated in the environmental management system, there will be further aspects to investigate, e.g. the risk of accidents, chemical exposure, occupational load, noise and vibration. Throughout such an inventory inexpedient procedures or use of materials in the company are often discovered.

3.2.2 Environmental Policy

Secondly an environmental policy should be written. The policy should reflect the environmental values of the organisation and contain its overall aims and principles as a basis for developing the environmental objectives and targets. The environmental policy is decided upon by the management of the company/organisation and should as a minimum be known by the employees and made available to the public. In more proactive organisations, the management will take into account the views of business partners, shareholders, employees and stakeholders when deciding the policy.

3.2.3 Assessing Potential Environmental Impacts

In the light of the environmental review, the organisation assesses the emissions and ranks them by their potential environmental impacts. There are different assessments or score systems that can be used to rank emissions by their impacts on the environment.

First of all, the organisation must ensure that it complies with the national environmental legislation by creating an overview of the relevant environmental laws and regulations. Further environmental performance improvements can take off by using checklists or environmental impact assessments. The environmental assessment can furthermore be combined with an economic assessment when ranking the different target areas. The economic assessment can be used as an argument when the environmental manager presents the potential environmental objectives and targets to the management of the organisation.

It is very important, that the management chooses an assessment system that matches the size and capacity of the organisation. The main purpose of an environmental management system is to reduce the environmental impacts of the organisation's activities and not to create an extensive administrative apparatus. Bearing that in mind, a way of prioritising environmental objectives and targets, is to start with the improvements that are significant but also economically feasible, and then to invest the profit in less feasible environmental improvement. Furthermore, some trade organisations have made checklists containing the most common impacts related to the type of production or service in question, including examples of best practice in reducing the impacts.

3.2.4 Planning

After the management and the environmental manager have agreed on a set of environmental objectives and targets, an action plan must be made. First, an analysis should be carried out, in order to identify how the objectives could be reached, e.g. changes in the production process or investments in cleaner technology. This planning process is closely linked to the en-

vironmental assessment process and can be seen as a repeated process between these two steps, where the impact assessment and the best available techniques are linked.

Based on analyses and considerations carried out in the planning process, a detailed plan of action is created. In the environmental action plan responsibilities, deadlines, competences and control of tasks for the implementation process are defined. Due to their great knowledge of the existing procedures, the employees working within the target areas should be involved in the planning process. The involvement can also be seen as a training aspect, which provides insight into the new techniques and technologies. The action plan contains the procedures of the environmental management system.

3.2.5 Implementation and Training

A very important part of the implementation process is the training of employees. If a target in the action plan is to lower the use of resources, it might imply new production procedures, which should be properly introduced to the workers at the production line in question. Another core issue is the maintenance or change of the procedures for coordination and communication between the departments. It must be ensured that new procedures are established when old procedures are proven insufficient. Thus, it is clear that to improve environmental performance, the environmental management system must be fully integrated into daily management structures of the company.

3.2.6 Checking, Corrective Actions and Management Review

The environmental management system must not only contain procedures for improving the environmental performance. It also must include procedures for monitoring the performance, in order to measure whether the improvements fulfil the set objectives and targets. This checking is called an internal audit which can be carried out by an employee within the company or an external consultant. (An internal auditor should not, however, audit his own area of environmental management routines). The audit must be followed by corrective actions when necessary in order to fulfil the targets of the environmental action plan.

In addition to the audit, the company could be verified by an external certification body in order to receive a certified/registered environmental management system. An external verification process is repeated normally every third year.

Finally the management of the organisation must periodically review the audit results; the environmental policy; objectives and targets; and the environmental management system as a whole, in the light of the ever-changing market conditions.



Figure 3.3. EMAS certification. *The Benecke-Kaliko plant in Eislingen, Germany received its EMAS II certificate in December 2006 after an eco audit. Over the last six years the company has been able to reduce its solid waste by 200 tonnes. (Photo: ContiTech. http://www.contitech.de/ct/contitech/themen/kommunikation/presse/061220_benecke/presse_de.html)*

3.3 Comparing the Management Systems

3.3.1 EMAS, ISO 14001 and the Green Network

In 1993, EU launched a voluntary EU regulation called Eco-Management and Audit Scheme (EMAS) which was revised in 2001, when it became EMAS II. EMAS covers organisations operating in the European Union and the European Economic Area (Norway, Iceland and Liechtenstein), that is, a total of 30 countries. In 2005 the number of EMAS registered organisations was approximately 3,500.

The private organisation, International Organization for Standardization (ISO), developed an environmental management system named ISO 14001 in 1996 (renewed in 2004). As mentioned, the ISO is a worldwide federation of national standardization bodies with more than 100 member bodies, which makes the ISO 14001 global. The ISO 14001 standard is recognised by the European Commission as a stepping-stone towards participating in EMAS.

Along with the two international standards a number of schemes exist, developed by local organisation as part of a local environmental programme. Green Network in Vejle County, Denmark, will serve as an example of such a programme for the comparison (Table 3.1).

3.3.2 The Objectives of EMAS

The objectives of EMAS are to promote continuous improvements in the environmental performance of companies or organisations and to prevent pollution, to provide the incentive for companies to pass on relevant information to the public, and to comply with the environmental regulations. It is the intention that environmental improvements will be provided through the establishment as well as implementation of environmental management and audit systems.

The objective of ISO 14001 is to prevent pollution and to promote continuous improvements of the procedures of the environmental management system. ISO 14001 is designed as a framework with the potential to organise environmental management in the company in a systematic way. The verifier is mainly checking if the management system is maintained and improved, and only secondarily or not at all checking the improvements in environmental performance.

Compliance with legislation is not a direct requirement, as long as the target of the action plan is to obtain compliance.

The international schemes are developed in order to strengthen and certify the environmental management procedures of the company, which requires comprehensive docu-

Box 3.2 Three Management Systems – ISO 14001, EMAS and the Green Network

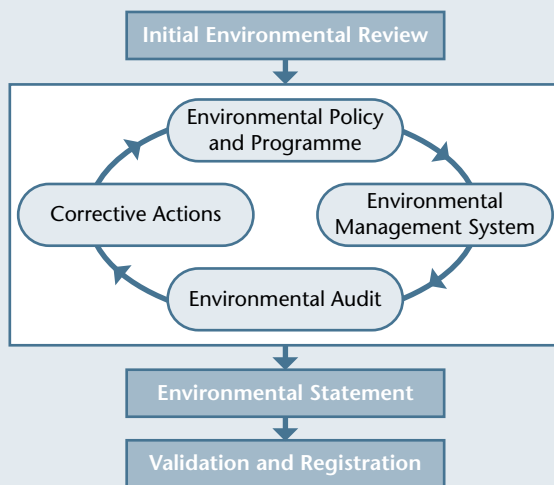
EMAS

The very core of the EMAS is to a large degree similar to ISO 14001. The content of ISO 14001, can also be found in EMAS. There are some differences between the two EMS standards, though. EMAS differs from ISO 14001 by supplementing some add-ons with the scope to improve continual environmental improvement.

The main add-ons in EMAS (compared with) ISO 14001 are:

- The demand for an Initial Review, to identify activities of the companies which should be focused on by the EMS (only a recommendation in ISO 14001).
- An Environmental Statement is required by companies participating in EMAS, to communicate the environmental issues of the company and its effort to improve environmental performance (only recommended in ISO 14001).
- Organisations registered with EMAS must prove (in the environmental statement) that continual environmental improvement is being made in every period of a review (ISO 14001 only requires continual systems improvement, though recommending environmental improvements).

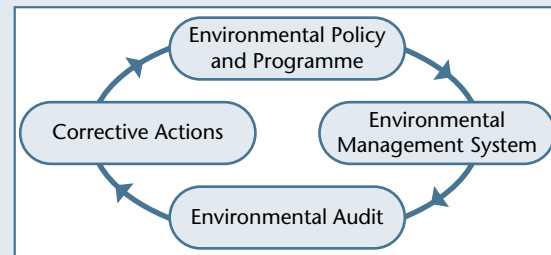
In spite of the different names of the phases of EMAS and ISO 14001 the content of the phases is quite similar.



ISO 14001

The main requirements of ISO 14001 can be subdivided into 5 steps, constituting a process which, when followed repeatedly, should lead to continual improvement:

1. Environmental policy.
2. Environmental plan.
3. Environmental management program.
4. Auditing and corrective action.
5. Management review.



The Green Network

The idea behind Green Network's work is for the individual member company to be in a position to undertake its own environmental management tasks and to attain tangible goals in the environmental area – both in relation to the external environment and to the workplace environment.

The environmental management work is actively backed up by the individual company's environmental authority, which within an agreed-upon framework will provide guidance to the company. An important tool in this process is the Green Network's environmental statement manual.

In addition to the work with environmental statements, Green Network offers its members courses, conferences, projects and exchanges of experiences, via its Industrial Environment Club.

Green Network covers Vejle County and the Municipality of Middelfart. The public authorities involved in the co-operation are the Municipalities of Fredericia, Horsens, Kolding, Middelfart and Vejle, Vejle County and the Danish Working Environment Service.

In addition to its public-sector members, the network counts a continually increasing number of manufacturing companies, educational institutions, consultants, other municipalities, etc. among its members.

The scheme of Green Network in Vejle County has been running for 10 years now, and there are currently about 250 members including 190 companies.

Source: Green Network, 2004.

mentation to enable auditing. The objective of the local scheme is to introduce local companies to environmental management, which means that the focus is on the learning process and tangible results rather than comprehensive monitoring and documentation. The scope and objective are slightly different but so is the range of the standards. Each of the three environmental management systems is significant, as is shown in Table 3.1.

The ISO 14001 is recognised by the EMAS regulation to be an appropriate environmental management system within the EMAS, meaning that the EMAS goes beyond the requirements of ISO. The Green Network scheme places itself between EMAS and ISO 14001 requirements. The EMAS and Green Network schemes require an initial review, which is only recommended in ISO 14001. The initial review and the assess-

ment may not be completely objective, but do establish an overview of the material flow and the waste streams in the company, which is an important initial step that enables the company to target significant environmental problems. Both schemes state that the company may freely choose methods of impact assessment. ISO 14001 requires that the company as a part of the environmental management system establish a procedure to localise environmental aspects of the product, activities and services that have significant environmental impacts.

In EMAS, the environmental policy must promote compliance, continuous environmental improvements and – along with ISO 14001 – pollution prevention, while the Green Network scheme does not have any direct demands to the contents. On the other hand, the Green Network requires that the envi-

Table 3.1 Comparison of EMAS, ISO 14001 and Green Network. (Green Networks Conditions for Membership)

Action & aspects	EMAS	ISO 14001	Green Network
1. Initial Review	Verified initial review.	No, but recommended.	Yes (must follow manual).
2. Environmental Policy	Yes, including a commitment to continuous improvements & pollution prevention.	Yes, including a commitment to pollution prevention.	Yes. <i>Before review:</i> management approved project plan, incl. budget, timeframe etc. <i>After review:</i> Management approved environmental priorities and approach.
3a. Assessment/Prioritising	Yes.	Yes, vague formulation.	Yes, according to environmental, technical & economic aspects.
3b. Plan	Yes.	Yes.	Yes.
4. Implementation	Yes.	Yes.	Yes.
5a. Audits	Frequency (min. every 3 rd year) & methodology of audits of the EMS and of environmental performance can be carried by internal or external auditor.	Audits of the EMS (frequency or methodology not specified), can be carried by internal or external auditor.	Internal.
5b. External Verification	Required every 3 rd year with yearly surveillance related to environmental statement.	Periodically surveillance and reassessment (normally carried out respectively once a year & every third year).	Required within first 3 years of membership. After that every 2 nd year.
6. Environmental Statement	Yes, every 3 rd year with yearly updates. Publicly available.	No, but communication recommended. Environmental policy must be publicly available.	Yes, available to the authorities. Information must go 5 years back.
7. Commitments & Requirements	Employee involvement & training; continuous improvements of environmental performance & compliance.	Environmental training. Continuous improvements of EMS.	Continuous environmental improvement process.
8. Contractors and Suppliers	Required influence over C&S and they must comply with company policy.	Relevant procedures are communicated to C&S.	No requirements.
9. Range	EU and the European economic area.	Global.	Local (Vejle county, Denmark).

ronmental policy of the company reflect the significant environmental issues related to the production or services. This criterion, along with objectives of environmental improvements and less administration, gives the possibility of using the resources more focused in the implementation. Therefore the scheme is appropriate for companies that have just started out with environmental work and small companies with scarce resources.

3.3.3 Environmental Statements

EMAS and the Green Network require that the company issues an environmental statement every third year. The statement is addressed to the organisation's stakeholders e.g. neighbours and customers, and must present the emissions related to the production. In the environmental statement, the organisation must describe the environmental efforts and achievements. The organisation should also provide the public with information on the environmental performance in the environmental statement. Furthermore the organisation is urged to have an open dialogue with the stakeholders.

The statement is intended to be an important document for the stakeholders to gain knowledge about the environmental state of a company. There are no demands on the comparability of the environmental statements.

3.3.4 A Comparison

EMAS is the most ambitious environmental management system of the three. The requirements for employee involvement and training and measurable environmental performance improvements are very explicit and more radical than in either ISO 14001 or the Green Network. Involvement and training are important if the system is going to be properly adopted by employees in the company, while implementation to some extent is a matter of changing routines and organisation of the labour, which also includes a change of habits. The Green Network holds similarities to EMAS but is the easiest applicable. ISO 14001 is the only environmental standard that is issued globally, which is an advantage in a globalised economy.

3.4 The Experiences and Effects of Environmental Management Systems

3.4.1 The Insufficiencies of EMS

On the face of it, the requirements and recommendations in ISO 14001 and EMAS may seem sufficient to ensure improved environmental performance in the companies introducing such management systems. As mentioned, especially the requirements of the EMAS regulation seem to be sufficient. Being the most demanding environmental management standard, the

EMAS could be expected to deliver clear results in relation to environmental performance.

However, examined more closely, it becomes clear that even EMAS is characterized by a lack of sufficient requirements to ensure environmental improvements. Vague formulations and a lack of minimum criteria in the EMAS regulation

Box 3.3 Environmental Statement

The environmental statement is an instrument for communication between the organisation and its stakeholders. It allows the public to detect if a company/an organisation fulfils its objectives and targets.

While making the environmental review ahead of the statement, a lot of companies/organisations obtain knowledge about resource use and emissions from the production. The following is the minimum requirements as presented in the EMAS regulation:

- A description of the organisation and a summary of its activities, products and services and the organisation's relationship to any parent organisations.
- A brief description of the environmental management system and the environmental policy.
- A brief description of all significant direct and indirect environmental aspects which results in significant impacts.
- A description of environmental objectives and targets in relation to the above.
- A summary of the data available on the performance of the organisation compared with its environmental objectives and targets, and also a description of other factors regarding environmental performance.

The EMAS regulation holds criteria for environmental performance reporting. The criteria should secure that the organisation uses existing relevant indicators so that the environmental data gives an accurate appraisal of the performance. It must be possible to compare the performance year by year and compare the performance with sector, national or regional benchmarks.

A point through all the requirements in both the statement and the performance reporting, is that the descriptions should be written in a clear and unambiguous language. This, together with the comparable datasheets, will enable the stakeholders to communicate with the organisation.

Sources: EMAS; Green Network.

constitute possible barriers to improvements of environmental performance, by leaving room for different interpretations of the requirements. Experience shows that the requirements are in fact not always implemented in conformity with the intentions of the regulation.

Being voluntary, EMAS is firstly to a large degree dependent on the willingness of the companies to implement the requirements in conformity with the intentions. Secondly, the requirements themselves are characterized by vague formulations and a lack of minimum criteria for the requirements that form the backbone of EMAS:

- The requirement for continuous improvement.
- The requirement for external verification by independent verifiers.
- The requirement for an externally verified environmental statement.

3.4.2 Is Continuous Improvement Actually Occurring?

Fully in conformity with the wording of EMAS, though not in conformity with its intentions, the requirement for continuous improvement may be interpreted as incremental improvements in areas of focus, while the overall environmental performance is not necessarily improved, possibly even worsened. The possibility of a worsening of the environmental performance is due to the fact that when the focus of the EMS is moved away from earlier focus areas, companies might cause more environmental problems in that area than before the focus in earlier years. It is important to understand that companies that take such action would still not be committing any breach of the formal requirements of EMAS – or for that matter ISO 14001.

Since EMAS holds no specific minimum criteria for what could be considered an *environmental improvement*, companies might themselves define criteria for environmental improvement. In fact there will be no lower limit for what could be considered an environmental improvement. An EMAS registered company could improve very little environmentally and still keep its registration, since no breaches of the EMAS regulation would be committed.

3.4.3 External Verification by Independent Auditors

The lack of minimum criteria for continuous environmental improvement means that it is the responsibility of the external verifier of the EMS to determine whether or not the company is engaged in *continuous improvement*.

According to the EMAS regulation, the company must have the EMS externally verified by an independent verifier. It is, however, the responsibility of the company itself, however, to choose which verifier should verify the environmental state-

ment and the entire EMS. The company may choose verifiers from all over the EU. It could be feared that some verifiers will interpret the requirement for continuous improvement rather vaguely, to ensure the largest possible spreading of EMAS, in order to create a market for their services, and to be competitive in relation to other verifiers. It is, however, also possible that companies will prefer verifiers that they look upon as reliable, to increase the reliability of the environmental statement.

The verifier's report to the management is confidential, but breaches must be reported to the relevant national authority. It is, however, doubtful if breaches will be reported in all cases. Experiences from England show that companies do not necessarily lose their EMAS verification when a breach is identified [Gouldson and Murphy, 1998]. Other studies show that withdrawal of certificates happens only rarely [e.g. Dahlström and Skea, 2002].

According to the EMAS Regulation, Annex 5, the verifier should not make his/her own analyses of the environmental impacts of the company. The verification should be based, in principle, upon the company's own information, derived from e.g. internal auditing of the system and presented in the environmental statement.

For the reason of comparison across companies, a common standard for the quality of the data in the environmental statements is crucial. However, no criteria on data standards have been established. Companies may, for instance, choose to publish the environmental data in index figures, which are relative and only describe a development over time, not giving any specific quantitative information about environmental performance in comparison to other companies.

3.4.4 Studies on Environmental Performance and EMS

It is important to keep in mind that the lacking requirements of EMAS and other management standards and the insufficient implementation of the requirements in the companies, do not necessarily mean that companies get no environmental benefits from introducing an EMS.

Cases prove that some companies actually experience improved environmental performance after having implemented an EMS – at least according to representatives of the companies in question [e.g. Hillary, 2000]. Furthermore, a study by Marinova and Altham in 2000 shows that improvements in environmental performance derived from implementation of Cleaner Technologies are in fact related to the implementation of an EMS.

The question is, however, whether the companies would have made the environmental improvements, irrespective of whether an EMS had been introduced. Many studies have been conducted to uncover the correlation between EMSs and environmental performance. Two studies are, however, especially

interesting, because of the large data set they are based on. In one study, carried out by Clausen et al. 2002, case studies and telephone interviews were conducted with 1,277 German EMAS-registered facilities. In another study carried out by the MEPI, referred to in Hertin et al. 2003, case studies were conducted of 274 firms and about 400 production sites in six industrial sectors in Austria, Belgium, Germany, Italy, the Netherlands and the UK.

The overall conclusion of both studies [Clausen et al., 2002; Hertin et al., 2003] is that the researchers were unable to identify any clear overall statistically significant correlation between EMSs and environmental performance. Some significant correlations were found on specific performance indicators, but only a few. For most performance indicators, no correlation was found. Furthermore, the few correlations that were discovered were not all confirming the hypothesis that EMSs improve environmental performance. Some of the analyses of performance indicators actually showed a negative effect on environmental performance in 1) companies with an EMS compared to companies without; 2) companies with an EMS compared to the average industry level; and in 3) companies before and after the introduction of an EMS.

The studies were unable to identify any significant correlation between EMSs and environmental performance, thereby suggesting that environmental improvements are not necessarily initiated by the adoption of an EMS.

The outcome of the studies indicates that the effects of EMSs on environmental performance are unpredictable; and that EMSs do not guarantee improved environmental performance. It seems that the effects of EMSs depend on the implementation of the system in the company and supposedly external factors like characteristics of the company adopting the system.

3.4.5 Correlations Between EMS and Environmental Performance

Studies also indicate that companies, which adopt an EMS, are usually “picking the low-hanging fruits”, that is, they are making the environmental improvements, which are easiest and most economically attractive. The question is whether such improvements would have been made anyway. These companies are experiencing difficulties in continuing environmental improvements after having “picked the low-hanging fruits”. Experience even shows that many companies withdraw from the EMAS system when the “low-hanging fruits” have been picked [e.g. Giessel and Veen, 2004].

Some studies actually indicate that the presence of an EMS in a company does not even guarantee legal compliance. Even when it comes to EMAS registered companies, violation of regulations is not rare [e.g. Dahlström and Skea, 2002]. Being sys-

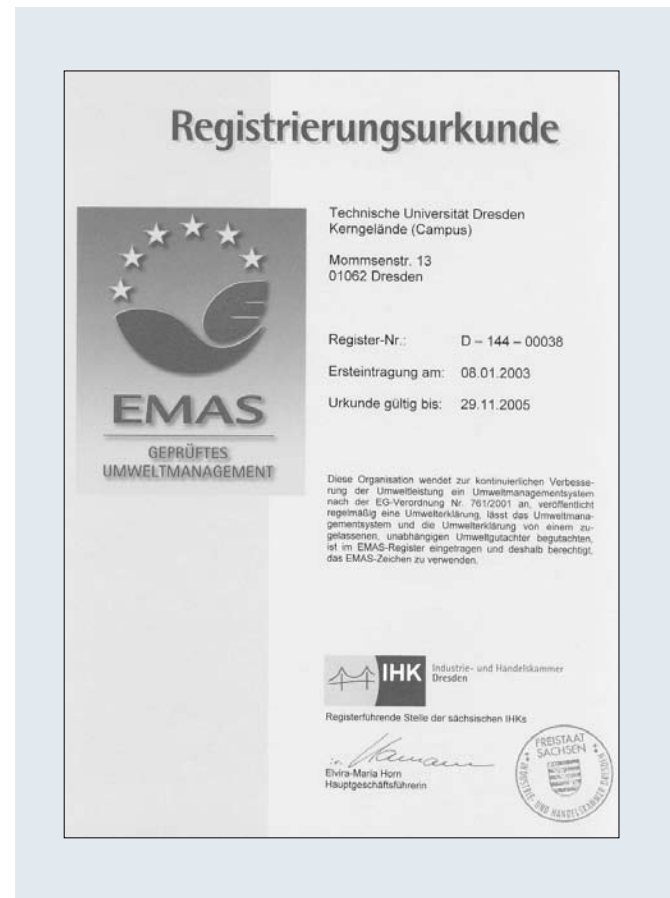


Figure 3.4. EMAS certificate. An example of an EMAS certificate, in this case for the main campus of the Technical University of Dresden, Germany. (http://www.tu-dresden.de/www/bwbu/forschung/abgeschlossene_projekte/emas_tud/inhalt.htm)

tems with the purpose to provide environmental improvements beyond regulatory compliance, indications of non-compliance could constitute serious harm to the reputation of EMS.

The use of EMSs is, however, a new practice. Such systems have only been in use since the mid 90’s, and the knowledge of the effects of the systems is therefore rather limited. Both ISO 14001 and EMAS were developed in the 90’s, and EMAS II was introduced as late as in 2001. So, naturally, our knowledge about the effects of EMS, and companies certified according to these two management standards, is even more limited. Thus, the studies have not been able to investigate long-term effects of the systems, which may prove to be substantial.

Another possible explanation of the recent studies’ inability to prove a correlation between EMS and environmental performance could be insufficiencies of the analysis models used in the studies. The missing correlation may in fact be due to analysis models that do not include all relevant data.

3.4.6 Environmental Management Systems and Compliance with Legal Regulations

One of the most often voiced reasons for a company to introduce an EMS is to assure compliance with environmental regulations. The management of the company want to be sure that no surprises will come when authorities come to check their performance. However, as already mentioned, the implementation of an environmental management system does not in itself lead to compliance, even if, for natural reasons, companies with EMS and certified companies are much more seldom found to have neglected a regulation. If it happens, authorities are more willing to negotiate on how to achieve compliance without paying penalties for a company that has introduced a management system.

3.4.7 The Positive Sides – Improved Overview and Financial Benefits

A general conclusion from many studies [e.g. Clausen et al., 2002] is that EMSs do provide the company introducing such a system with a better overview of the environmental impacts of all the activities of the company in question. This knowledge is primarily derived from greater data collection, which is systematised quite effectively by an EMS like EMAS or ISO 14001.

The improved data collection also allows for a greater insight into what regulation the specific company is covered by, which is very relevant for the company, simply to be able to comply with the formal requirements [e.g. Dahlström and Skea, 2002]. Surprisingly, companies without an EMS tend not to have an overview of the relevant legislation but only fragmented knowledge, gained because of specific campaigns on the subject from regulatory bodies or trade unions; or because of customer and other shareholder demands.

Studies show that EMSs are able to provide essential data on environmental performance as well as relevant legislation. It is, however, important to note that gaining knowledge does not necessarily mean that actions are taken in the light of the knowledge. If the company chooses to act upon the knowledge gained and starts meeting regulatory requirements, it must be assumed that the company will improve its environmental performance. In this way, an EMS could indirectly contribute to a better environmental performance. However, such a correlation has not yet been proven in any study.

Studies [e.g. Clausen et al., 2002] also indicate financial advantages in introducing an EMS in a company. The market response is not overwhelming, but some positive effects on company competitiveness have been identified, and the payback time of some of the investments in the EMS is quite short, which makes it profitable for at least some companies to invest in such a system.

3.4.8 How to Ensure Improved Environmental Performance

As already mentioned, the success in adopting an EMS is to a large degree dependent on the way it is implemented in the company. In spite of the pitfalls mentioned above, EMSs have in fact the potential to provide improved environmental performance, but it depends on a full implementation of the EMS. The implementation of systemic requirements is of course important, but in order to get real environmental benefits of the system, a full integration of environmental considerations in all of the activities and all levels of the company is a necessity.

Fully implemented, an EMS could contribute substantially to a better environmental performance, but this is still not commonplace today [e.g. Clausen et al., 2002]. If the EMS is thought of by the company as just another instrument to gain profit, and environmental considerations are not entirely integrated into all activities of the company, the environmental benefits of introducing an EMS are not necessarily identifiable. A study by Hamschmidt from 2000, referred by Hertin et al., 2003, indicates that other motives than improved environmental performance are often dominant when companies adopt EMSs. This could perhaps be a barrier for the integration of environmental considerations into all activities.

Previous experiences with cleaner production have shown four important elements to make a successful implementation of cleaner production in an enterprise. The same certainly applies to the environmental management systems:

Management commitment: The management of the company must be devoted to the implementation, which means that it ought to be involved in following up on the environmental policy, the actions taken etc.

Employee involvement: The management should use the experiences from the employees in the production, because they have the every day experiences and tacit knowledge about the production processes.

Cost awareness: In order to make the most environmentally and economically efficient experiences, the management must have information about costs. Experiences from SMEs show that resources are wasted because the management does not have the proper cost information.

An organised approach: To implement CP-solutions it is necessary to establish procedures that make possible identification, implementation and evaluation [Berkel, 1999a].

Study Questions

1. List some reasons for self-regulation instead of authority regulation of an activity.
2. Describe in brief, or with a diagram, how an EMS works.
3. Compare the three EMS of ISO 14001, EMAS-II and the Green Network, and give reason for introducing each of them.
4. Enumerate the tools an environmental management system has to assure correction of environmental shortcomings.
5. What will determine if an EMS will achieve its objectives? Comment particularly on continuous improvement.
6. Describe in what way, and in what situations, the introduction of an EMS will lead to compliance with regulations.
7. Compare the roles and tasks of authority control and external audit for certification of an EMS:
8. Describe the role and structure of an Environmental Statement as well as Environmental Reporting in an EMS. Does it support compliance?
9. What are the results of research on EMS in industry? Did it, and if so in what way, improve environmental performance?
10. Summarize in three sentences what roles EMSs may have in environmental regulation.

Abbreviations

CP	Cleaner Production
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management Systems
IMS	Integrated Management Systems
ISO	International Organization for Standardization
IVM	Institute for Environmental Studies, Free University of Amsterdam
LPG	Liquid Propane Gas
MEPI	Measuring Environmental Performance of Industries (an IVM project)

Internet Resources

Institute for Environmental Studies (IVM), Free University of Amsterdam

http://www.ivm.falw.vu.nl/Research_projects/index.cfm/

The Eco-Management and Audit Scheme (EMAS)

http://ec.europa.eu/environment/emas/index_en.htm

ISO Management Systems ISO 9000/ISO 14000

<http://www.iso.ch/iso/en/iso9000-14000/index.html>

Green Network

<http://www.greennetwork.dk/page61.asp>

US Environmental Protection Agency on EMS

<http://www.epa.gov/ems/>

UK Environment Agency on EMS

http://www.environment-agency.gov.uk/business/444251/466235/?version=1&lang=_e

EMAS Environmental Statement Library

http://ec.europa.eu/environment/emas/es_library/library_en.htm

Self-regulation and Voluntary Corporate Initiatives

4.1 Voluntary Business Initiatives

4.1.1 The Challenges of Improving Environmental Performance

This chapter will review a number of voluntary corporate initiatives that have been developed partly as private sector initiatives and partly as a joint industry – government ventures. The objectives of the initiatives vary considerably in scope and influence across the subjects, countries, and regions. They go from supply-chain management, over product development and operational standards, to reporting standards and consumer information systems. They are still developing.

As the companies establish environmental management systems in order to minimise environmental impacts caused by internal production processes, other environmental management concepts have been developed to address two other issues. Firstly, the problem related to managing the environmental performance of the suppliers or *entire life cycle* of the product, and secondly, the *communication of the environmental performance* from the suppliers to the consumers (often a company) or from the company to customers as illustrated below.

The global division of labour has increased the risk of environmental dumping, since the enforcement and the level of environmental regulation varies globally. Corporations that seek to prevent environmental dumping as an effect of their outsourcing strategies must include the suppliers in their environmental management. They do this by setting up standards for environmental performance and working conditions at the suppliers, called “codes of corporate conduct”.

The challenge an organisation or company is facing today when striving to improve its environmental performance is thus two-fold. First *in time*: the entire life cycle of the product or

service need to be understood in order to know when the most significant impact occurs. Is it during the production phase or the use phase, or perhaps at the end-of-life? For which of these different phases is it most important to achieve improvement? Upstream and downstream environmental impacts become dominating in the life of the products.

Secondly *in space*: the globalised economy of today forces the company to ask which actor in the chain is the one that is

In this Chapter

1. Voluntary Business Initiatives
 - The Challenges of Improving Environmental Performance
 - The Life-Cycle Perspective
 - The Communication Perspective
2. Instruments Based on Corporate Responsibility
 - Codes of Conduct
 - Environmental Stewardship and other Codes
 - Corporate Social Responsibility
3. Calculating Environmental and Societal Costs
 - Sustainability Accounting
 - Environmental Management Accounting, EMA
 - The Triple Bottom Line
 - The Global Reporting Initiative, GRI
4. Product-related Measures
 - Eco-design
 - Extended Producer Responsibility
 - Eco-labelling
5. Evaluating Corporate Voluntary Initiatives
 - The Positive Sides of Voluntary Measures
 - Which Environmental Management Instrument to Choose
 - Does Voluntary Measures Lead to Compli-

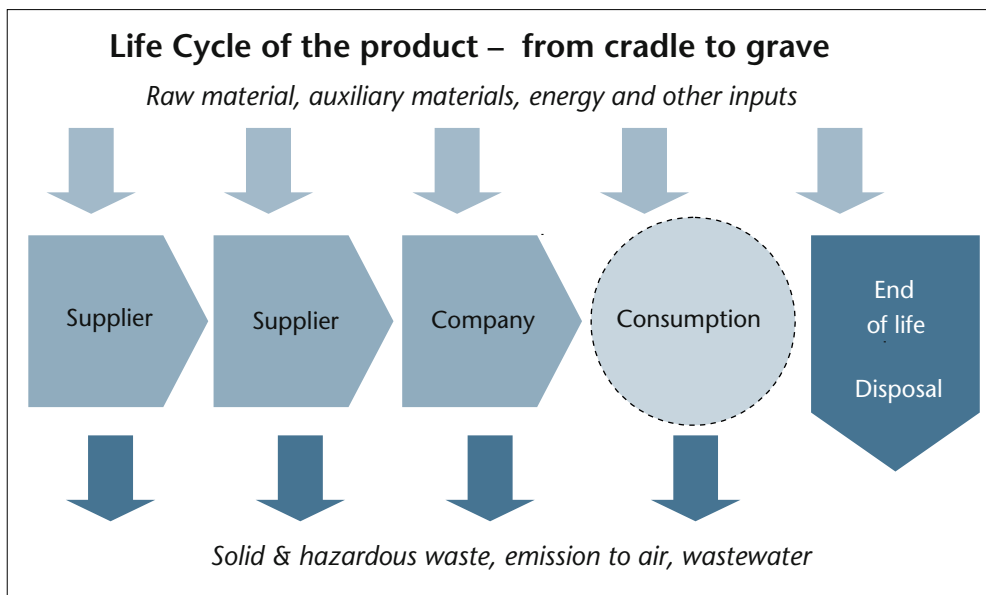


Figure 4.1 The life cycle perspective. During the entire life cycle of a product material flows (from up to down) impacting on the environment takes place. The extraction of raw materials is most important for a copper cable, but the consumption phase for e.g. a car. Recycling, not shown here, should be promoted whenever possible.

causing the most impact. Is it resource extraction, supplier's production or the use phase? Again, what role does each one of these have in the efforts to achieve improved environmental performance? How can it be controlled?

4.1.2 The Life-Cycle Perspective

A number of tools are available to systematically review and find environmental improvements for existing products, product development. One of the most comprehensive of these is *eco-design or design for the environment, DfE*. It is a concept that addresses the product's environmental performance from cradle to grave by changing the design of the product. In an eco-design the impact of the product in several different aspects, such as resource use, transport, toxicity, waste etc, is reviewed over its entire life cycle. Ways to improve the product in all these different aspects is then made. Eco-design is a managerial tool that can be used by all companies. Experience is that a product development using eco-design most often also leads to improved economy. Eco-design, pioneered by Delft University of Technology in the Netherlands, has been much promoted by UNEP in the so-called *Promise Manual* first published in 1997 and further developed since.

A technically more advanced tool for studying the environmental impact during the life cycle of a product is *Life Cycle Assessment, LCA*. In an LCA the entire material flows connected to the life cycle of the product is quantitatively assessed. Typically the environmental impacts of several hundreds of materials are measured. LCA was pioneered by beverage companies, which wanted to see which was more environmentally friendly, a recyclable glass bottle or a non-recyclable plastic

bottle. During the 1990's it was further developed by the Society of Environmental Toxicology and Chemistry (SETAC), which defined standards etc needed. It is today established as an important tool for larger industries.

Both eco-design and Life Cycle Assessment, LCA, is treated in detail in book 3 in this series.

4.1.3 The Communication Perspective

The eco-design reviews and LCA results are not well suited for information about environmental performance of a product to the average consumer. They are too detailed and technical. Therefore a series of simplified tools for communicating environmental profiles of products to the customers have developed. These are *eco-labels*. Eco-labels exist in a large variety of shapes. Some of them use criteria formulated and monitored by governmental agencies. Most of them are established by NGOs or as a business undertaking in trade organisations.

Another way of communicating the environmental performance of the company is green reporting, that is, *environmental reports*, together with economic reports.

Also the results of codes of conduct, that is the social performance of the company, needs to be communicated to the customers, or in general to the stakeholders of an organisation. Otherwise they would lose an essential part of their meaning. The reports of a company have the increasingly important task of building trust and goodwill. For this reason a number of tools for social reporting have developed. These are in most cases based on company initiatives and thus part of the culture of self-regulation and voluntary corporate initiatives that is in focus in this chapter.

4.2 Instruments Based on Corporate Responsibility

4.2.1 Codes of Conduct

Along with growing global trade and production, a number of companies, shareholder associations, unions and intergovernmental organisations have established *codes of corporate conduct*. The codes of conduct state the corporate policy on environment, labour conditions etc. They were established to respond to the societal concerns about the level of safety and working conditions and the environmental impacts of the company activities [OECD 2001].

Several attempts have been made to make common codes of conduct by trade associations and intergovernmental organisations, in order to prevent the dumping of environmental standards and working conditions, which tends to be one of the negative effects of global production. The United Nations Centre on Trans-national Corporations made a draft in 1988, and in England a proposal on a common national code of conducts was made. It seems, though, that these common standard codes are not fully accepted, and still an increasing number of organisations make their own codes of conduct. These include IKEA and Nike. Some enterprises adopt very broad codes of conduct made by institutions like the UN. The codes of other companies are much more specific and related to the problems connected only to their area of business [OECD 2000].

A code of conduct is a statement that must be followed by management instruments, such as EMAS and ISO 14001, and guidelines on best practices to be fully implemented. Depending on the company's activities, the implementation could take place within the organisation itself and/or at the suppliers. Internal and external implementations bring different challenges and require to some extent different sets of instruments. The management of a corporation or company has the power to allocate the necessary resources when it is an internal implementation of a code of conduct. When the implementation is taking place in an external company, a supplier, there are other managers in charge who may not be devoted to the code of conduct, which can put a brake on the implementation. A similar situation can develop in a large multinational corporation, which is characterized by geographical as well as cultural differences dividing the corporate head from the divisions in other countries. Furthermore, the implementation of the code of conduct will compete with the purchasing and financial departments' demand for price reductions, the production manager's lack of time etc.

4.2.2 Environmental Stewardship and other Codes

In 1998, 246 codes of conduct from organisations in OECD countries were reviewed by an OECD workgroup in order to

investigate which organisations developed codes of conducts, what objectives the codes set for themselves and by which means these objectives should be addressed. According to the workgroup the codes were mainly made by (multinational) companies (148), but some were made by industry and trade associations (92); partnerships of stakeholders, such as unions and NGOs (32); and international organisations (4).

Environmental stewardship (145) was the second most frequently mentioned issue in the survey, next to labour standards (148). Consumer protection was mentioned in 117 cases, bribery in 56 cases, competition in 50 cases, information disclosure in 45 cases, science and technology in 26 cases and taxation in 1 case [OECD 2000].

According to the OECD investigation, the coverage of the codes varies much. Some codes mention the environment briefly, while other codes (26) are completely devoted to the subject. The three most common attributes discussed in the environmental stewardship [OECD 2000] are:

- Compliance with the law.
- Openness to community concern.
- Environmentally friendly products and services.

In 51% of the codes it was stated that the code is an attempt to protect or enhance the reputation of the enterprise or its products. For larger companies their public reputation is a valuable asset. The code of conduct is a way to make a statement about the ethical issues related to the production and is a part of the concept of corporate social responsibility. Fewer codes described how the code should be enforced, and only one enterprise mentioned that two suppliers have been excluded as a result of non-compliance with the code [OECD 2000].

It remains to be investigated whether companies actually implement their codes on their suppliers or if it is just a piece of paper for suppliers to sign that free the corporations from their legal responsibility but with no actual practical implications. The enforcement of the codes may be a future challenge for the companies, if they want to live up to the corporate social responsibility that they have declared by making a code of conduct. Additionally, a public monitoring of this process should make sure that the companies are committed to and fulfilling their own standards.

4.2.3 Corporate Social Responsibility

The need for organizations in both public and private sectors to behave in a socially responsible way is increasing in society. This has led to the development of the notion of *Corporate Social Responsibility*, CSR. It is based on the understanding that an organisation or company has responsibility for the effect of its activity in the surrounding world. A widely quoted



Figure 4.2 Corporate Social Responsibility. *Koffie Kàn is a small-scale Coffee Roasting House in Belgium that strives to minimise the company's impact on the environment, while at the same time giving support to small-scale farmers in social development projects in Honduras and Mexico. In 2002 Koffie Kàn was honoured with the Solidarity award [http://www.koffiekan.be]. (Photo: © Co-op Fairtrade)*

definition (World Business Council for Sustainable Development) states, "Corporate social responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large."

The organisation Business for Social Responsibility (BSR) defines corporate social responsibility as "achieving commercial success in ways that honour ethical values and respect people, communities and the natural environment." A variety of terms are used when talking about CSR: business ethics, corporate citizenship, corporate accountability, and sustainability. In this sense, CSR is viewed as a comprehensive set of policies, practices and programs that are integrated into business operations, supply chains and decision-making processes throughout the company and includes responsibility for current and past actions as well as future impacts.

CSR is linked to sustainable development, and many argue that CSR obliges companies to take not only business interests into account, but also all dimensions of sustainability, in particular environmental and social aspects, in addition to economic ones.

Corporate responsibility has a moral background but also a very factual one. It reflects an increased importance of factors other than the purely economic, including environmental performance, the situation of the workers, the concern for the customers, and the society in general. "Society" in this context is often meant to include all the stakeholders of a company.

Another factor is the increased role of so-called *ethical investing*. Financiers prefer to invest in companies that have

a certain ethical standard. Basic standards include legal compliance, e.g. human rights, respect for workers rights, and respecting environmental regulations, but it may also consider a company's CSR. Social performance may also be considered when selecting providers of goods and services. Ethical investments represent an increasing share of all investments, e.g. in Sweden alone some 20 billion dollars in 2004.

It is no surprise that CSR has grown exponentially in the last decade. It is important to say that more often than not companies that have a well-developed CSR programme underline that this is good business. It is profitable in economic terms contrary to conventional thinking.

CSR is starting to be included in the general management agenda. There is an array of different opinions as to the right approach ranging from strict legislation at one end to complete freedom at the other. Government regulation in this area is increasing, and sometimes international, such as EU, legislation. ISO, the International Organization for Standardization, has decided to launch the development of an International Standard providing guidelines for social responsibility (SR) to be published in 2008 as ISO 26000. It will be voluntary to use, that is, will not include requirements and not be a certification standard. ISO says "Our work will aim to encourage voluntary commitment to social responsibility and will lead to common guidance on concepts, definitions and methods of evaluation."

4.3 Calculating Environmental and Societal Costs

4.3.1 Sustainability Accounting

The first experiments with "green accounting" were carried out in the 1970s by enterprises trying to calculate how they were obliged to take societal responsibility. The statements were called corporate social accounting or social responsibility accounting. Among the large number of problems related to these accounting systems were the lack of detail and commonly accepted standardisation of the systems, which made a comparison of statements nearly impossible for stakeholders. In the early 1980's, the number of experiments declined, but in the late 1980's the environmental movement returned and the development of green accounting is still going on in many forms [Ulhøi 1997]. The most recent initiatives are EMA (Environmental Management Accounting) and GRI (Global Reporting Initiative), both sponsored by the UN.

Along with the Brundtland Report in 1987 several attempts were made to develop sustainability accounting systems. One of the efforts was a continuation of the social responsibility accounting from the 70s. It balances up the economic, social and environmental activities of a company to identify if they are

sustainable or un-sustainable. This has led to attempts at calculating the societal cost of the un-sustainable activities [Ulhøi 1997]. The problems related to these efforts are mainly to set the scope of the impact assessment, and calculate the value of the irreversible environmental impacts on nature. There is, however, no self-evident scope of impact studies, which makes it difficult to calculate the costs of impacts.

4.3.2 Environmental Management Accounting, EMA

For environmentalists conventional accounting practices have several shortcomings. They hide environmental costs, e.g. in overhead accounts; they often allocate environmental costs incorrectly; they see environmental costs as fixed when they may actually be variable; they do not account for volumes (and thus costs) of wasted raw materials correctly; and, especially they do not include relevant environmental costs in the accounting records at all.

As good environmental and sustainability management by business and other organisations become increasingly important, good accounting and financial management techniques have developed. Environmental Management Accounting, EMA, is among the most widely practiced. It primarily supports the information needs of the organisation's own management, but is also used for company reporting.

The concept combines the environmental and economic accounting of the company into one tool. Environmental management accounting is an instrument that is used to describe the environmental efficiency or performance of the company. Here the mass balance is an inventory of the activities carried out in the company. The environmental management accounting is an instrument to support managerial decisions. For example it provides economic cost assessments when making new investments.

EMAN, a network of researchers, policymakers and business promoting EMA, defines EMA as “the identification, collection, estimation, analysis, internal reporting, and use of materials and energy flow information, environmental cost information, and other cost information for both conventional and environmental decision-making within an organization”.

As an example Novo Nordisk's environment report accounts for environmental costs and investments which summarise the costs of running the environmental department; the costs of waste water treatment; biomass management; costs of handling and disposal of solid waste; energy taxes and remediation costs for polluted sites, so-called brown fields.

The environmental manager too often performs green accounting without any connection to other parts of the company. But green accounting alone is not efficient in supporting managerial decisions, as it was developed only to provide green

information. Environmental management accounting, on the contrary, is first and foremost a decision-making instrument, which can be used by the company management to prioritise environmental tasks and investments.

EMA can be used also by other organisations, e.g. local authorities.

4.3.3 The Triple Bottom Line

A relatively established type of sustainability accounting is the *Triple Bottom Line*. The “triple” refers to the economic, environmental and social aspects of sustainability. The phrase was coined by John Elkington, co-founder of the business consultancy SustainAbility in 1994. It was later expanded and articulated in his 1998 book “Cannibals with Forks: the Triple Bottom Line of 21st Century Business”.

One example of how it is applied is the Novo Nordisk, a Danish medical company that produces insulin and devices related to diabetes care. Since 1991, the company has worked on developing green accountings. The report on the triple bottom line from 2001 contains a financial report and social and environmental accounts. The idea of the triple bottom line is also said to represent *profit, people and planet*; the thought is that the enterprise or organisation can reveal a truer image of its assets through the combination of the three accounts. The environmental report describes the key environmental performance indicators. These are input of raw materials; packaging energy and water; and output in the form of air emissions, liquid and solid waste and the total amount of products produced. The indicators of the mass balance are compared with the mass balance from previous years [Novo Nordisk 2002]. On the basis of the account it is possible to conclude whether the enterprise is more or less eco-efficient than the previous year.

Legislation mandating a Triple Bottom Line is under consideration in some countries, but most argue that businesses should be able to voluntarily adopt a “Triple Bottom Line” as part of their bylaws.

4.3.4 The Global Reporting Initiative, GRI

The GRI, Global Reporting Initiative, is perhaps the most recognised format for reporting in which economic, environmental and social aspects are all covered, that is, sustainability reporting guidelines. GRI, created in 1997, today works with ISO and UNEP. The GRI is supported by many important organisations, such as Business for Social Responsibility (BSR). BSR writes “the independent Global Reporting Initiative's Sustainability Reporting Guidelines (GRI), which promote disclosure on a broad set of management policies and performance indicators, have emerged as an important benchmark for

many companies' CSR reporting. Globally, some government agencies and even stock exchanges have begun requiring more public disclosure of companies CSR performance."

The Global Reporting Initiative's (GRI) vision is that reporting on economic, environmental, and social performance by all organizations becomes as routine and comparable as financial reporting. GRI accomplishes this vision by developing, continually improving, and building capacity around the use of its Sustainability Reporting Framework. An international network of thousands of organisations from business, civil society, labour, and professional institutions create the content of the Reporting Framework in a consensus-seeking process. BSR has helped lead the development of CSR reporting as a professional discipline. Staff has participated in collaborative efforts by entities such as the Global Reporting Initiative (GRI), AccountAbility and the U.K. Company Law Review to develop and refine CSR reporting guidelines and standards.

The Guidelines should be used as the basis for all reporting. They are the foundation upon which all other reporting guidance is based, and outline a core content for reporting that is broadly relevant to all organizations regardless of size, sector, or location. The Guidelines contain principles and guidance as well as standard disclosures – including indicators – to outline a disclosure framework that organizations can voluntarily, flexibly, and incrementally, adopt. The guidelines from 2002 have in 2006 been replaced by Guidelines v3.0. Protocols are the "recipe" behind each indicator in the Guidelines and include definitions for key terms in the indicator, compilation methodologies, intended scope of the indicator, and other technical references.

In 2006 more than 1,000 companies reported according to the GRI guidelines, most of them large, or very large. For some time there have also been guidelines for public institutions, to make it possible for local authorities in particular to adopt a uniform set of principles for sustainability reporting.

4.4 Product-related Measures

4.4.1 Eco-design

Eco-design is a tool to improve the environmental performances of a product, just as the environmental management systems aim at improving the environmental performances of the company. Eco-design addresses the whole life cycle of the product.

While eco-design focuses on the product, there are other tools focusing on other parts of the manufacturing process. Thus Cleaner Production, CP, deals with the production process itself. Supply-Chain Management is looking in particular on the resources used for the manufacturing. Waste management is geared towards the end of the life of the product.

There are several different names for the concept of environmental improvements through product design, e.g. Design for Environment, DfE, Life Cycle Design and Eco-design. In the end these are essentially the same process and based on the original work of Delft University of Technology in the Netherlands. In general, eco-design is a set of techniques to reduce environmental impact from each of the different aspects of a product, such as material used, transport and packaging, function, recycling etc. It differs from traditional design by adding environmental awareness to aesthetics and functionality as criteria for success.

A work paper from a team at the International Organisation of Standardisation, ISO, suggests three eco-design strategies: 1) Strategy for optimising the function of the product; 2) strategy for conservation of resources, reuse, recycling and energy recovery; 3) Strategy for prevention of pollution, waste and other effects [ISO 2001]. The three strategies involve different instruments but by following one of the strategies the results will overlap.

As implied, there are innumerable factors that motivate enterprises to use eco-design. The motivation can be the wish for an easier end-of-life treatment; reuse/recycling of the product or the materials; or solving environmental impacts related to the product initiated by legislation. Other drivers can be the expectation of new market shares by promoting sustainable products or, as already mentioned, cost savings by reduced resource and energy use.

One of several factors that can promote eco-design is the response to new or expected regulations. Innovation will then be concentrated on complying with the new demands. An example is Siemens Mobile Phones that tries to respond to the demand for lead-free soldering in electronic equipment by experimentally launching 10,000 lead-free telephones.

Another objective of eco-design is to enable the producer to achieve systematic improvements of the function performed by the product or effects of the product, whether motivated by legislation or other factors. The most radical perspective is to rethink – not redesign – the product or service by starting out with the function of the old product and the expectations on the new product or service. This strategy could make completely new solutions possible that do not result in as great environmental impacts as the old product.

Yet another possible strategy is redesign. Redesign can be based on a life cycle assessment or screening, which points out the most problematic environmental impacts of the product. The concept of the product remains the same but substances and material can be substituted or production processes changed.

At the end of an eco-design process, the environmental performance of the new solution should be evaluated, e.g. by



Figure 4.3 Eco-design. *Eco-design and Life Cycle Assessment have become standard tools in many large and small industries. These tools have contributed to reduced material weight, environmental impact and improved recyclability of many standard cars. In the future we may see cars with advanced technology, such as this Daimler Chrysler using a fuel cell powered electric motor. The driver is the Czech commissioner for science and research Janes Potocnik. (Photo © European Community)*

comparing the new and the original product. The solution of one problem can easily be the cause of other environmental impacts, which need to be avoided.

The scope of eco-design embraces the whole life cycle – also called the product chain – of the product from extraction of raw materials, production, use, and finally the end-of-life treatment. The efficiency of eco-design varies a lot, depending on the strategy and the product type. Often radical rethinking of the product is far more eco-efficient than redesign [Brezet 2001]. For example it is more radical to use mobile telephones instead of building an entire conventional land-based phone system. This is now being done in several countries in Africa. Replacing a product with a service is another example, such as when a car company leases the cars instead of selling them. Shared use of products is a further possibility such as joining a car pool instead of using a private car,

A more detailed treatment of eco-design is given in Book 3 in this series.

4.4.2 Extended Producer Responsibility

The material flows in Europe and the world have resulted in a crisis of waste. Material flows were largely linear, giving rise to enormous waste heaps. The 1970's saw the first strict efforts to reduce waste flows, implemented in Germany. Today there are increasingly stricter regulations on waste in all of Europe, and costs for sending waste to landfills are increasing. A most important strategy for waste management is recycling.

Conventionally the local municipality has the responsibility to take care of waste. This is now being reconsidered. With the increasing amount and complexity of waste, the OECD and the EU Commission have introduced the concept of *Extended Producer Responsibility*, suggesting that the producer holds the responsibility for a product after its end use. In other words, the producer is obliged to ensure a reasonable waste treatment. This means that the company that manufactures, imports and/or sells products and packaging is required to financially or physically be responsible for the products after their useful life. They may take back spent products and manage them through reuse, recycling or in energy production. Another possibility is to delegate this responsibility to a third party, a so-called *producer responsibility organization* (PRO), which is paid by the producer for spent-product management. In this way, EPR shifts responsibility for waste from local government to private industry, obliging producers, importers and/or sellers to internalise waste management costs in their product prices [Hanisch, 2000].

Extended Producer Responsibility has been implemented in many forms, which may be classified into three major approaches:

- Regulatory
- Negotiated
- Voluntary

In the EU's WEEE-directive (waste of electrical and electronic equipment), the environmental producer responsibility, including demands for recycling of more than 50% of the products, is an example of the regulatory approach. To respond to the legislation, enterprises can use the eco-design strategy, for example by selecting the materials used in the product on the basis of their recycling potentials. In this way it is possible to reduce the use of virgin raw materials. This could also be beneficial to the companies as it saves the costs of resource extraction. Depending on the expected regulation, the enterprise can use one of these three eco-design strategies.

In Sweden much waste management is the result of a negotiation between industry and the government. In response a multitude of waste management companies have developed. They have organised waste collection stations in cities, collect and return e.g. glass, paper, and plastics etc back to industry as

Box 4.1 Eco Labels



The Flower is the official EU eco-label award, introduced in 1993, inspired by the Swan. So far, more than 250 licences have been awarded products in 23 product groups.

Objectives:

To assist consumers in their shopping choices, identifying which products are environmentally preferable, thereby enabling the consumers to act for the benefit of the environment, by purchasing environmentally sound products.

To make manufacturers compete in developing the most environmental sound products as a result of the greater focus on environmental issues by the consumers.

Means:

Creating, upgrading and maintaining a common EU-wide eco-label with clear, regularly updated criteria that have to be met by manufacturers. (Criteria are set by the Eco-labelling Board with representatives of different interest groups.)

Criteria:

Should guarantee the lowest possible impact on the environment through the entire life cycle of the product in question, without lacking behind compared to similar products, in terms of quality, duration and functionality.

Product groups:

All purpose cleaners; Clothing, bed linen and indoor textiles; Copying and graphic paper; Dishwashers; Dishwashing detergents; Hand dishwashing detergents; Hard floor coverings; Laundry detergents; Light bulbs; Mattresses; Paints and varnishes; Personal computers; Portable computers; Refrigerators; Shoes; Soil improvers; Televisions; Tissue paper; Tourist accommodation service; Vacuum cleaners; and Washing machines.

(Further reading: European Eco-label catalogue)

Source: <http://www.eco-label.com/default.htm>



The Swan is the official Nordic eco-label and was developed by the Nordic Council of Ministers in 1989. The eco-label of the Swan can be found on more than 800 products within 70 product groups in Scandinavia.

Objectives, Means and Criteria:

Objectives, means and criteria are quite similar to the ones of the EU Flower. A main difference compared to the Flower is that the awards are reviewed every year.

Product groups:

Adhesives; Audiovisual equipment; Automatic dishwashing detergent; Batteries (primary and rechargeable); Building materials; Car care products; Car wash installations; Cleaning products; Cleaning services; Closed fireplaces for biofuel; Closed toilet systems; Coffee filters; Composts; Compressors; Copying machines/printers/fax machines; Cosmetic products; De-icers; Detergents for textiles; Dishwasher detergents for professional use; Durable wood (Alternative to conventionally impregnated wood); Filmforming floor care products; Flooring; Furniture and fitments; Grease-proof paper; Hand towel roll services; Hand washing up liquid; Hotels; Industrial cleaning and degreasing agents; Kitchen appliance and equipment; Laundries; Lawn movers; Light sources; Lubricating oils; Marine engines; Microfibre cloths and mops; Oil burner/boiler combinations; Outdoor furniture; Packaging paper; Paper envelopes; Personal computers; Photo finishing services; Printed matter (brochures, catalogues, magazines); Printed wiring boards; Printing paper; Sanitary products; Shampoo/conditioner; Small heat pumps; Solid biofuel boilers; Supermarkets and grocery stores; Textiles; Tissue paper; Toner cartridges; Washing machines; Vehicle tyres; Windows; Working machines, park and garden; and Writing instruments.

Source: SIS Ecolabelling 2004 ; <http://www.svanen.nu/Eng/>

material recycling. A minimum level of recycling for various waste categories was agreed on with the government, which has been achieved. In particular the recycling of aluminium beverage cans, using deposits, has been very successful (more than 90%).

4.4.3 Eco-labelling

An eco-labelling award scheme is a market-based instrument that should stimulate both the supply and demand of products with reduced environmental impacts. An eco-label provides the consumer with an easier way to find ecologically or environmentally friendly products. The idea is to provide the consumer with enough information to act in an environmentally sound way without creating an information overload that will only serve to confuse the consumer even more. The other objective with the eco-labelling scheme is to attract companies to take environmental precautions in their product chain, because the scheme provides the companies with recognizable information about the characteristics of the product, an environmental brand. Information about products is one of the cornerstones both according to the economic theoretical understanding of an open market with free competition, and the concept of the political consumer.

The eco-labelling award schemes are voluntary and are often based on a multi-criterion approach. The latter means that the criteria are selected from life cycle considerations, which can be a combination of energy savings, material-efficiency, and reduced amounts of hazardous substances or heavy metals. An example of a label that only has a single criterion is the US energy-star on electric and electronic equipment, which demonstrate the products with a low level of energy demand in the use phase.

The eco-labels are awarded by independent third-party organisations that check if products meet the criteria of the scheme. Other types of schemes exist, with various labels and criteria. The International Organization for Standardization (ISO) has identified three broad types of voluntary labels, of which eco-labelling could be categorised under the Type I group:

- Type I -- a voluntary, multiple-criterion based, third party program that awards a license that authorizes the use of environmental labels on products, indicating overall environmental preference of a product within a particular product category based on life cycle considerations.
- Type II -- informative environmental self-declaration claims.
- Type III -- voluntary programs that provide quantified environmental data of a product, under pre-set categories of parameters set by a qualified third party and based on life cycle assessment, and verified by that or another qualified third party [GEN].

Though the idea of eco-labels is to guide the consumer to products with certain environmental characteristics, the jungle of different labels sometimes tends to confuse more than provide guidance. Both the schemes of the EU and the Nordic Council are evaluated and tightened up every third year. It has been discussed if the award schemes can be used as a regulatory push to urge companies to improve the environmental performance of their products. The problem is, on the other hand, the desire that as many producers as possible should apply for the eco-label. The experience from the EU eco-labelling on textiles shows that the committee evaluating the criteria chooses to keep the criteria at the same level, so that more producers would apply for the eco-label. If this is a general tendency it speaks against the eco-labelling schemes as a regulatory push. The eco-labelling schemes then do not motivate the producers to improve the environmental performance of products.

4.5 Evaluating Corporate Voluntary Initiatives

4.5.1 The Positive Sides of Voluntary Measures

Corporate voluntary initiatives are interesting from a policy perspective because companies have the power to improve their environmental performance by changing the organisation of production, the demand to suppliers, and investing in environmentally sound technologies. Voluntary instruments can serve as strategic management systems for implementation of these improvements with regard to the economy and specific technical possibilities of the company. Even if corporate self-regulation cannot replace legislation, the implementation of voluntary initiatives is partly motivated by the pressure from environmental regulations. In addition, voluntary initiatives are motivated by a need to build corporate images. Finally it may allow a company to manage the flow of resources within the corporation as a whole, at single production sites, and through linkages to the supply chain.

A certificate or a corporate code of conduct does not by itself lead to environmental improvements. Only by a thorough implementation throughout the whole company, from the managing director to the worker on the floor, can it contribute to environmental improvements. It is an ongoing development process, which does not stop but rather begins when implementing the environmental management instruments. In order to benefit from voluntary initiatives, it is of great importance for the management to realise and commit to this continuing process.

4.5.2 Which Environmental Management Instrument to Choose

Environmental management instruments can be used to change the perception of the relation between environmental problems

Box 4.2 Reports on Voluntary Instruments in Press

Xerox Saved \$2 Billion Through Eco-Design and Manufacturing [www.greenbiz.com]

Japanese Eco-Design May Help Businesses Meet New EU Standards [www.edie.net/news/news_story.asp?id=6285&channel=0#]

Novo Nordisk: Companywide Commitment to Triple Bottom Line Safe [Climate Case Study, 2003]

Future 500 Upgrades Software Tool for Better CSR Strategy, Reporting [www.greenbiz.com]

SAN FRANCISCO, June 15, 2005 – The Future 500, a nonprofit network of major corporations and NGOs, has released the third version of its Global Citizenship 360, a software process designed to promote better CSR strategy and performance and help improve GRI and sustainability reporting.

Currently used by over 75 auto, food, beverage, banking, energy, and electronics companies in 60 countries worldwide, Global Citizenship 360 (GC360) helps companies measure, report, and improve performance against the Global Reporting Initiative (GRI), Dow Jones Sustainability Index, FTSE4Good, Global Compact, ICCR, and 16 other standards. With a built-in GRI reporting framework, the GC360 aligns a total of 20 sets of standards with the GRI guidelines to drive further value from GRI reporting efforts.

Formerly known as the CAP Gap Audit, the GC360 software also includes an analysis tool for performance assessment, information management, trend analysis, and strategy creation.

Report Examines Companies' Success in Applying GRI Economic Performance Indicators [www.greenbiz.com]

SAN FRANCISCO, Calif., Dec. 6, 2005 – Business for Social Responsibility has released a new report that reviews how well the Global Reporting Initiative (GRI) Economic Performance Indicators have been applied by 33 companies, including GE, McDonald's, Novo Nordisk, Shell, Starbucks, and Toyota. Reporting on Economic Impacts evaluates how the Economic Performance Indicators have been used and proposes recommendations for updating the GRI Guidelines.

BSR's new report addresses direct, indirect, and local economic impacts based on the most recent sustainability reports released by a cross-section of companies. For each of these dimensions, Reporting on Economic Impacts explains BSR's findings and conclusions, the implications for Guideline revisions, and recommended changes to ensure the clarity, comparability and assurability of the GRI Economic Performance Indicators.

and solutions, by changing the way the company manage their resources, product development, purchase etc. The applied management instruments, like environmental management systems, codes of conduct and eco-design can maintain the focus on the environmental issues that must be addressed. In addition, tools like input-output balances, environmental management accounting, and life cycle assessment can be used to reveal the financial side of the company's environment, or the main environmental impacts of the production, and of the product from cradle to grave.

Common to these voluntary instruments is that they can serve as indicators of the corporate environmental management approach. A more thorough analysis of the environmental management initiatives can determine whether the corporate initiatives address the most significant environmental problems of the company, or if they are only image building. Furthermore, a study can reveal if the initiative improves the environmental performance of production and products. Global Citizenship 360 has developed a software that can be used to study the relevance and effectiveness of the instruments a company uses (See further Box 4.2). It can also be used to study a company without environmental schemes, to locate what type of environmental approach the company should choose.

4.5.3 Do Voluntary Measures Lead to Compliance?

For their effect, voluntary measures are totally dependent on management intentions and the kind of use management makes of them. Whether under the heading of corporate responsibility, accounting principles or product responsibility there will always be a business element, or perspective, in setting up the measures in the first place. It may be cost reductions, image nursing or improved stakeholder relations, including relation to public authorities. Except for the cost reduction purpose, these business perspectives will, however, only work if there is substance to the environmental and corporate responsibility side of the initiative in the eyes of target groups and stakeholders. Setting up voluntary measures without the intention to make them work can easily become counterproductive for the company. Voluntary measures are at the same time expensive, or very expensive, to establish, and the cost reductions often aimed at as a central element to the initiative will only be met if they are effectively implemented and maintained. In these latter two aspects lies an implicit push towards fulfilling the environmental and social responsibility aims of the measures. This in turn will support compliance, which will always be a built-in *minimum* in any voluntary measure.

Study Questions

1. Describe the most important stages in the life cycle of a product and the environmental impacts, which may be caused by each of them.
2. Explain the concepts of environmental stewardship and corporate social responsibility (CSR) and argue for or against that these should be adopted by business.
3. Describe what issues are addressed in a code of conduct.
4. What instruments do companies use to communicate their environmental performance and social responsibility to their stakeholders?
5. Explain how environmental accounting and other forms of sustainability accounting may help companies to reach the goal of sustainable business.
6. Describe the concept of Triple Bottom Line and how it became a success in the business world.
7. Describe the different forms of sustainability reporting and what role they play for the companies and the stakeholders, in particular customers, owners and public authorities.
8. Describe in brief how the eco-design of a product is conducted, and what issues are addressed in the re-design of a product.
9. What are the reasons for a company to start working with eco-design?
10. Describe the most common types of eco-labels of products and what information they provide.
11. What are the reasons for companies to start using eco-labels on their products?
12. List the most important voluntary regulatory instruments in the field of environment and sustainability used by major business and other organisations such as municipalities; describe the role they have in achieving compliance with environmental legislation.

Abbreviations

BSR	Business for Social Responsibility
CP	Cleaner Production
CSR	Corporate Social Responsibility
DfE	Design for the environment
EMA	Environmental Management Accounting
EMAS	Eco-Management and Audit Scheme
GEN	Global Eco-labelling Network
GRI	Global Reporting Initiative
ICCR	Interfaith Center on Corporate Responsibility
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
OECD	Organisation for Economic Co-operation and Development
PRO	Producer responsibility organization
SETAC	Society of Environmental Toxicology and Chemistry
SR	Social responsibility
UNEP	United Nations Environment Programme
WBCSD	World Business Council for Sustainable Development
WEEE	Waste of electrical and electronic equipment

Internet Resources

European Environment Agency's guide to LCA

<http://reports.eea.europa.eu/GH-07-97-595-EN-C/en>

Environment Canada's website of life cycle management

<http://www.ec.gc.ca/ecocycle/en/whatislcm.cfm>

IKEA Code of conduct

<http://www.ikea-group.ikea.com/corporate/responsible/conduct.html>

Corporate Social Responsibility (CSR) web pages of the European Commission

http://ec.europa.eu/enterprise/csr/index_en.htm

International Institute of Sustainable Development, IISD, on CSR standards

<http://www.iisd.org/standards/csr.asp>

CSR Europe

<http://www.csreurope.org/>

Business in the Community – UK Network of 700 companies site of CSR

<http://www.mallenbaker.net/csr/>

Business for Social Responsibility, BSR

<http://www.bsr.org/>

Environmental Management Accounting (EMA) Research and Information Centre

<http://www.emawebsite.org/>

The Environmental and Sustainability Management Accounting Network, EMAN

<http://www.eman-eu.net/>

Global Reporting Initiative, GRI

<http://www.globalreporting.org/Home>

European Union Eco-label Homepage

http://ec.europa.eu/environment/ecolabel/index_en.htm

European Eco-label Catalogue

<http://www.eco-label.com/default.htm>

The Swan Ecolabel

<http://www.svanen.nu/Eng/>

Global Ecolabelling Network (GEN)

<http://www.gen.gr.jp/index.html>

Pre Consultants Eco-design

<http://www.pre.nl/ecodesign/default.htm>

The Global Citizenship 360

<http://www.future500.org/audit>

GreenBiz.com

<http://www.greenbiz.com>

Edie

<http://www.edie.net>

World Business Council for Sustainable Development, collection of case studies

<http://www.wbcsd.ch/templates/TemplateWBCSD2/layout.asp?type=p&MenuId=MTYx&doOpen=1&ClickMenu=LeftMenu>

Shared Responsibilities

5

5.1 The Background

5.1.1 The Limitations of Control

The 1987 launch of the notion of sustainability by the Brundtland Commission was a kind of summary and logical consequence of the previous 20 years of experience: it was clear that control of the pollution was insufficient. Any kind of control had resulted in extra costs while the problem remained, albeit in a different physical form. We may control the wastewater at the outlet and treat it to remove the dirt before dispatching the water to the river or the sea. But the dirt, taken out, will then have to be dealt with somehow. The only possible response is prevention of pollution instead of control. You will have to address the source of the pollution, which means the point of production whether that is industrial manufacturing, farming or production of electric power. It includes all sectors of life, also the private consumption, where e.g. reduction in use of energy, whether electricity or petrol, is of the same importance for the pollution prevention.

Addressing the source of the pollution means more interference with private – first of all business – interests and decision-making. One needs to go into the details of how an activity works. Mandatory regulation would still form the backbone of environmental protective measures, but the source-oriented, pollution prevention approach cannot be put into practice without business involvement – and consent. This is the background to a growing interest for shared responsibility.

In this chapter we will first take a closer look at the alternative, the call for business-authority cooperation in European, international and global fora. We will then focus on

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the *covenants* – environmental agreements between government and industry on reduction goals for certain substances or products within an agreed time frame – and finally the related procedures of reporting and documentation. This has been the most common and concrete form of truly “shared responsibilities”, as it is based upon the contract form and, therefore, is a market-based instrument.

5.1.2 Shared Responsibilities

Shared Responsibilities is an expression widely used for the last decade in the environmental policy context. It refers to an understanding amongst national and international politics and businesses, of mutual responsibilities for the fate of the global environment. Both politicians and business are expected to act in support of this understanding, where possible jointly, or at least in some sort of cooperation. The goal is to combine efforts and forces for efficient protection of the environment.

The previous chapters demonstrated how increased business environmental awareness has been materializing in a number of concrete steps in areas not subject to mandatory regulation. The introduction of Environmental Management Systems, EMS, is the key example. Another case is eco-labeling. Here the framework is established by law, but the use is either voluntary or leaves considerable room for adaptation to the specific needs of the particular organisation or company.

Thus there are several examples of how business has accepted a responsibility for the protection of the environment and natural resources. This is true even if that responsibility comes as a result of different kinds of pressures. These pressures include the threat of new and enlarged mandatory regulations from authorities, actions by grass root organisations and other citizen pressure groups, or thirdly through the market by consumer and customer requests.

In the balance between self-regulation and regulation by outside authorities, self-regulation is often the better alternative for a company. It gives the company or organisation larger freedom to choose how to deal with an issue; it is less resource demanding and may lead to increased good will and acceptance in society. We will now look at this more closely.

5.1.3 The Choice between Self-Regulation and Authority Control

In several areas the need for some kind of regulation has grown during the last few decades. In very many of these cases self-regulation has been the outcome. A few examples will illustrate the reason for this choice.

Introduction of gene technology during the 1970’s spurred a heated debate on ethics, in particular on safety and risks on one hand, and respect for genetic integrity, on the other. What

could a researcher or an industry do with this technology? Fears for diseases caused by genetically engineered microorganisms spreading in the population and concerns for animal welfare were raised. The research community responded with a moratorium of several years, around 1976-80. During that time risk research was conducted and strict guidelines for research were outlined and committees to control them were organised. As a result authorities found no reason to intervene with legislation and control. Industry research, e.g. in the pharmaceutical industry, followed the scheduled devised by universities closely.

Box 5.1 The Johannesburg Earth Summit



Figure 5.1 WSSD in Johannesburg 2002. *The third Plenary meeting.* (©UN Photo 2002.)

The Rio+10 summit in Johannesburg 2002 had two main purposes:

- Reaffirming Agenda 21 and other initiatives from the Rio conference and later conferences and filling in holes that have impeded the implementation process of such initiatives;
- Agreeing on new goals and targets for certain areas.

An Action Agenda was agreed upon, setting targets in the following areas:

- Water and sanitation
- Energy
- Health
- Agriculture
- Biodiversity & ecosystem management
- Finance, trade and globalization

Of specific relevance for the topic of this chapter is one of the agreed goals within the area “Finance, trade and globalisation”. The participating countries commit themselves to “Actively promote corporate responsibility and accountability”.

Source: UN 2003

Legal control, with formal rules, permits, reports, monitoring visits etc., was by all considered to be avoided by all means.

Another example is found in the media world. Many years back a news articles in tabloid papers publishing unfounded pejorative statements about individuals, raised the request that freedom of expression, established in the constitution in several countries, needed to be limited. The press responded by establishing internal committees, which were to handle complaints on news media for unethical publishing. The legal right for freedom of expression remained unchanged. Very few court cases on news media have taken place.

Several other groups in society have during the last few decades institutionalised self-control within their profession. It is for any such activity a better alternative than authority interventions and reduction of the professional activities by stricter legal control. Now we see a similar strategy developing in the area of industrial production and environmental impact.

5.2 The EU and Business World Response

5.2.1 The EU Environmental Action Programmes

The concept of shared responsibilities is very clearly reflected already in EU's 5th Environmental Action Programme *Towards Sustainability* from 1992, launched in time for the up-coming 1992 Earth Summit on Environment and Development in Rio de Janeiro [Box 2.7, p. 45]. With this programme, the European Union recognised that the approaches used and measures taken till then were not enough to deal with the expected growth of the world economy. Achieving balance between economic activity, global equity and protection of the environment required, it was said, a sharing of the responsibilities among politics, authorities, and private business. It was in addition asking also the individual citizen to include these considerations in the choices they were making for themselves and their families. [*Towards Sustainability*, p 3]. The same participatory approach dominates the Agenda 21 document from the 1992 Summit.

The demand was seen to cut across all areas of the EU-programme, but has in addition got its own chapter in the programme. A number of areas, initiatives and actors are mentioned here, but without allocation of resources and ways of action to put them into practice. Much of this will have to take place at the national and regional/local level.

Covenants are environmental agreements between government and industry. It is one of the instruments mentioned within this area.

The EU's 6th Environmental Action Programme repeats the need for cooperation and dialogue, but does not refer specifically to the covenant or any other concrete steps and means to help this cooperation and process of dialogue. However, the

programme stresses the efforts to secure more effective implementation of the already existing policies as a main task for all member states for the programme period. The combination of dialogue and the agreed goals for reduction of adverse environmental impact may open for an even wider use of the covenant at the national level, where the implementation takes place. We shall look more closely into the experiences and likely developments below.

5.2.2 The Sustainability Agenda

The Rio Summit in 1992 made the concept of sustainability the focal point for all efforts to improve and secure the environment. The Johannesburg Summit September 2002, the 10th year follow-up on the Rio Summit, confirmed sustainable development as the core of the efforts and the notion, by which all initiatives and policy-making should be interpreted and graded. In 1992 the concept of sustainability had elements of "a need for fundamental restructuring". In the 10 years since, the concept had been included in mainstream business vision and agendas. Sustainability had been taken over – if not hi-jacked – by global corporate business with the acceptance of an applause from key international government organizations.

Box 5.2 Sharing Responsibilities in a Competitive World

The April 1996 International Conference on "Sustainable Industrial Development: Sharing Responsibilities in a Competitive World" was organized jointly by the the Government of the Netherlands, the Dutch Business Association, the EU-Commission, the OECD and the United Nations. The following quote is part of a longer summary of the conference, written by the Dutch chairman of the conference, Ruud Lubbers:

The conference embraced the concept of eco-efficiency as a central objective of Sustainable Industrial Development.

However it was also stressed that improving ecoefficiency is more than just developing and applying new technology. Equally important is to find new ways of doing business by linking together different industries, to set up joint ventures between public utilities and private industries, to establish financial structures that will ensure a fair distribution of costs and benefits in combining efforts to improve eco-efficiency. It is worth stressing that emphasizing the significance of institutional approaches for economic efficiency is very much in phase with modern concepts in economic theory.

Source: Lubbers 1996

An example of this development is the April 1996 International Conference on “Sustainable Industrial Development: Sharing Responsibilities in a Competitive World”. The conference was jointly organized by the Government of The Netherlands, the Dutch Business Association, the EU Commission, the OECD and the United Nations. The report from the conference (Box 5.2) was sent to the United Nations Secretary General.

The conference embraced the concept of eco-efficiency as a central objective of sustainable industrial development. More efficient resource use would reduce pollution at the source and be better business. The conference also called upon more international cooperation at e.g. the EU policy level to enhance the scope of this concept. The conference saw covenants as a possible framework for the partnership between the private and the public sector. It pointed to the Dutch experiences as a model for that solution. Further the conference pointed at the need for improving SMEs environmental management capabilities, especially to make SMEs have access to technology and share expertise between corporate business and SMEs. It is especially relevant since SMEs often serve as suppliers to the big companies.

5.2.3 Business Action for Sustainable Development-Initiative, BASD

In October 2001 in Paris the World Business Council for Sustainable Development (WBCSD) and the International Chamber of Commerce (ICC) jointly organised a strategy meeting called Business Action for Sustainable Development Initiative, (BASD). It was a cooperative venture for the run-up to the Johannesburg Summit. The idea was to make sure that the business voice was heard in a strong and cohesive manner in Johannesburg and that business had its proper place at the 2002 World Summit.

Focus of the WBCSD Presidential address to the meeting was a 10-Point Vision document on “The business case for sustainable development”. It summarised the current thinking on sustainability in the organisation. The prime condition for making this vision for a sustainable society come true was said to be shared responsibility among governments, business and civil society. The roles were indicated accordingly:

- Business should provide safe and sustainable products.
- Government should create the right political framework for the market economy, which at the same time should promote sustainability.
- Civil society should provide sound advice to consumers and help them select the right products and make the right choices in their own lives as a way of supporting sustainability.

The concluding remarks pointed to the need for a holistic view and an integrative approach to achieve sustainability.

It is not surprising – and fully understandable – that business organisations promote business interests in all possible areas, including the issue of sustainability. The problem is that the incommensurability and reciprocally conflicting character of the different suggestions for actions provided is not even mentioned. It may be summarised as the conflict between growth and sustainability. This conflict is not hinted at either by government representatives, political leaders, NGO-representatives, or by academia, frequently present or invited for presentations at these different occasions and conferences like those mentioned here. There seems to be a consensus on mainstream thinking and understanding of economics, politics and broader societal issues by all organisations and individuals participating in these discussions, making all papers and policy documents look very much the same. This underlines the very ideological nature of the issue of sustainability itself, which in turn affects the proposals and the documents provided to that end. It requires that scholars, studying these issues be on the alert.

In 2005 the WBCSD took a fresh look at its strategy so far, where the organisation had been active raising awareness of business and distributing information on the numerous important issues linked to sustainable development, summarised in Box 5.3. However important still, the

“members boldly decided it’s no longer enough to study [the] issues ... [WBCSD] must now work with new partners to develop and advocate solutions and to manage [the] issues. It needs to help put in place framework conditions that will allow business to play an evermore effective role in managing natural resources and alleviating poverty.” [WBCSD Annual review 2005 – *From Awareness to Action*]

The WBCSD talks about “a major turning point in its operations” (op. cit.) The council and its members wanted to take on a much more active and implementation oriented role in the efforts of bringing Sustainability about. It wanted to implement the new strategy.

5.3 Covenants/Environmental Agreements, EA

5.3.1 Environmental Agreements versus Command-and-Control

The core of an *environmental agreement*, EA, also called a *covenant*, is a written statement, entered into by the government and the relevant industrial organisations and/or individual companies on implementation of specified government policies on the reduction of pollution from that sector. The EAs are seen as a way of broadening the set of policy instruments

available and in particular to be able to meet the expectations in the concept of shared responsibilities, whereby business is invited to have a say, and at the same time expected to take on greater responsibility for protecting the environment.

The agreement is seen as the core element in a programme to improve the effectiveness of policy implementation in an industrial sector. The member companies might be expected to look more favourably upon obligations, that are taken on by agreement instead of issued as an “order” or command in a command-and-control culture.

5.3.2 EA and the Dutch National Environmental Policy Plan, NEPP

There is a great variety in the ways environmental agreements are conceived as well as in their content and their scope among the different EU countries. EAs have been used for more than 20 years, but in the present round and understanding they took off in the late 1980’s. It began with the Dutch National Environmental Policy Plan (NEPP) from 1989 and an updated NEPP+ already from 1990.

The overall idea of this new legislation was to set up a strategy for achieving sustainability by the year 2010, with intermediate milestones for each area by 1995 and by 2000. Sustainability is defined for the purpose by a broad range of

Box 5.3 The Business Case for Sustainable Development

Ahead of the Johannesburg Summit 2002, the World Business Council for Sustainable Development presented in the paper “The Business Case for Sustainable Development” their vision for a sustainable society. In the paper, the vision of WBCSD is subdivided into 10 so-called ‘building-blocks’ that, when put together, constitutes the business contribution to a sustainable society.

1. **The market:** “Sustainable development is best achieved through open, competitive, rightly framed international markets that honor legitimate comparative advantages. Such markets encourage efficiency and innovation, both necessities for sustainable human progress.”
2. **The right frame:** “full-cost pricing of goods and services; the dismantling of perverse subsidies; greater use of market instruments and less of command-and-control regulations; more tax on things to be discouraged, like waste and pollution and less on things to be encouraged, like jobs (in a fiscally neutral setting); and more reflection of environmental resource use in Standard National Accounts.”
3. **Eco-Efficiency:** “The WBCSD defines eco-efficiency as being achieved by the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle, to a level at least in line with the Earth’s estimated carrying capacity.”
4. **Corporate Social Responsibility:** “... the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve their quality of life.”
5. **Learning to change:** “Movement toward corporate concern for the triple bottom line – financial, social, and environmental performance – requires radical

change throughout the corporation.” “The goal is unification of vision from shop floor to boardroom. This requires new systems of rewards. It requires hard looks at corporate basics, such as the product portfolio and relations with suppliers and customers.”

6. **From dialogue to partnerships:** “Business has much experience with stakeholder dialogue, but still too little with the next step: practical partnerships composed of players in different sectors.” “Progress toward sustainable development requires many more and more complex partnerships.”
7. **Informing and providing consumer choice:** “If business believes in a free market where people have choices, business should accept responsibility for informing consumers about the social and environmental effects of those choices.”
8. **Innovation:** “Recent history suggests that those living in wealthier countries do not intend to consume and waste less. Given that the other 80% of the planet’s people seek to emulate those consumption habits, the only hope for sustainability is to change forms of consumption. To do so, we must innovate.”
9. **Reflecting the worth of the earth:** “We do not protect what we do not value. Many of nature’s resources and services are currently not monetized. Establishing such prices in ways that do not cut the poor off from crucial resources could reduce resource waste and pollution.”
10. **Making markets work for all:** “The business case for poverty reduction is straightforward. Business cannot succeed in societies that fail. Poverty wastes human resources – the ability of the poor to contribute to societal development, theirs and others – and undermines market potential – the potential for the poor to purchase goods and services.”

Source: WBCSD 2002

quality objectives, covering the main environmental issues or “themes”. They are then turned into more than 200 quantified targets. The responsibility for achieving these targets is then devolved to the key economic actors in terms of their contribution to the environmental impact related to these targets. These actors (industry, agriculture, transport etc.) then become “target groups”, to whom government will then allocate the responsibility for implementing the targets set in the NEPP. The planned EAs with industry would cover about 90% of the targeted pollutants from Dutch industry. The EA is therefore the legal instrument by which the sector responsibility is formally taken on by the target group. In the Dutch case the EA is a legally binding contract according to Dutch civil law.

This stringency is unusual in the EAs, used in all other countries, and so are the ambitions invested in them. EAs in other countries are often concerned with waste management, in particular in areas with a need for collection of used consumer packaging (bottles, cans) or widely used products, containing noxious substances (batteries with cadmium and lead, used tyres). Only few, if any, of these EA’s are legally binding – or rather, not legally enforceable by court ruling.

The point of departure in the Dutch system is therefore set targets for a range of pollutants, relevant to a particular target group like e.g. the chemical industry. Those set targets are not negotiable at the negotiation table for the agreement. They represent the policy, which has to be implemented. The negotiations will instead have to establish what has been called a “knowledge base” for the agreement on the implementation. This is concerned with an inventory of current emissions in the sector, and sub-sector distribution of these emissions. The data achieved is used to get the burdens distributed according to the pollution contributed. Finally a database is set up to store and to update all these data for subsequent use.

5.3.3 Implementing Environmental Agreements

The database describing the present state of pollution in a specified sector provides the knowledge base for signing a specific Environmental Agreement. The first document to be made is called a *Declaration of Intent* between the two parties, government and industrial sector, represented normally by the business sector association. The Declaration constitutes an Integrated Environmental Target Plan (IETP) for the industry in question, which is the legal background for the actual implementation initiatives to be taken. On the industry side the IETP is then signed by all individual companies, active within that sector and thereby making it legally binding for them to act in accordance with the plan and to contribute their share of the reductions in impact, contained in the plan.

The regional and local authorities are also partners to the EA negotiations. Regional and local authorities in most EU countries, e.g. in Holland, like in Denmark, have the main responsibility for the implementation of the environmental regulations. This includes the issuing of the environmental permits, that many of the companies involved here will end up having in order to operate their business.

Box 5.4 PPP Public Private Partnership



Figure 5.2 Partnership for Science. *Uppsala Science Park is a Public-Private Partnership currently supported and established by Uppsala County, Uppsala municipality and Uppsala University, currently housing 150 enterprises in the field of biomedicine and information technology. (Photo @ Uppsala University)*

Government-industry agreements appear in other situations besides environmental protection. The number of projects which are common undertakings between business and government or local authorities is increasing. Under the name of public-private partnerships, infrastructure developments, remediation of brown fields, sports areas and many other projects are financed both by tax money and private investments. In this way railroads, roads etc either become possible or are constructed earlier than if only public funding were available.

There are several ways for the private actors to get money back on their investments. These include time-limited monopolies, agreed charges, etc. Such schemes need to be part of the contract between the public and private when a project starts.

It is clear that public-private partnership has in the first place been necessitated by limited access to public funding. But at the same time it is an expression of an administrative culture needed by the authorities to achieve sustainability. Sustainability can not be reached by authorities or the private sector in isolation. Cooperation is needed.

With the IETP established the subsequent planning and negotiation for the implementation of the plan will differ as to the nature of the industry in question.

For sectors with homogeneous types of production, the parties will establish a “Sector level Implementation Plan”, stipulating directly what each individual company in that sector will have to do to comply and contribute their share of the targeted results. That will then become a part of the environmental licence, which these companies have. It will also be introduced into the licence next time it has to be reviewed, separately and at once, if needed for the company to comply with important requests in the Sector Level Implementation Plan.

For sectors with heterogeneous, that is complex/mixed-type, production processes with a wider range of environmental impacts, the implementation has to be individualised for each single company. For these companies a Company Environmental Plan (CEP) is worked out to be valid for four years and then revised. The CEP is the instrument which combines the IETP and the legally binding obligations taken on by the company when signing the agreement. In CEP the company obligations are detailed and specified for all the relevant pollutants and impacts in the IETP for that particular company. The CEP is prepared in close cooperation and dialogue with the local or regional authorities, responsible for that company’s environmental licence. When the CEP is approved by the authorities it will serve as the essential management tool for the company’s environmental licence.

5.3.4 Experiences from the Dutch Environmental Agreements

The unique and at the same time important feature of the Dutch system of EAs is the stringent combination of the Government Environmental Policy, stated as the sector-wise quantified objectives for reduced impact, the EAs, signed as the IETPs, and the actual implementation via the combination of the Environmental Licences and the IETP-obligations through the CEPs or the Sector level Implementation Plans.

The first Dutch EA was signed in 1990 with the printing industry. In 1992 the EA for the base metal industry and in 1993 the EA for the chemical sector were signed. With those last two EAs the very complex – heterogeneous – sectors were included, and the CEP instrument therefore was to be put to use. The first round of CEPs in the chemical sector were evaluated in 1997 by the Dutch Inspectorate for the Environment – a government agency. Some of the main conclusions on these first round of CEPs were:

- The CEPs are acceptable overall, but its scope for improvements on areas of uncertainty, and details on

financial priorities are weak and so is – important for the second round of CEPs – its strategic content.

- The competent authorities have resource problems (lack of time and in some cases also skill) to deal adequately with the CEPs and include the content fast enough into the licences.
- There are problems with the accuracy of the quantitative emission data in the CEPs and in the annual reporting – essential for monitoring the progress towards targets.
- The national direction for the development of the CEPs is important and has been working in the chemical sector with a strong association and a surveyable number of companies.

Box 5.5 The Dutch Covenant Concept

Covenant:

Voluntary agreement between government and certain companies, entered into by the government to secure the implementation of Dutch environmental regulation.

Objective:

To implement the Dutch Environmental Policy Plans (NEPPs) in companies, by making voluntary agreements to follow the regulation.

Philosophy:

Only if the companies share the understanding of the importance of the regulatory initiatives will they be prepared to implement them.

Requirements of the Covenants (for Companies):

A Company Environmental Plan (CEP)
Specific targets for environmental improvement, including BAT-technologies.

Advantages of the Concept:

A effective implementation structure for the original Dutch license.
May constitute the basis for implementing the targets of the IPPC-license.
Could be a suitable implementation structure for EMAS, since the requirements are quite similar to the ones in EMAS.

Limitations of the Concept:

Does not in itself establish a sufficient implementation structure to secure the implementation of the demand in the IPPC directive for an integrated approach to environmental regulation.

Source: Gouldson & Murphy 1998

- Integration of the new CEP instrument internally in companies with e.g. an environmental management system and for the authorities integration into the existing licensing and monitoring system were both not paid enough attention to before the start and should be given higher priority.

In 2002/2003 a study on the effectiveness of the agreements or covenants, commissioned by the Dutch ministry of the Environment (VROM), was carried out [Bressers and De Bruijn, 2005]. The focus of the project was the identification of success and failure factors. The central conclusion on the use and effects of the covenants is quite positive, although several constraints were also identified. Most importantly, the implementation context turned out to be highly relevant for covenant success.

5.3.5 Upcoming Revised Dutch Environmental Policy has a Limited Role for Environmental Agreements

The Dutch government presented during 2000 to parliament a proposed new NEPP, – the 4th National Environmental Policy Plan (Summary report, *Where there's a will there's a world – Working on Sustainability*). It has EAs or Covenants included as an instrument, having achieved many successes, first of all in reducing emissions and thereby the presence of priority substances in the environment. But the implementation problems, mentioned also in the study by Bressers and De Bruijn, are underlined and a new evaluation study announced to help create the background for a “decision of the future role of covenants in the policy mix” [op.cit. p 30]. This is the one and only mention of covenants in the report.

The proposal takes its point of departure in the presently changing nature of environmental impact from human, economic activity, placing the climate issue, the loss of biodiversity and the need for profound changes of social life firmly on the agenda. That in turn means, that long-term and broad, future oriented policy development is needed, compared to the thinking of the 1980's and the 1990's. The proposal refers to a 1997 document on Environment and Economy, outlining the perspective for a sustainable economic development. At the core of this perspective lies a complete decoupling of economic growth and environmental impact. An evaluation of the effectiveness of a bottom-up approach to achieve this goal is made. It points out that holding the private sector accountable for their own actions within a co-operative approach with agreement and covenants as the key instruments has scored successes. The evaluation also shows, however, that the intended decoupling cannot be achieved by private initiatives alone. “This requires a national government policy which should focus on incorpo-

rating environmental costs into the prices” (op.cit. p 8). This reference to the need for giving market instruments in the form of taxes, levies and tradable permits is accepted as an important base for future environmental policy and mentioned throughout the report.

This indicates a more general shift in policy and policy instruments as the understanding of the environmental threats is shifting from the need for control of emission of noxious substances to water and air, to the need for profound societal restructuring in the reach for sustainable economic development. It's a more normative approach to policy, but implemented to a higher degree by market-oriented, first of all economic, instruments. This demands re-thinking and re-formulation of the concept of “shared responsibilities”. There needs to be a co-operation on limiting the impact from current practice to a profound restructuring, “working on sustainability” as the subtitle of the NEPP-4 programme reads.

5.4 Environmental Agreements and the EU

5.4.1 Evaluation of the Environmental Agreements

In 1997 the European Environment Agency (EEA) published a review of Environmental Agreements and environmental effectiveness as an evaluation of environmental policy instruments. It was made to contribute to the European Parliament's debate on the EU-Commission Communication on Environmental Agreements from November 1996.

The evaluation was based on the scarce literature and little empirical evidence available due to the quite recent introduction of this instrument, supplemented by six case studies made for the purpose of the study. The main conclusions of the study were:

- It is difficult to make a quantitative assessment of the environmental effectiveness, the reduction in impact achieved, of the case studies due to lack of baseline information and reliable monitoring data as well as consistent reporting.
- Wider benefits were found on improvements on the situation and on the encouragement of environmental management in business.
- The transparency, credibility and accountability of the policies pursued with the EAs were doubted due to the often limited public access to the process of establishing the agreements.

The EEA concluded that the environmental agreements were most useful as complements to other policy instruments to help raise awareness, create consensus and provide a fo-

Box 5.6 EA Suitability and Implementation

Some concluding remarks from the European Environmental Agency's study on the suitability and implementation of Environmental Agreements (EAs):

EAs are most suitable for:

- proactive industries or businesses
- small number of partners or high organisation level of signatory partners
- production of goods (i.e. industry)
- sectors which have matured and face limited competition (i.e. where there are few opportunities for 'free riders')
- environmental problems of limited scale (national and regional environmental problems)
- limited number of sources of pollution
- long-term targets (early signal)

Implementation is more effective when:

- clear targets are set prior to the agreement
- the agreement specifies the baseline against which improvements will be measured
- the agreements specifies reliable and clear monitoring and reporting mechanisms
- technical solutions are available in order to reach the agreed target
- the costs of complying with the EA are limited and are relatively similar for all members of the target group
- third parties are involved in the design and application of EAs

Source: EEA 1997, p 15

rum for information sharing and testing of new mechanisms to increase flexibility. The case studies demonstrated a potential for the agreements in raising effectiveness of implementation, where regulatory and fiscal instruments are difficult to enforce or apply.

The cases in the study were taken from six different countries. They included two cases on Target Setting EAs (An EA on End-of-Life Vehicle disposal from France, and a German EA on CO₂-emissions) and four Implementation EAs (Sweden on Packaging Waste handling, The Netherlands on Chemicals, Portugal on Pulp & Paper and Denmark on Packaging Waste handling).

The EEA study seem to come out less favourable than the investigation made about one year later by the Dutch Inspectorate for the Environment referred to above. Some of the reservations were the same, however, first of all on the quality of the emission data. The EEA study had the Dutch cases as the most productive, including effectiveness, although still with reservations. The study provided a short list on EA suitability and their implementation (Box 5.6)

5.4.2 The Member States Survey

A study on the use of EAs within the member states showed some 300 EAs in force in 1996 and that they were operating in the twelve countries that were then member states. This study together with the above mentioned EEA study were important drivers for an EU Communication on the role and possible use of EA's. The Communication concluded that EAs with indus-

try have an important role to play in the total mix of policy-instruments. They can:

- Promote pro-active attitudes on the part of industry.
- Provide cost-effective, tailor-made solutions on implementation.
- Allow for smooth and effective measures in advance of legislation.

The Commission stated that it is important to ensure transparency and reliability for the EAs. The Commission later developed guidelines for their use and conditions for their use when implementing EU Directives, and indicated how they might be used as policy instruments at the EU level. At this level there are problems for the Commission, as Agreements in terms of legally binding contracts are not part of the legal instruments, open for the Commission according to the EU Treaty. In this respect, the Commission can therefore only use "Understandings" or "Commitments" or that kind of "soft" expressions.

The 6th Environmental Action Programme, decided upon in 2002 and running till 2010, does not have any central place in the strategies and the policy instruments highlighted for EAs at the national level. A Commission Communication [COM (2002) 412] presents the work on EAs at the Community level, but it remains quite preliminary and inconcrete as to action. The lack of explicit mentioning of the EAs at the national level in the 6th EAP is surprising in as much as a crosscutting priority for the new programme is improved

implementation of community legislation in the member states. It remains therefore to be seen whether we here see a change in policy at the EU-level along the same lines, as we saw at the Dutch NEPP-4 programme. It still remains to be seen what the role of EAs will be in the EU policies. That will most likely affect the policies towards the EA in the member states. A shift away from EAs as a central policy instrument is indicated also by the fact that there have been no further initiatives concerning EAs at the EU level since the late 1990's evaluations and the subsequent Commission Communications.

5.5 Experiences of Shared Responsibilities

5.5.1 The Meaning of "Share"

The term Shared Responsibilities rests upon the recognition of a dual power base for the regulation of environmental impact. On the one hand there is the public and political authority, divided into different levels and with the legitimacy to regulate activities, private and public, at a societal level. On the other hand there is the private business, in this matter representing at the same time the dominating polluting entities. Despite the exclusive power, in a democratic society, for the political authority to legislate and thereby oblige private business to adhere to and comply with the legislation, the notion of shared responsibility implies that this formal authority does not work. It is not able to make businesses comply with the regulation made to protect the environment and natural resources. It therefore needs to enter into a power-sharing exercise with the polluter to reach the level of protection asked for.

The material presented in this chapter – and very much more could have been added – shows, that this state of affairs worries neither national governments nor supranational political entities like the EU. Rather, it is seen as “good environmental governance” to involve subjects of a regulation and stakeholders alike not only in shaping and formulating the regulation to come, but also in administering and implementing the regulation already carried and in force.

It is actually quite seldom that these notions and understandings are questioned, let alone made subject to a more thorough critical assessment. We have seen a few remarks from the EU Commission on possible problems with transparency and accountability for EAs. Most importantly that they are concluded – at least in the final stages – in closed negotiations between government agencies and business representatives to make it possible to reach an agreement at all.

But the whole underlying societal structures and relations and their possible influence on the problems encountered and



Figure 5.3. Environmental agreements. After agreement with authorities several major industrial groups have established companies to manage recycling. In Sweden today the return of aluminium cans, with a deposit, is about 90%. At Aass brewery in Norway cans made from recycled cans are filled. (Photo: <http://www.resirk.no/sw1134.asp>)

solutions available are neither investigated nor discussed, when the UN, the EU, the OECD, nor World Summits meet and receive “white” or “green” papers and issue declarations on the way to sustainability and global equity. OECD thus writes “Increased Trade and Investment Liberalization is vital (for poverty eradication) and its importance for sustainable development cannot be underestimated, ...but needs to be accompanied by appropriate national policies to ensure social and environmental benefits as well as economic growth”.

[From the OECD-document *Working together towards sustainable development – the OECD Experience*]. This is just a brief example.

This type of reasoning is commonplace and has become common sense or “mainstream”. The contradictory character of, and within, this type of reasoning is not addressed. The strongly contested and outright problematic argumentation on free trade and poverty eradication is presented as an obvious and proven fact. When one is no longer able to critically address fundamental societal issues and assumptions, one is left with curative, post-active solutions. One is left with an ideology.

5.5.2 Implementation

At the level of implementation, which is gaining increasing attention (EU 6th Environmental Action Programme and the OECD-2002 Work Programme), the notion “Shared Responsibility” is actually misplaced and a misunderstanding. Compliance is not a shared responsibility. For a company subject to a given piece of regulation, compliance is an obligation – or a “responsibility” – and an obligation for the company alone. To make companies be more active, make them show greater readiness, on compliance represents a long since understood

interconnection between increased regulation of the environmental impact at the source and a need to find ways of reducing public sector costs in implementing such a regulatory strategy. Company management is closest to the decision-making on what to produce, what machinery and what raw materials to use. Thereby they are best to decide on how to best avoid producing the pollutants they should avoid.

We are here at the very centre of our whole presentation and analysis. We want management to make environmental concern an integrated part of the managerial function and management decision-making in the company. Environmental compliance should be a “routine matter” in line with paying the paychecks to the employees at the end of the month or the week. The competent authority can then save on monitoring and control and have more time to support the company in forward-looking and dynamic technological changes with a positive environmental perspective. There are then also more time for other public authority duties on preservation of environment.

Here Environmental Management Systems can be of help, especially if company management happens to operate at a “system” level in all important areas. Otherwise the EMS will be a separate and thereby also easily isolated phenomenon without significant impact on management actions. In Chapter 3 we have dealt with EMS in the previous section together with other, essentially, management voluntary environment related actions. And we have presented an additional instrument close to management experiences and a well-known business tool, the Environmental Agreement. Also this instrument is concerned with compliance, organised in a form and in a way which opens for management influence on the details on “how” but, again, not on “whether” as the compliance is obligatory for the company.

5.5.3 Securing Compliance

The present-day environmental implementation instrument no 1 is the Environmental Licence or Permit. In its EU variant it is called and IPPC licence, applying to those industries with the most and potentially most negative impact on the environment. Here we are within the full-fledged authority-based policy instrument – resting on an EU Directive with the subsequent obligation for all member states to implement it in their environmental law. The environmental permit – and the IPPC Directive – is addressed in the subsequent chapter.

A completely different issue is that of “beyond compliance”. This refers to the management of a company taking measures to protect the environment and/or natural resources or reach out for equity which is not (yet) included in any regulation and therefore not mandatory. There can be many reasons for initiatives like this, but they will eventually be linked to

the interest of the company to be sustained for long time. This may be for marketing, for cost saving on supplies or production, or more generally for image promotion. (This in turn has much in common with the marketing issue.) Still, these initiatives can be important as they might be setting new standards for e.g. salaries and working conditions at their suppliers in 3rd-world countries, or sustainable production of raw materials like cotton and synthetic fibres. They can be true examples of sharing responsibilities while at the same time benefiting company interests.

5.6 Shifting Nature of Environmental Challenges Changes the Notion of “Sharing”.

5.6.1 New Trends

Recent moves described and trends spotted above indicates that the concept of “shared responsibilities” is being reviewed and re-launched lately. In this the industrial actors have the WBCSD as a model, while the political actors have the most covenant/EA-oriented country, the Netherlands, as the model. In addition the EU 6th Environmental Programme follows the same “line”. Industry talks about moving from “awareness” to “action”. Governments talk about moving from implementation by authority control mixed with consent, till implementation by levies and taxes, i.e. economic incentives. The key to understand the development is the same on both sides, that is, the allegedly changing nature of the environmental problems. The important goal is to get global and systemic. The “savings” and “emission reduction” agendas are over and to a great extent also covered and solved. Remaining problems, e.g. with chemicals, as now regulated by the EU REACH initiative, are predominantly a health issue rather than an environmental issue.

5.6.2 The New Task Ahead

The task ahead is a profound restructuring of the way we produce and live and the way we secure our standard of living. To avoid backward oriented changes, decoupling is the up-coming agenda for our societies. Or even more stringent: not only decoupling but rather a reverse relation between economic progress and environmental impact. Business has accepted that this agenda is set, fixed and unavoidable with the climate issue as the “driving force” for the change of public opinion and hence of politics. Taking action means that the response and contribution from business “will come through our core business, not from philanthropic programmes. If action to address global issues is to be substantial and sustainable, it must also be profitable”. [WBCSD, op.cit./Box. 5.3]. The message from the industrial sector is clear: we will act and do so as far as profitability allows. Possible contradictions between the

task ahead and the limits of profitability are – once again – not addressed.

For politics and government the Dutch NEPP-4 reflections indicates, that the politicians have given up on the regulatory side. Instead they point to market-oriented solutions. In the Netherlands these are levies, taxes and tradable permits. The liberalist government in Denmark, on the contrary, has excluded itself from using taxes for changing company (and people) behaviour at all. A recent suggestion from government was to decrease the environmental taxation and leave almost everything to the market alone. The recent unambitious energy and climate policies at the national level in many countries as well as at the EU level (with many of the same nations assembled there) tells a story of leaving things to the profitability of the market. Companies are trying to get their “own share of the cake” by levies and taxation, which themselves will remain “peanuts” in comparison with the profits at hand. Putting the key part of the regulation in an economic form means making it compatible with the profitability claim. Then it leaves the nature/recipient oriented regulation with absolute thresholds aside. The balance in the “shared responsibilities” concept will then have tilted.

Study Questions

1. Is sustainability the responsibility of a) state; b) business; or c) both?
2. What are the pros and cons of regulation and self-regulation from the business and authority side respectively?
3. How does the European Union view self-regulation, specifically what does the 5th and 6th EAP say?
4. What are the main differences between business concepts like Eco-Efficiency and Cleaner Production, brought forward at the Johannesburg conference and the concept of sustainability?
5. Explain the Dutch covenants concept, and what makes them unique.
6. What are the limitations of environmental agreements?
7. What requirements are essential for the implementation of environmental agreements?
8. Explain the Branch level Implementation Plan and the notions of IETP and CEP.
9. What lessons could be learned from the Dutch covenant concept/process?
10. Is there a possible synergy between CEPs and EMS with its initial review and environmental statement?
11. Could experiences from the Dutch system of covenants, with its large proportion of voluntariness, be transferred to your country?
12. Explain and discuss the contradictions between free market competition and poverty eradication and between profitability and sustainability, pointed at in the text.
13. What is meant by being ‘left just with an ideology’ when omitting the confrontation on fundamentally differing positions?

Abbreviations

BASD	Business Action for Sustainable Development-Initiative
CEP	Company Environmental Plan
EA	Environmental Agreement
EAP	Environmental Action Programme
EEA	European Environment Agency
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management Systems
ICC	International Chamber of Commerce
IETP	Integrated Environmental Target Plan
IPPC	Integrated Pollution Prevention and Control
NEPP	The Dutch National Environmental Policy Plan
OECD	Organisation for Economic Co-operation and Development
PPP	Public Private Partnership
REACH	Registration, Evaluation and Authorisation of Chemicals
SMEs	Small and Mediumsized Enterprises
VROM	Dutch ministry of the Environment
WBCSD	World Business Council for Sustainable Development
WSSD	World Summit on Sustainable Development (Johannesburg Conference)

Internet Resources

Johannesburg Plan of Implementation

http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POIToc.htm

International Institute for Sustainable Development (IISD) on the WSSD (2002 Johannesburg conference)

<http://www.iisd.ca/vol22/enb2251e.html>

World Business Council for Sustainable Development

<http://www.wbcsd.ch>

WBCSD Annual Review 2005

<http://www.wbcsd.org/DocRoot/i3aFM6E34L5LskqjG2A6/ar2005.pdf> with the new strategy document 'From Awareness to Action', May 22nd 2006

<http://www.wbcsd.org/DocRoot/u9JWotRo7iZka7fEMbV2/WBCSD-business-card.pdf>

WBCSD Annual Review 2006

<http://www.wbcsd.org/DocRoot/BfNGWxUk4gSKBfZfbYV7/annual-review2006.pdf>

International Chamber of Commerce (ICC)

<http://www.iccwbo.org/>

International Environmental Agreements database

<http://iea.uoregon.edu/>

EEA study Environmental Agreements – Environmental Effectiveness

<http://reports.eea.europa.eu/92-9167-052-9-sum/en/page007.html>

4th National Environmental Policy Plan

<http://www2.vrom.nl/Docs/internationaal/NMP4wwwengels.pdf>

The Dutch Ministry of environment

<http://international.vrom.nl/pagina.html?id=5450>

European Environment Agency

<http://www.eea.europa.eu/>

Activities of the EU – Environmental agreement and COM/2002/0412 final

<http://europa.eu/scadplus/leg/en/lvb/l28126.htm>

EU_Sixth Community Environment Action Programme 2002-2010

<http://ec.europa.eu/environment/newprg/index.htm>

Working Together Towards Sustainable Development: The OECD Experience

http://www.oecd.org/document/8/0,2340,en_2649_37425_2757192_1_1_1_37425,00.html

The Swedish can recycling (Swedish EPA)

<http://www.returpack.se>

Environmental Licensing and the IPPC Directive

6.1 Components of Environmental Law

6.1.1 Modernising Regulation through Integration

In the previous chapters we have focused, firstly, on the companies' internal possibilities for taking responsibility for their environmental issues, and secondly on the joint efforts between industry and authorities to promote shared responsibility for the environmental impacts of industrial activities.

In the following chapters we will focus on the regulation by authorities of industrial processes, based on national and international law and forming the legislative framework for keeping the environmental impact of industrial activity within politically acceptable limits. This regulation consists of *normative*, or command-and-control, instruments as well as *economic* – market driven – instruments.

Normative regulation first focused on the consequences of industrial discharges into the air and waters. The regulation was differentiated according to type and absorbing capacity of ambient nature. Companies were required to decrease or clean the discharges to meet the limits established against this background. This approach does not contribute to solving or minimizing the load of pollution created, merely containing it. As has been discussed earlier, the answer was to shift the focus from “end-of-the-pipe” to the source of the pollution, i.e. to the production process. This meant a shift from a predominantly static and defensive to a dynamic and proactive approach to regulating industrial environmental activity. In the EU-member states this led to demands on technology and tighter emission limit values. It was formulated in the 1996 Directive on Integrated Pollution Prevention and Control, the so-called IPPC directive. This directive required industrial installations to use the Best Available Techniques (BAT) and base its emission limits upon this assumption.

At the end of this chapter we will address the challenge of securing a dynamic development in reducing the environmental impact, embedded in the IPPC-approach, but not automatically realized.

In this Chapter

1. Components of Environmental Law
Modernising Regulation through Integration
The Legal Framework
National and International Legislation
2. Directives Related to IPPC
IPPC, EIA, SEVESO and EMAS
Environmental Impact Assessment
Which Directives Apply?
Public Participation
3. The IPPC Directive
Regulating Industrial Activities
The Base of the Directive
Objectives and Principles of the Directive
The Integrated Approach
Emission Limit Values, ELV
Best Available Techniques
Review, Update, and Public Participation
4. The IPPC Licensing Procedure
The Environmental Courts
The IPPC Permit Application
5. Assessment
Key Elements
BAT and BREFs
Economic Aspects of BAT
The Relation between Emissions, EQSs and the
Local Environment
Formulating Conditions in the Permit

6.1.2 The Legal Framework

The environmental regulatory framework in the EU, and in most industrialized countries, has five main stages:

- The law.
- Standards for the use of technologies and/or standards for the environmental quality.
- Licences or permits to allow industrial facilities to operate.
- Monitoring of compliance with the law and the licence.
- Enforcement of the law and the conditions included in the licence.

There is a specific relation between these five stages. Each and every step has a distinct function in the general aim to protect the environment and natural resources within the context of economic and other human exploitation. The *law* and the *standards* are the politically decided level of intervention to be applied. They represent what is politically meant to be sufficient to reach that goal. The *licence* (or *permit*, meaning the same thing) is the formal instrument linking the law with every single operational activity, that the law is meant to regulate. The licence is, in other words, implementing the law. *Monitoring* is the follow-up check from the environmental authorities of every single operation to make sure that the licence – and thereby the law – is complied with. When non-compliance is registered, the final step, the *enforcement*, is activated. That may in the end mean substantial fines for the company and for management personally and, possibly, closure of the company and its operations.

6.1.3 National and International Legislation

For the EU member states the legal framework is made up of EU legislation, binding for all member states and of, separate or additional, national legislation. National legislation is decided on by the national parliament and implemented by the government according to the national constitution. EU legislation on the environment has increased dramatically from 1987, when the EC Treaty was renewed and received a separate chapter on the environment for the first time, and till today.

EU legislation has the form either of a Directive or of a Regulation. A Regulation has immediate and direct binding effect for everybody in all member states. A Directive, on the other hand, must be written into national legislation (transposed or legally implemented) before taking effect. The transposition must be completed normally within two years and must comply fully with all the main elements of the directive. Each member state decides how the implementation should be organised, e.g. by placing the rules in different parts of current national legislation or making a completely new national law to hold the new regulation.

In addition to national and European regulations there are also regulations based on international law. These are the treaties or conventions made regionally (e.g. HELCOM, the Convention on the protection of the Baltic Sea) or globally (e.g. the Climate Convention). These enter into force in the individual countries only after ratification (confirmation) by the national parliament. Many regulations based on international environmental law are now channeled through EU legislation, and appear for the member states as a Directive or a Regulation. This process is based on the EU Treaty (Art 24 EU and Art 300 EC), which regulates when the Union takes over the representation of the member states in several international matters. Although the implementation will take place via EU legislation, the individual countries will still be represented at these international negotiations. The purpose is that the signing of a possible treaty or a convention should be made by each member country jointly with the EU representative to underline the wider support and to influence the negotiation process.

All nations have authorised some institution to control the activities and thereby implement the regulations. These are referred to in the legal text as the *Competent Authority* (CA). For small installations it is often a municipality-based authority or a regional, that is a county-based, authority. For larger installations it is typically a national authority such as the Environmental Protection Agency of the country, but it may also be e.g. an Inspectorate, such as the Chemical Inspectorate. It is only when the Authority responsible for the implementation of the directive finds that an installation is not complying with the given permit (licence) that the police authority or a court is addressed.

6.2. Directives Related to IPPC

6.2.1 IPPC, EIA, SEVESO and EMAS

The IPPC Directive is related to three other legal EU instruments. These are the Seveso II Directive, the EMAS Directive and the Environmental Impact Assessment, EIA, Directive. The Seveso II and EMAS have already been dealt with (chapters 1 and 2). Below we will introduce the EIA Directive. Environmental Impact Assessment of the effects of certain public and private projects was formally requested first in 1985 [Directive 85/337/EEC] which was later amended in 1997 [Directive 97/11/EC].

The Seveso II and EIA directives are both based on the experiences of the early 1980's, and several serious accidents in industrial plants. But their goals and scopes are different, and the definitions used are not identical. As the discussion of these and the IPPC Directive took place more or less in parallel, they do not contradict each other.

The EIA Directive covers a broad array of activities ranging from industrial to infrastructure projects likely to have significant effects on the environment. The IPPC Directive focuses on the environmental impact of new and existing industries and some agricultural activities. It does not cover infrastructure projects. The Seveso Directive applies to establishments where dangerous substances are present, and thresholds for installations sometimes differ from those used in the EIA Directive.

The differences between the different instruments relate to their different objectives. In comparison with the EIA Directive, the IPPC Directive places more emphasis on the Best Available Techniques and technical processes, whereas Seveso focuses on the risks of major accidents. In this context the scope of the information required under the EIA procedure is the widest and is largely comprehensive of the documentation required under the other directives, so the documentation required for the EIA Directive could be considered as a basis which will eventually be supplemented by other information required by the other instruments. [Interrelationship between IPPC, EIA, SEVESO and EMAS, Impel final report 1998].

6.2.2 Environmental Impact Assessment

The environmental impacts considered in an EIA assessment differ depending on national legislation, although some common ground has been created through the EU directive. Included are thus

- Space intrusion, affecting a neighbourhood.
- Pollution, including pollution caused by transport.
- Effects on ecosystems and nature.
- Nuisance for the society such as air pollution, noise, and odour.

More recently the social effects of a new installation have been stressed as important to consider. E.g. a new hydropower plant for which a large area is flooded to create a reservoir may cause villages to be set under water. Equally the opening of a new mine, especially strip-mining, may lead to displacement of whole populations. This may lead to very difficult decisions where two important values, a socio-economic and environmental, have to be balanced.

A very central concern in EIA is the effect on biodiversity. This is especially underlined in developing countries and in the UN Convention on Biodiversity. If, e.g. a railroad is planned to go through areas with unique biotopes, the company may be forced to choose a different route to get a permit.

For plans, programmes and policies an SEA, Strategic Environmental Assessment, is made based on a EU Directive adopted in 2000, mostly used for transport infrastructure

plans. There are also requirements regarding trans-border effects of new installations, such as a hydropower plant, which may influence a river upstream into another country.

6.2.3 Which Directives Apply?

It may be argued that IPPC projects should require an EIA procedure because they are considered to be large installations in EU legislation. But the question if an application is needed in the EIA, IPPC and Seveso Directives needs close scrutiny. Annex III of the EIA Directive covers aspects to be taken into account in the determination of whether an EIA is required. Neither the IPPC nor the Seveso Directive has such an annex. Member States may provide for a single list of projects for mandatory EIA (Annex I to the EIA Directive) and then include all or some of the projects in Annex I of the IPPC Directive. In the case of changes or extensions of existing projects, a range of decisions are left to Member States.

The EIA and IPPC procedures may be coordinated. On the other hand, it is possible to apply the EIA and IPPC provisions separately and a project may, therefore, be subject to both procedures. In these cases, the results of the EIA procedure shall be taken into account for the purpose of granting the permit under the IPPC Directive. Environmental reports, information or documentation are required by all instruments. Therefore, synergies should be used wherever possible, and links should be established to avoid duplication (e.g. article 6.2 of the IPPC Directive). However, the environmental reports or documentation of the EIA and IPPC procedures are focused on environmental effects and measures for prevention and reduction of these effects, whilst the Seveso reports are focused on the risk analysis and safety conditions.

6.2.4 Public Participation

Public participation is required in all four instruments but with different characteristics. In the EIA Directive, the 'public' has to be informed and the 'public concerned' consulted before development consent is granted. In contrast, the IPPC Directive the obligation is only to consider the 'public' comments before the decision is made. In the Seveso Directive the involvement of the public is related to the different measures to be taken, e.g. emergency plans. The EMAS regulation requires that the public must be informed about the EMAS scheme.

In Environmental Impact Assessment public participation is important. All those that may be influenced by possible nuisances from a new installation have the right to express their opinion on the proposal. The result of the EIA should be published in a report, and a public consultation should be undertaken. The comments and the report should be taken into account when the final decision is made and when the public

Box 6.1 The IPPC Directive

Introducing the IPPC Directive

Industrial production processes account for a considerable share of the overall pollution in Europe (for pollutants such as greenhouse gases, acidifying substances, wastewater emissions and waste). The EU has a set of common rules for permitting and controlling industrial installations in the IPPC Directive of 1996.

1. In essence, the IPPC Directive is about minimising pollution from various industrial sources throughout the European Union. Operators of industrial installations covered by Annex I of the IPPC Directive are required to obtain an authorisation (environmental permit) from the authorities in the EU countries. About 50.000 installations are covered by the IPPC Directive in the EU.
2. New installations, and existing installations which are subject to "substantial changes", have been required to meet the requirements of the IPPC Directive since 30 October 1999. Other existing installations must be brought into compliance by 30 October 2007. This is the key deadline for the full implementation of the Directive.

The IPPC Principles

The IPPC Directive is based on several principles, namely (1) an integrated approach, (2) best available techniques, (3) flexibility and (4) public participation.

1. The *integrated approach* means that the permits must take into account the whole environmental performance of the plant, covering e.g. emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and restoration of the site upon closure. The purpose of the Directive is to ensure a high level of protection of the environment taken as a whole.
2. The permit conditions including emission limit values (ELVs) must be based on *Best Available Techniques* (BAT), as defined in the IPPC Directive. To assist the licensing authorities and companies to determine BAT, the Commission organises an exchange of information between experts from the EU Member States, industry and environmental organisations. This work is coordinated by the European IPPC Bureau of the Institute for Prospective Technology Studies at EU Joint Research Centre in Seville (Spain). This results in the adoption and publication by the Commission of the BAT Reference Documents (the so-called BREFs). Executive summaries of the BREFs are also translated into the official EU languages.
3. The IPPC Directive contains elements of *flexibility* by allowing the licensing authorities, in determining permit conditions, to take into account:

- (a) the technical characteristics of the installation.
 - (b) its geographical location.
 - (c) the local environmental conditions.
4. The Directive ensures that *the public has a right to participate* in the decision making process, and to be informed of its consequences, by having access to
 - (a) permit applications in order to give opinions.
 - (b) permits.
 - (c) results of the monitoring of releases.
 - (d) the European Pollutant Emission Register (EPER).In EPER, emission data reported by Member States are made accessible in a public register, which is intended to provide environmental information on major industrial activities. EPER will be replaced by the European Pollutant Release and Transfer Register (E-PRTR) from 2007 reporting period onwards.

Legislation

The original IPPC directive has been amended twice since it entered in force. The first amendment reinforced public participation in line with the Aarhus Convention. The second amendment clarified the relationship between the permit conditions established in accordance with the IPPC Directive and the EU greenhouse gas emission trading scheme.

The consolidated legal text in official EU languages and a short summary of the IPPC directive and amendments are available at the Europa-site.

Key Implementation Measures

The Member States have chosen various approaches to implement the IPPC Directive, such as case-by-case permitting or use of General Binding Rules for industry sectors.

More information can be found in the first implementation reports by Member States. Reports for the second reporting period (2003-2005) were sent to the Commission by 30 September 2006. Reports can be found on Reportnet. Update on the reports submitted by Member States can be found in this site.

The Commission has adopted in November 2005 its first IPPC Report. It included an IPPC Implementation Action Plan set up to support the Member States and monitor the progress made towards meeting the deadline of 30 October 2007 for the full implementation of the Directive.

Source: the DG Environment webpage <http://ec.europa.eu/environment/ippc/index.htm>

is informed about that decision afterwards. If a Court of Concurrence, or corresponding authority, decides on the permits, the public – and in general all stakeholders – have the right to have their say on the proposed new installation in the court process.

The Aarhus Convention ensures that the public has access to information on the environmental effects of different projects. This convention was adopted by the Community in 2003 [Directive 2003/35/EC].

6.3 The IPPC Directive

6.3.1 Regulating Industrial Activities

A considerable part of the environmental impact is caused by industrial activities. In the European Union there are millions of companies of concern for the environment and thus in need of regulation for the protection of the environment. The large majority of these are small and medium sized enterprises, SMEs, mostly with a limited impact. These are all controlled by national legislation. But there are about 50,000 large industrial sites with activities of major concern. These are all controlled by the IPPC Directive and should have an Environmental Licence based on this directive to be allowed to operate.

The IPPC Directive 96/61 EC of 24th Sept. 1996, on Integrated Pollution Prevention and Control, was implemented in September 1999 in the EU-15. The ten new member states that entered the EU on the first of May 2004, have negotiated different terms and conditions for when this directive should be fully implemented. However it cannot be later than 30 October 2007. The directive is, as mentioned, concerned with the major industrial installations and installations in sectors of industry with potentially high environmental impact or risk. These, listed in Annex 1 to the Directive, include among others: energy industry; production and processing of metals; mineral industry; tanning; chemical industry and waste management [IPPC Directive annex 1]. It means that most private industrial output is regulated by the directive. The smaller and/or less dangerous installations are typically regulated along the same lines, but according to nationally established regulation.

The regulatory concept in the IPPC-directive is that the industrial activities, included in the Annex 1 to the directive are prohibited, i.e. cannot be established and commence activity, until they have been given an environmental licence. The licence includes specification of the regulatory requirements they should fulfill to be allowed to operate. This concept makes sure, that risks are controlled from the very start. And, even more importantly, the environmental authorities are not met with a *de facto* situation in terms of big investments,

which are difficult to have modified or changed dramatically for environmental protection reasons when first established.

Compliance with the conditions in the licence is monitored and enforcement action taken where necessary to secure full compliance by the companies. These issues are dealt with in Chapter 7.

6.3.2 The Base of the Directive

The IPPC directive has been in force since 1999 for new installations and for installations planning for substantial changes in their operations. For existing installations step-by-step implementation was decided. All existing installations must have an IPPC-type of license by October 2007. The grace period for the existing installations is given in order to make it possible to absorb implementation costs.

The Directive is based on the objectives and principles of the environmental policy of the Community as set out in Article 174 (EC) of the EU-Treaty. This includes the

- Principle of prevention.
- Principle of intervention at the source.
- The Polluter Pays Principle.
- The Precautionary Principle.

The directive represents a new approach in European industrial regulation. The integrated licence, comprising all media (air, water and soil) and all outputs (polluted air/dust/gases, wastewater and solid waste) is the instrument developed to put this approach into practice. It addresses all relevant aspects of environmental impact from an installation. Earlier, emissions to air and water were considered separately in accordance with two different Directives. The IPPC directive furthermore emphasises that attention must be given first to prevent the generation of the pollution, and only when this is not possible action must be taken to reduce emissions by means of cleaning technologies [IPPC Directive preamble, sections 4, 5, 6].

6.3.3 Objectives and Principles of the Directive

The overall purpose of the directive is to ensure that member states of the Union provide the necessary framework for the Competent Authority to be able to ensure that installations are run in a proper way. The Competent Authority, most often the Environmental Protection Agency, EPA, should thus see that

- The necessary measures are taken in order to prevent pollution, particularly through the application of BAT.
- Waste production is avoided or that waste is recovered when produced and – if it is technically and economically impossible – is disposed of while avoiding or reducing any impact on the environment.

- Energy is used efficiently.
- Measures are taken to prevent accidents and limit their consequences.
- Measures are taken to avoid risk of pollution and return the site of operation to a satisfactory state when activities are definitively closed down. [IPPC Directive article 3].

Besides these overall objectives, the Directive formulates six key principles that shall direct the regulation. These principles are:

- The integrated approach (article 7).
- Conditions formulated as Emission Limit Values (ELV) (article 9.3).
- The use of Best Available Techniques (BAT) as baseline for setting conditions (article 9.4).
- Periodical review and update of the permit and/or conditions (article 12 and 13).
- Self-monitoring (article 9.5).
- Public participation (article 15).

We will discuss each of these principles in turn.

6.3.4 The Integrated Approach

The objective of an integrated approach is to prevent emissions to air, water or soil in order to achieve a high level of protection of the environment as a whole. The integrated approach is to secure that the operator of a firm is discouraged from transferring pollution from one medium to the other. Separate approaches to control emissions to air, water or soil separately may, on the contrary, encourage the shifting of pollution between the various environmental media and thus not protect the environment as a whole [IPPC Directive preamble 7 and 8].

The principle of integration implies that conditions and the granting procedure shall be fully coordinated, whenever there is more than one authority involved in the permitting process [IPPC Directive Article 7].

6.3.5 Emission Limit Values, ELV

The conditions set up for the operation of installations shall normally be formulated as emission limit values (ELV). Where appropriate, the emission limit values may, however, be supplemented or replaced by equivalent parameters or technical measures [IPPC Directive Article 9,3].

In the directive, emission limit values shall mean “the mass, expressed in terms of certain specific parameters, concentration and/or level of an emission, which may not be exceeded during one or more periods of time” [IPPC Directive Article 2.6]. Whereas emission shall mean: “the direct or indirect re-

lease of substances, vibrations, heat or noise from individual or diffuse sources in the installation into the air, water or land” [IPPC Directive Article 2.5].

The emission limit values for substances shall normally apply at the point where the emissions leave the installation, and any dilution must be disregarded when determining the values. However, when it comes to indirect releases into surface water, i.e. when an installation discharges its wastewater to a common, often municipal, wastewater treatment plant, the effect of a wastewater treatment plant may be taken into account when determining the emission limit values of the installation involved. If the effect of the treatment plant is included in the licence for the installation, it necessitates that an equivalent level is guaranteed for the protection of the environment as a whole, i.e. at the point of discharge from the treatment plant, whereby it is secured, that it does not lead to higher levels of pollution of the environment [IPPC Directive Article 2.6].

6.3.6 Best Available Techniques

The emission limit values and the equivalent parameters and technical measures referred to above shall be based on the *Best Available Techniques* (BAT). Historically BAT has in some nations been termed BATNEEC, where the NEEC referred to ‘Not Entailing Excessive Costs’. It was thus an emphasis of the *proportional principle* saying that the requirement imposed must not be too costly compared to the environmental protection gained. The general proportional principle remains important and in force, while the specific “NEEC” addendum to the BAT-concept seems to have vanished.

BAT shall not prescribe the use of any technique or specific technology, but take into account the technical characteristics of the installation concerned [IPPC Directive Article 9,4].

In the directive 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], where:

- ‘Techniques’ shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.
- ‘Available’ techniques shall mean those 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.

- ‘Best’ shall mean “most effective in achieving a high general level of protection of the environment as a whole” [IPPC Directive article 2.11].

What constitutes the best available technique is of course extremely central in the directive. It is dealt with in detail by a special institution of the Union and is expressed in the so-called BREF documents. This will be further explained below.

6.3.7 Review, Update, and Public Participation

In the light of technical advances, Best Available Techniques will change over time. The competent authorities must therefore monitor or be informed of such progress in BAT [IPPC Directive article 11]. The directive further requires that the member states of the EU shall take the necessary measures to ensure that competent authorities periodically reconsider and, where necessary, update the conditions set for industry [IPPC Directive article 13]. The reconsideration shall furthermore be undertaken in any event where:

- The pollution caused by the installation is of such significance that the existing emission limit values of the permit need to be revised or new such values need to be included in the permit.
- Substantial changes in the best available techniques make it possible to reduce emissions significantly without imposing excessive costs.
- The operational safety of the process or activity requires other techniques to be used.
- New provisions of the Community or national legislation so dictate [IPPC Directive preamble 20 and article 13].

The directive demands that the operator carry out ‘suitable’ self-monitoring of releases including measurement of methodology and frequency, evaluation procedures etc. in order to supply the competent authority with data to evaluate the conditions of compliance [IPPC Directive article 9.5].

The directive demands transparency in the licensing process and therefore sets up a procedure that necessitates the involvement of the general public and ensures that different interests are considered in the process. The public shall thus have access to and the opportunity to comment on the permit application and a draft permit before it is processed. Furthermore the general public shall have access to the issued permits as well as the monitoring data in order to inform the general public on the installations’ actual and potential impact on the environment [IPPC Directive Article 15].

The Commission is currently carrying out a review of the IPPC Directive, and related legislation on industrial emissions, over the period 2006-2007. The review will not affect requirements of the IPPC Directive that Member States and industry will need to fulfill before 30 October 2007.

This review is based, *inter alia*, on the outcome of the consultation organised on the basis of the Commission Communication of 19 June 2003 *On the Road to Sustainable Production – Progress in implementing Council Directive 96/61/EC concerning integrated pollution prevention and control and contributions*.

6.4 The IPPC Licensing Procedure

6.4.1 The Environmental Courts

To achieve the above-mentioned objectives and principles, the IPPC Directive requires that member states set up an integrated licensing system for industrial installations, agricultural activities and landfills, all listed in annex I of the directive.

The member states need to establish competent authorities for the licensing procedures. These are *environmental courts* or *courts of concession*, with the authority to grant permits for installations covered by the directive. A permit or licence should be granted if conditions and requests for modifications of the installation can guarantee that the installation complies with the requirements of the directive. If this is not possible, the court shall refuse to grant the permit [IPPC Directive article 8].

It should be noted that the environmental court normally also handles applications for e.g. large infrastructures such as roads, railroads and bridges etc. Environmental courts are normally established on a regional or national level or both. They are not the same authority as the one which is responsible for inspection and control. (The inspection authority is however often responsible for issuing permits on a lower level, see below.)

For installations which are not listed in Annex 1 to the directive, the member states can establish a set of general requirements for a certain type of installations, that they must comply with. This standardization of the requirements for smaller and/or less polluting installations simplifies the licensing process both for the companies and for the authorities. Here the competent authority may be the same as the one responsible for inspection and control, that is an inspectorate or municipal or regional authority. Still, this procedure requires that an integrated approach and an equivalently high level of environmental protection are ensured in the handling of installations, subject to such general regulations [IPPC Directive article 9 and preamble 16]. A licence must be issued stating the

conditions from the general set of rules, applicable to the particular installation, as well as stating additional requirements, based on local or other, supplementary regulations, affecting the particular installation.

A licensing procedure normally has 3 stages:

1. Application for the licence by the company.
2. Assessment by the CA of the application checking layout, technology, production process and material use against the relevant range of regulations.
3. Formulating performance conditions and monitoring and reporting requirements in the permit.

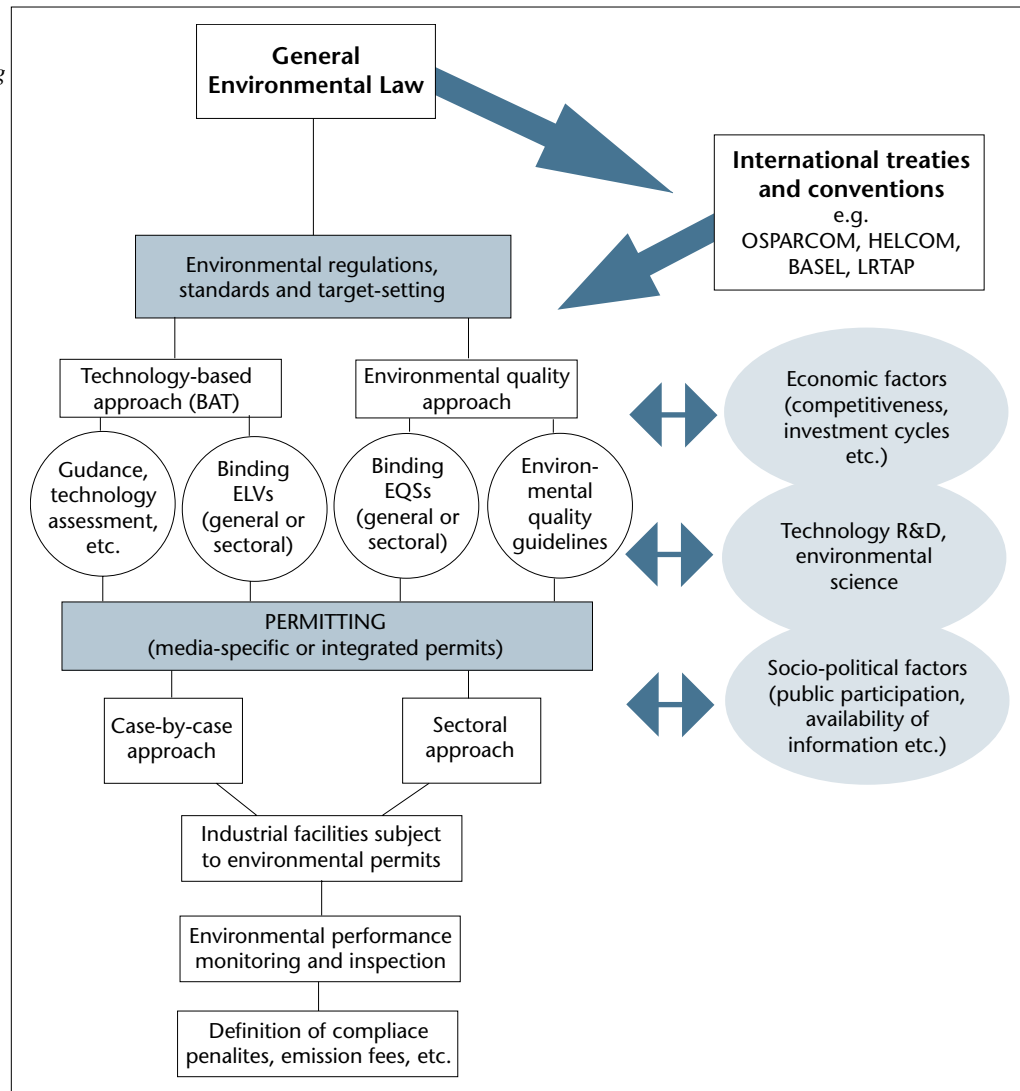
6.4.2 The IPPC Permit Application

The IPPC-directive demands that installations listed in annex 1 of the directive must apply for a permit before starting operation [IPPC Directive article 6].

This application shall include:

- A description of the installation and its activities.
- The conditions of the site of the installation.
- The use of raw- and auxiliary materials, other substances, and energy.
- The sources of emissions.
- The nature and quantities of foreseeable emissions from the installation into each medium.
- The identification of significant effects of the emissions on the environment [IPPC Directive article 6].

Figure 6.1 The policy framework of environmental permits. Factors taken into consideration when issuing an environmental permit or licence are all indicated in the diagram. The legal framework at the top, the ways to do it (technology or environmental quality based approaches) in the middle, and the implementation part (sectoral or case-by-case) at the bottom. [from OECD 1999, p 32]



The company in question thus needs to map its production processes and its technologies, showing inputs and outputs of materials and waste. A flow chart of the different processes is a useful approach linking the input, the use of resources, and the output, the products and different emissions to the different processes and techniques in the form of a mass balance, covering the full throughput of the installation and thereby providing a complete overview of its environmental impact.

Furthermore the application shall include a description of proposed technologies and other techniques to prevent or reduce emissions as well as measures for prevention and recovery of waste from the installation, whereby a clear link is established between the technologies used and the level of emissions made. Finally the application shall include measures planned to monitor emissions into the environment [IPPC Directive article 6].

To fulfill the requirements for public participation in the licensing process, which must take place prior to CA decision-making, the application must include a non-technical summary of all relevant information to make sure that the general public has a real chance to understand the potential environmental impact of the installation planned, and come up with comments where people find that modifications are needed. [IPPC Directive article 6].

6.5 Assessment

6.5.1 Key Elements

The process starts when the company applying for an IPPC permit hands in its documents (an Environmental Impact Assessment or an IPPC application or both) to the proper authority, that is the environmental court, or court of concession.

The court considers whether to grant or refuse the application or what conditions to require for a permit, based on the existing environmental law and after careful assessment, as well as giving concerned parties, stake-holders, the opportunity to intervene. If the assessment is divided among more administrative units, the member states are obliged to establish a co-ordination between them to make sure that an integrated approach to the licensing can be achieved, and that the shifting of emissions from one medium to another is taken into account and prohibited [IPPC Directive Art. 7].

A key element in this assessment is the decision on what can be considered as Best Available Techniques, BAT, in the context of the particular installation. If Environmental Quality Standards or local environmental conditions require tighter conditions than those, which can be obtained by BAT, the CA must apply these stricter conditions to the licence. [IPPC Directive Art. 10]

Let's take a closer look at these key elements of the assessment.

6.5.2 BAT and BREFs

When defining what is to be considered BAT, whether it is for the specific installation or sector in general, the likely costs and benefits of a measure as well as the principles of precaution and prevention shall – as mentioned earlier – be taken into consideration.

Besides this overall direction, annex IV of the directive lists different further considerations that shall be taken into account when setting the conditions (Box 6.2) [IPPC Directive Annex IV]. These considerations provide some guidance on what needs to be assessed before licensing the operation of the firm. However these considerations are obviously very general in respect to defining BAT.

The directive therefore requires that the Commission organises an exchange of information across Member States and

Box 6.2 Considerations in the Process of Determining Conditions

- The use of low-waste technology
- The use of less hazardous substances
- The furthering of recovery and recycling of substances generated and used in the process and of waste, where appropriate
- Comparable processes, facilities or methods of operation which have been tried with success on an industrial scale
- Technological advances and changes in scientific knowledge and understanding
- The nature, effects and volume of the emissions concerned
- The commissioning dates for new or existing installations
- The amount of time needed to introduce the best available technique
- The consumption and nature of raw materials (including water) used in the process and their energy efficiency
- The need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it
- The need to prevent accidents and to minimize the consequences for the environment
- The information published by the Commission pursuant to Article 16 (2) or by institutional organizations.

Source: IPPC Directive: Annex IV

Industry concerning what is to be considered as Best Available Techniques, about monitoring related to BAT and developments within the BAT concept [IPPC Directive article 16]. Therefore the commission has established the European IPPC Bureau at DG Joint Research Centre in Seville to develop this.

The outcome of this exchange of information is put together in the European BAT Reference Documents (BREFs). The BREFs are guiding documents to be used by the authorities when formulating conditions. The BREFs are rather technical documents of several hundred pages, giving overviews of existing technologies in each sector. By comparing the performance of various installations across the European Union the authors conclude what should be considered best available technique and the acceptable level of pollution within a sector at the EU level. The aim is to provide “horizontal” (branch-specific) BREFs for all industrial sectors listed in Annex I of the Directive. In December 2006 the 31 documents originally planned had been prepared. Three of them still awaited formal adoption. Furthermore there are some “vertical” BREFs that provide general guidance on methods to be used when establishing conditions in a licence, i.e. on how to define BAT economically and technically, and on how to set up self-monitoring requirements. These vertical BREFs are not sector-specific.

As mentioned, the BREF’s are non-legally binding guidelines that each member state should take into consideration when defining BAT and setting Emission Limit Values. However, the Directive gives the Council powers to set community emission limit values for IPPC installations, if evaluations show that the nationally and locally established limits and conditions do not lead to a satisfactory level of protection [IPPC Directive article 18]. This possibility has not yet been utilized by the Commission.

6.5.3 Economic Aspects of BAT

The starting point when defining BAT is always the technical characteristics of the installation applying for the licence. The BREFs (or other nationally determined BAT guiding system) present which techniques to be considered the most environmentally favourable and at the same time generally accepted as economically and technically viable within the sector. But it is only guiding material for the decision on whether the applying installation fulfils the BAT requirement [IPPC Directive article 9.4].

The definition of what constitutes “economically and technically viable” techniques is somewhat unclear in the directive. The question is whether it should be understood as eco-

Box 6.3 Annex III of the IPPC Directive

Indicative list of the main polluting substances to be taken into account if they are relevant for fixing emission limit values

Air

1. Sulphur dioxide and other sulphur compounds.
2. Oxides of nitrogen and other nitrogen compounds.
3. Carbon monoxide.
4. Volatile organic compounds.
5. Metals and their compounds.
6. Dust.
7. Asbestos (suspended particulates, fibres).
8. Chlorine and its compounds.
9. Fluorine and its compounds.
10. Arsenic and its compounds.
11. Cyanides.
12. Substances and preparations which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction via the air.
13. Polychlorinated dibenzodioxins and polychlorinated dibenzofurans.

Source: IPPC-directive Annex III

Water

1. Organohalogen compounds and substances which may form such compounds in the aquatic environment.
2. Organophosphorus compounds.
3. Organotin compounds.
4. Substances and preparations which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction in or via the aquatic environment.
5. Persistent hydrocarbons and persistent and bioaccumulable organic toxic substances.
6. Cyanides.
7. Metals and their compounds.
8. Arsenic and its compounds.
9. Biocides and plant health products.
10. Materials in suspension.
11. Substances which contribute to eutrophication (in particular, nitrates and phosphates).
12. Substances which have an unfavourable influence on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.).

nomically and technically viable at a sector level or for the specific installation.

However, the commission has expressed its opinion on this matter in a Handbook on the implementation of the EU environmental legislation directed especially to new Member States. In this, the commission suggests the following:

‘Economically viable’ is usually taken to apply to the category of installations as a whole, rather than to individual operators. However, what is economically viable may be different between different sectors of industry, and may be different in the case of existing plants as opposed to new ones. In practice the CA should, in consultation with representatives of the industrial sector concerned, examine the viability of proposed processes to arrive at an acceptable definition of a BAT, which is achievable by the installations. Reference to worldwide examples of techniques and assessment of availability in the country concerned should feature in the examination [EU-Handbook on the Implementation of EC Environmental Legislations, Section 7, p. 51f].

Thus, the CA both needs to consider the technological performance of the individual plant and the average level of achievable technological performance of the sector in general, and to decide the appropriate level of protection

If the companies cannot meet these levels at once, the Directive contains an option to set temporary derogations from the requirements. This implies that a rehabilitation plan is approved by the CA, ensuring that these requirements are met within six months and that the project will lead to a reduction of pollution [IPPC Directive article 9.6].

6.5.4 The Relation between Emissions, EQSs and the Local Environment

The directive states that where an Environmental Quality Standard, EQS, requires stricter conditions than those achievable by the use of BAT, additional measures shall be required in the permit [IPPC Directive article 10].

In the directive, an Environmental Quality Standard shall mean “the set of requirements which must be fulfilled at a given time by a given environment or particular part thereof, as set out in Community legislation” [IPPC Directive article 2.7].

As the EQS typically refers to local or regional environmental conditions, generally binding EQS at the EU level and even the national level are not set. These standards are to be found in different parts of EU and national legislation, which must then be taken into account when issuing environmental licences. When assessing the environmental benefits from the BAT requirements, the geographical location and the local environmental conditions should always be considered. If the BAT-approach cannot secure compliance with these standards,

additional Emission Limit Values (ELV) must be included in the conditions of the licence. [IPPC Directive article 9.4, preamble 18]. On special occasions local environmental conditions might lead to denial of the application altogether when located at this particular place or area.

6.5.5 Formulating Conditions in the Permit

As stated above the condition should primarily be formed as a maximum level of emissions – Emission Limit Values (ELVs).

ELV’s express the amount, defined in terms of concentration and/or level of emission, which may not be exceeded over a certain period of time.

Based on the assessments of the application, the CA shall thus decide on an appropriate maximum level of the different pollutants that the firm is allowed to emit during operation.

Principally, this may involve all the substances used in production. The directive does recommend, however, that ELV’s are primarily laid down for the particular groups, families or categories of substances that are listed in annex III of the directive.

The ELV’s are used also because they set a certain level to be met without prescribing the techniques or the methods used to achieve this level. Those decisions should be left to the company management to avoid limiting or hampering innovation and thereby technological development [IPPC Directive preamble 17]. And thereby the responsibility for fulfilling the requirements is also placed solely where it belongs – with the company management. Finally, the CA will typically not have the information or the qualifications to enter into that type of decision-making. But the CA might, based on horizontal experiences from numerous applications and inspections at productions sites, have advices to offer the company in the process of dialogue between the CA and the company, which is a typical part of a licensing procedure.

The directive gives, however, the options to supplement or even replace the emission limit values by equivalent parameters or technical measures, where this is appropriate [IPPC Directive 9.3].

Besides these performance conditions to ensure that the company is operating within a predefined acceptable level of pollution, the competent authority shall also formulate self-monitoring requirements. The objective of the self-monitoring is three-fold: to simplify the follow-up for the CA regarding compliance and enforcement; to push the firm to keep track of their environmental performance; and to use the self-monitoring data in an emission register available to the general public.

Study Questions

1. What are the main components of a legal framework for an environmentally hazardous activity in a EU member state?
2. Describe the basics of the IPPC, EIA, EMAS II and Seveso II directives and how they are related.
3. In what way does public participation come in when these four directives are implemented?
4. List what activities in the EU member states need an IPPC license (numbers and character); comment on how those not needing an IPPC license are regulated.
5. What is the philosophy behind, and main components of, the IPPC Directive?
6. What are the main advantages and limitations of the IPPC Directive?
7. Explain how the concept of BAT should be understood and used.
8. What are the advantages and drawbacks of defining BAT on the sector level in comparison to defining BAT on the company level?
9. What should be included in an IPPC permit application?
10. Discuss the use of EQSs and ELVs in relation to the local environment and the IPPC license.

Abbreviations

BAT	Best Available Techniques
BOD	Biological Oxygen Demand
BREF	BAT Reference Document
CA	Competent Authority
COD	Chemical Oxygen Demand
EIA	Environmental Impact Assessment
ELVs	Emission Limit Values
EMAS	Eco-Management and Audit Scheme
EPA	Environmental Protection Agency
EPER	European Pollutant Emission Register
E-PRTR	European Pollutant Release and Transfer Register
EQS	Environmental Quality Standard
HELCOM	Helsinki Commission of the Convention on the Protection of the Baltic Sea
IMPEL	European Union Network for the Implementation and Enforcement of Environmental Law
IPPC	Integrated Pollution Prevention and Control
LRTAP	Long Range Transboundary Air Pollutants
NEEC	Not Entailing Excessive Costs
OECD	Organisation for Economic Co-operation and Development

OSPARCOM	OSPAR Commission
R&D	Research and Development
SEA	Strategic Environmental Assessment
SMEs	Small and Medium-sized Enterprises

Internet Resources

DG Environment webpage on the IPPC Directive
<http://ec.europa.eu/environment/ippc/index.htm>

The consolidated IPPC Directive full text (pdf document)
<http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1996/L/01996L0061-20031120-en.pdf>

DG Environment webpage on the EMAS II Directive
http://ec.europa.eu/environment/emas/index_en.htm

DG Environment webpage on the Environmental Impact Assessment Directive
<http://ec.europa.eu/environment/eia/eia-legalcontext.htm>

DG Environment webpage on the Strategic Impact Assessment Directive
<http://ec.europa.eu/environment/eia/sea-legalcontext.htm>

DG Environment webpage on the Seveso II Directive
<http://ec.europa.eu/environment/seveso/index.htm>

Interrelationship between IPPC, EIA, SEVESO Directives and EMAS Regulation (Impel report 1998)
<http://ec.europa.eu/environment/eia/eia-studies-and-reports/impel-full-text.pdf>

IPPC 2003 Communication – On the Road to Sustainable Production
http://ec.europa.eu/environment/ippc/com_communication.htm

Documentation of BREFs by the European IPPC Bureau
<http://eippcb.jrc.es/pages/FActivities.htm>

Implementing Environmental Licensing

7.1 Balancing Rules for Environmental Licensing

7.1.1 Balancing Different Interests

When implementing environmental law in practice one will always be forced to strike a balance between different interests. These are often economy versus environment. To avoid pollution may be costly and difficult to finance for a company. Excessive costs may in some cases even lead to a threat to make a company less competitive, create unemployment or even close an activity. Often compromises are made to avoid such costs, or changes requested distributed over a number of years to reach an acceptable level of annual environmental investments.

Balancing may also involve the development of such conditions as development of infrastructures, protection of natural reserves, or the living conditions in residential areas. People living close to an industrial production have often, and for good reasons, complained about e.g. air pollution, intense and disturbing traffic, or risks. Such concerns need also to be weighed into a decision on licensing.

The environmental conditions for allowing an industrial activity are defined in environmental law. In practice, however, the conditions are not exactly defined. Thus it is a concern for the authority to arrive at a conclusion on the exact requirements for such a licence or permit. This chapter will discuss how a balance between different approaches is decided when an authority is developing a permit for a production facility. The parameters involved are technical, economic, environmental, managerial etc. They are all made in the context of the Integrated Pollution Prevention and Control, the IPPC, Directive, as the basis for environmental licensing within the European Union.

7.1.2 Technology or Limit Values

The IPPC Directive requires that the conditions formulated for an industry applying for a licence or permit shall weigh together several concerns. These are:

- The technical ones formulated in the Best Available Technique, BAT.
- The environmental concerns formulated in environmental quality requirements as the Environmental Quality Standards, EQSs.

In this Chapter

1. Balancing Rules for Environmental Licensing
 - Balancing Different Interests
 - Technology or Limit Values
 - Emission Limit Values
2. Best Available Technique
 - Sector or Company Standards
 - BREFs or Continuous Improvement
3. The Integrated Approach
 - The OECD Approach
 - Extending the Material Flows Perspective
4. Promotion of CP via the IPPC Licensing Framework
 - Promoting Environmental Development
 - The Licensing Process as a Dynamic Cycle
 - Negotiation During the Licensing Process
 - Developing Conditions
 - Information
 - The Weak Point – Lack of Systems View
5. Licensing and Other Regulatory Instruments
 - Goals and Policies in the Licence
 - Licensing Supporting EMS
 - Differences Between Licensing and EMS
 - Development and Environmental Plans

- The particular local conditions, the geographical location and the situation at the particular site or industry.

These conditions require the integration of two different approaches (Figure 6.1):

Firstly a technology-driven approach, where the focus is on the optimising of the technology choices in order to lower the pollution as much as possible. It corresponds to a licence to use the proposed techniques.

Secondly an environmental approach, whereas the focus is on the carrying capacity of the environment as direction for allowed pollution. This corresponds to a licence to pollute a specific amount.

The inclusion of both approaches gives wide freedom to formulate the national regulation. Here there are two different traditions. The directive focuses on the use of BAT as a basis for formulating the conditions whereas the EQSs and the local surroundings are more peripheral. The national regulation has traditionally focused on allowed pollution in respect to the local surroundings. When implementing the IPPC Directive we see a move from the environmentally driven licensing to a more technology-driven one. This is a move from regulating and controlling the emissions from the plant separately according to the media they are released to, to a more integrated, holistic, regulation focusing on the possibilities for process optimization through the use of BAT. It represents an understanding of the permit as an environmental approval of the technology and processes used in the production instead of, as earlier, a licence to pollute a certain amount.

7.1.3 Emission Limit Values, ELVs

Traditionally emission limit values have been the basis for environmental legislation. Emission limit values have still a very central place in the directive when formulating the conditions. This naturally means that focus will be at emissions rather than on inputs and processes. This is a problem for two reasons.

Firstly it is opposed to the directive's emphasis, that preventative actions should be the first option. If the formulated requirements do not correspond to this, it will be more difficult to keep the focus on the preventative actions in production.

Secondly emission limit values do not provide adequate flexibility for the installation and do commonly not correspond to how the companies themselves prefer to report their environmental aspects. Normally, in their internal accounting systems, companies present their result in respect to the number of produced units, so-called performance indicators. Thus we have e.g. number of tonnes of SO_x per produced units, rather than the total amount of SO_x from the factory. A way to make the condition more flexible and corresponding with the com-

panies' internal accounting system could be to formulate limits according to the produced units instead of absolute emission limits. Requiring production-related indicators can help provide an overall frame for the company to act within, whereas the conditions based on emission limit values make it difficult for the companies to maneuver [Kjær, 1996:20ff]. The dilemma is of course that the environment is sensitive to the absolute amounts, regardless of how many units are produced. An absolute upper limit on how much emission is allowed is also what an installation normally has in its licence, even if there also may be a value for the performance indicator.

Since the conditions and self-monitoring data would then be expressed in the same terms, the companies would have a clear indication of their environmental performance to incorporate into their management. A periodical evaluation of the company's development between the reviews of the permit can facilitate the implementation of the conditions.

7.2 Best Available Technique

7.2.1 Sector or Company Standards

As mentioned there are some uncertainties regarding the interpretation of the principle of Best Available Technique (BAT). It may be either the best techniques achievable on a sector level, or that achievable for each specific company.

If BAT is interpreted as the level achievable for an average of the firm in the sector, it is evident that the BAT sets a minimum-standard that cuts off the industries with the worst performance.

However, it is questionable if it is possible to specify BAT so that one specific technical solution can be defined as BAT [Kjær, 1996: 15]. The technology and techniques used in different productions can differ substantially even though they belong to the same sector and make the same. The different techniques used, the choice of resources, auxiliaries, intermediate feedstock, and the organization of the production will all influence the performance of the specific production. The different techniques will be very difficult to compare, especially because of the fact that one technique might perform better in some aspects but worse in others. To formulate uniform and coherent conditions may therefore prove to be difficult. If the idea is to provide different options for improvement, however, the work will be eased substantially.

The interpretation of BAT on the sector level has an additional disadvantage. It can make it more difficult to foster the firms to go further than what the sectorial standards prescribe and therefore halt innovation. When general or sectorial standards exist the competent authority needs quite strong arguments to make the firms see that they need to go further. When

Box 7.1 BAT in the Chlor-Alkali Industries

The electrolytic production of chlorine from sodium chloride solution (brine), the chlor-alkali process, was introduced on an industrial scale around 1890. Since the 1940's world chlorine production has risen enormously on the back of the burgeoning demand for plastics, notably PVC (polyvinylchloride) and polyurethanes, the production of chloro-aromatics such as chloro-benzene, solvents containing chlorinated hydrocarbons, and inorganic chlorine compounds.

The main technologies applied for chlor-alkali production are mercury, diaphragm and membrane cell electrolysis.

Technology choice

The mercury cell process involves two "cells" in an electrolyser through which saturated brine, 25% sodium chloride, flows. In the bottom a film of mercury (Hg) flows, serving as one of the electrodes, the cathode, adsorbing the sodium ions to produce sodium amalgam, thereby liberating chlorine gas at the anode. A typical plant using this technology needs about 200 tonnes of mercury; the contamination of land and waterways by mercury was, and is, a big environmental problem.

In the diaphragm process a diaphragm is employed to separate the chlorine liberated at the anode, and the hydrogen and caustic soda is produced directly at the cathode. A disadvantage with this method is that the chlorine gas produced is less pure than in the mercury process. Also the diaphragms are made of asbestos, which is an environmental concern, and need regular replacements.

In the membrane cell process the anode and cathode are separated by a water-impermeable ion-conducting membrane. Brine solution flows through the anode compartment where chloride ions are oxidised to chlorine gas, while the sodium ions migrate through the membrane to the cathode compartment which contains flowing caustic soda solution. The caustic soda produced with this technology is less concentrated. On the other hand the process is more energy efficient.

BAT considerations

The BREF document of the chlor-alkali process describes all three methods in some detail and the pros and cons for each of them. It is clear that the membrane process is the preferred one, both environmentally and economically; all plants built the last 20 years – since 1987 – use that technology. It is clearly said the membrane process is the best available technique, BAT. The BREF also describes the process for converting a plant from mercury to membrane technology as well as from diaphragm to membrane technology, and the environmental requirements made in connection with such conversions. The investments needed are estimated, citing some recent experiences in Western Europe



Figure 7.1 Chlor alkali industry. View of a membrane cell room equipped with bipolar electrolysers [source: the BREF document].

Regulations

Mercury emissions from the industry is the base for repeated request for out-phasing the mercury method in the chlor-alkali industry. According to Euro Chlor, the total mercury emission to air, water and products from chlor-alkali plants in Western Europe was 9.5 tonnes in 1998. Because of its historical experiences of mercury pollution, the Minimata disaster, Japanese regulation does not allow mercury technology to be used, and all installations in Japan are mercury free since mid 1980's. (The membrane technology was developed in Japan in the mid 1970s). Decision 90/3 of 14 June 1990 of the Commission for the Protection of the Marine Environment of the North-East Atlantic (OSPARCOM) recommends that existing mercury cell chlor-alkali plants should be phased out as soon as practicable, and no later than 2010.

In Europe there were in 2002 some 60 plants using the mercury methods, 40 of them in Germany, many in Russia, 2 in Poland, and 2 in Sweden. Present EU regulation foresees that the plants in the EU have changed technology or have closed by 2010. How to collect and store the mercury from these plants is still debated. Previously mercury was sold on the world market. This will not be allowed, as all trade with and use of mercury as such will be out-lawed. The mercury will have to be stored in old mines or equivalent places.

Source: The BREF document.

Box 7.2 BAT in the Cement Industry

Cement and concrete (a mixture of cement, aggregates, sand and water) is a basic material for building and civil engineering construction. Output from the cement industry is directly related to the state of the construction business in general and follows the overall economic situation closely. The production of cement in the EU-12 in 1995 was 172 million tonnes. In 1995 there were 252 installations producing cement clinker and finished cement in the EU-15 and a total of 437 kilns. In recent years typical kiln size has come to be around 3,000 tonnes clinker/day.

Technology choice

Cement manufacturing begins with the decomposition of calcium carbonate (CaCO_3) at about 900°C to leave calcium oxide (CaO , lime) and carbon dioxide (CO_2), known as calcination. The calcium oxide then reacts at high temperature ($1,400\text{--}1,500^\circ\text{C}$) with silica, alumina, and ferrous oxide to form the clinker, which is then ground or milled together with gypsum and other additives to produce cement.

There are four main process routes for the manufacture of cement. In the dry process, the raw materials are ground and dried to raw meal in the form of a flowable powder. The dry raw meal is then fed to a precalciner kiln or, more rarely, to a long dry kiln. In the semi-dry process dry raw meal is pelletised with water and fed into a preheater before the kiln or to a long kiln. In the semi-wet process the slurry is first dewatered and then fed either to a preheater or directly to a filter cake drier. In the wet process, the raw materials (often with high moisture content) are ground in water to form a slurry, which is either fed directly into the kiln or first to a slurry drier.

Historical development

The first rotary kilns were long wet kilns, up to 200 meter length, where the whole heat-consuming thermal process takes place in the kiln itself. The introduction of the dry process allowed drying, preheating and calcination to take place in a stationary installation rather than in the rotary kiln.

Grate preheater technology, better known as the Lepol kiln, was invented in 1928. It was the first approach to letting part of the clinkering process take place in a stationary installation outside the kiln. This allowed the rotary kiln to become shorter and reduced the heat losses and increased energy efficiency.

The invention of the suspension preheater in the early 1930's was a significant development. Preheating and even partial calcination of the dry raw meal takes place by maintaining the meal in suspension with hot gas from the rotary kiln. The precalcination technique has been available to the cement industry since about 1970. In this procedure a primary fuel combustion occurs in the kiln burning zone, while a secondary burning takes place in a



Figure 7.2 Kunda Nordic Cement Factory, Estonia. *The factory is one of the largest in the Baltic Sea region. It was transformed from an environmental disaster to a ISO 14001 certified plant in the ten years after the systems change. See further Book 4 in this series. (Photo: Kunda Cement)*

special combustion chamber between the rotary kiln and the preheater.

The four-stage cyclone preheater kiln system became standard technology in the 1970's when many plants were built in the 1,000 to 3,000 tonnes/day range. The exhaust gas is normally used for raw material drying.

BAT considerations

A large part of world clinker production is still based on wet processes. However, in Europe, more than 75% of production is based on dry processes thanks to the availability of dry raw materials.

Total burning energy requirement is – in MJ/tonne clinker – about 3,000 for dry process, multi-stage cyclone preheater and precalciner kilns, 3,100–4,200 for dry process rotary kilns equipped with cyclone preheaters, 3,300–4,500 for semi-dry/semi-wet processes (Lepol-kiln), up to 5,000 for dry process long kilns, and 5,000–6,000 for wet process long kilns.

The selected process will thus have a significant effect on the energy use. For new plants and major upgrades a dry process kiln with multi-stage preheating and precalcination is today's state of the art. The wet process kilns operating in Europe are generally expected to convert to the dry process when renewed, and so are semi-dry and semi-wet processes. Thus kiln systems with 5 cyclone preheater stages and precalciner are considered standard technology for new plants. Such a configuration will use 2,900–3,200 MJ/tonne clinker.

The selected process will also affect the releases of all pollutants, and be favoured by the new technology.

Source: BREF document

a sector specific BAT is defined, it is difficult to define the BAT for the specific firm as stricter than the sectorial requirements. When BAT is defined according to the specific facility the authority needs to set the requirements according to the techniques achievable for the company in question. In that way the authority can ignore the sector specific definitions of BAT and define BAT for the facility higher than the average performance of the sector in general. It is a way to foster the firms to innovate further and beyond the BAT defined in the sector.

On the other hand, if BAT is solely determined with respect to the specific firm, it is also evident that the performance achievable for that specific firm might be lower than the average performance of the sector. According to a strict interpretation of the BAT related to the specific firm there won't be any minimum restrictions. The facilities should then innovate on their own possibilities for improvements with no regard to the average sector level of technology performance. A strict interpretation will thus not be able to secure a minimum performance.

7.2.2 BREFs or Continuous Improvement

The directive's promotion on the individual licensing system for each specific installation emphasise the local authorities and their definition of conditions to promote improvement possibilities for the specific facility. To secure a minimum of acceptable BAT levels, the EU has prepared the European BAT Reference Documents, BREFs. The decision that the BREFs should be guiding documents shows that the EU sees them as minimum standards, and prefers that the relevant authorities and member states promote possibilities for improvements going beyond the BREFs.

In line with the above discussion about the directive, it is clear that the directive promotes an approval system where the competent authority should primarily assess the facility's possibilities for improvements. This should be done taking the overall performance

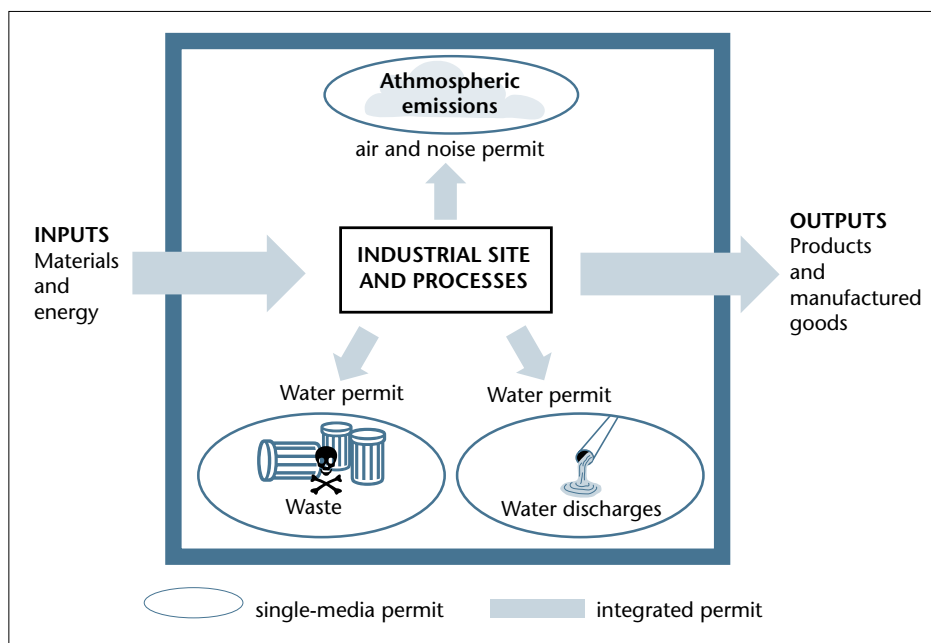
achievable in the sector into consideration. It involves assessing the performance of the installation and its improvement possibilities in order to determine BAT according to the installation. It also needs to compare this performance with the sector level, including the different guiding material as BREFs, other BATs or sector notes etc.

Besides this discussion on whether to interpret BAT as improvement possibilities for the specific firm or as an average level for the sector, a relevant discussion concerns the term BAT itself. The term BAT originates from Best Available Cleaning Technology (BACT). The BAT thus was a principle means to ensure that the best and cheapest end-of-pipe technologies were chosen. The directive does not adopt this interpretation. But with the directive's focus on emission limit values (and thereby on emissions rather than input) it can be difficult to keep the process technologies in mind.

Furthermore, the use of "Available" as the central element of BAT makes the term retrospective in its approach. It is mainly the technologies already existing on the market that are assessed in order to determine which are preferable and achievable. The BAT approach does, in this regard, not contribute to foster the companies to innovate new technologies in order to comply with BAT.

A more innovative and forceful approach, would be to firstly set requirements of continuous improvement of the installation's environmental performance, operating with short-term conditions, to be complied with by the facility right away (BAT); and secondly to set long-term objectives and requirements to guide and foster further innovation.

Figure 7.3 The base of an integrated permit. *In the single media approach air, noise, waste and water permits are treated and granted separately. In an integrated permit (grey frame) these are all interrelated [OECD, 1999 vol. 1 p. 33].*



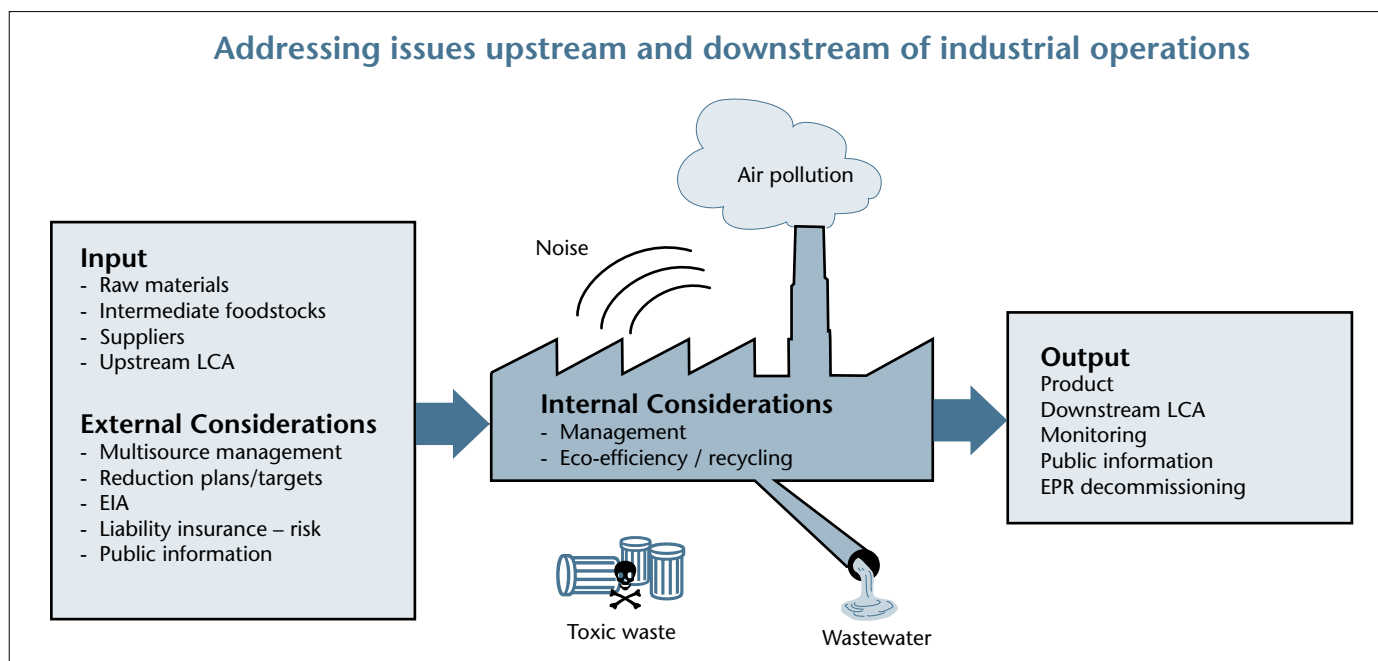


Figure 7.4 The OECD approach to integrated licensing. Here the production process itself is in focus to allow the development of pollution prevention techniques, and efficient resource use. In addition life cycle assessment, LCA, is used to the extent possible to regard upstream and downstream improvements. [Figure from OECD 1999 vol. 1, p 57]

7.3 The Integrated Approach

7.3.1 The OECD Approach

The primary focus in the integrated approach in the directive is that the plant shall receive one integrated permit instead of several media-specific permits.

The integrated approach thus mostly concerns the integrated assessment of emissions to all media. In the view of the OECD, the term is however broader and does not solely concern the integral assessments to the different media. It rather emphasises the assessment of the processes of the industrial site [OECD 1999 vol.1: 33].

The integrated assessment of the whole plant is thus the primary step in identifying the possibilities for pollution prevention. An integrated assessment of the whole installation should, according to the OECD, cover input, output and internal processes [OECD 1999 vol.1: 57]. Inputs are then defined as the use of resources, semi-manufactured articles and energy as well as intermediate feedstock. Output includes product, waste and emissions. Internal processes include the management of the production, eco-efficiency and direct recycling as well as the techniques used.

Such an assessment clearly links the levels of emissions to the use of resources and techniques in the production. The improvement of techniques in the production and a more efficient use of input must be expected to affect the emission

levels positively and thereby reduce the overall contamination. A natural first option to prevent pollution is thus to conduct an integrated assessment of the plant.

7.3.2 Extending the Material Flows Perspective

The OECD further argues that the integrated terminology should be extended on the input- and the output side. On the input side OECD propose to go beyond the facility – the site – now asking for a licence, and include the relation of the facility to suppliers and the raw materials and other products, they deliver to the facility. The licence cannot make request to these “upstream” suppliers themselves, but the licence might include requests to the applying facility to have in place systems, whereby the demands on quality and environmental impact from products and processes, which the facility has for itself, should also be complied with by the suppliers. It comprises Life Cycle Assessment on products, Environmental Impact Assessment on products and of supplying installations and presence of Liability Insurance for products delivered.

Much of the same goes for the output side as well, and here it concerns requests directly for the facility itself. Still, there is at present no legal background for such a demand, but it’s getting more and more commonplace among the most environmentally conscious companies on a voluntary basis, pushed by image-nursing and customer requests [OECD 1999 Vol. 1: 57].

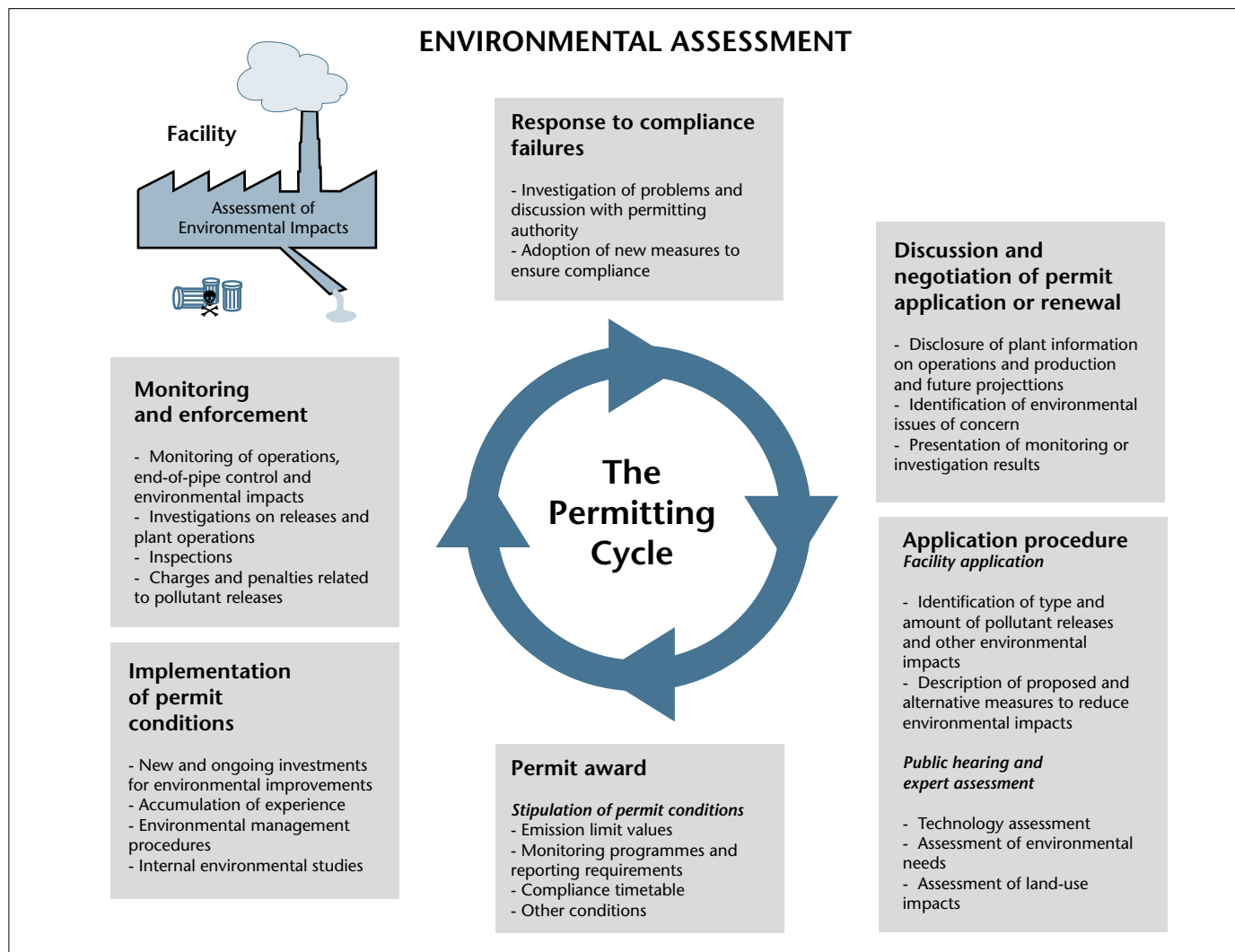


Figure 7.5 The environmental permitting cycle. *Permits of industrial productions are time-limited and the licensing is therefore cyclic. The permits and conditions in them, in addition, have to be adapted to the industrial investment cycles. This will allow for the development of new measures to achieve compliance and improve environmental performance in the next cycle. [OECD 1999 vol. 1, p 82].*

7.4 Promotion of CP via the IPPC Licensing Framework

7.4.1 Promoting Environmental Development

The EU IPPC framework may be used not only for normative environmental regulation of industry. Local authorities can act within this framework in order to foster industry to take action to minimize the environmental aspects of their production. It is a step beyond just setting minimum standards for industry.

The typical philosophy of the environmental regulation of industry and the issue of permits is to ensure that a minimum of binding standards are enforced. In this way authorities secure that facilities lagging behind in the environmental performance reach a minimum level of the environmental protec-

tion. We argue, however, that environmental regulation can go further. It can and should be used more progressively to set out directions and perspectives for the forthcoming developments. It can and should motivate companies to incorporate environmental considerations into all of their activities.

The OECD is one context in which one operates with the idea that regulation shall set out directions for innovations. Below follows a discussion how to develop the licensing procedure using this approach. It is mainly based on the recommendations from OECDs work on Environmental Requirements for Industrial Licensing [OECD vol 2: 99 ff and vol 1].

According to the OECD, the licensing should achieve a triple goal:

- Ensuring a minimum of binding standards.
- Providing clear indications on both short- and long-term objectives.
- Providing adequate flexibility for innovation.

When aiming at long-term goals, which require innovations, licensing must be construed less as a set of requirements that have to be met to ensure compliance. It should be more of an instrument to facilitate for companies to pursue a sustained, dynamic work of innovation and improvement of environmental performance. As stated above, the formulation of general and sector-specific standards might be favourable when it comes to securing the minimum level that every company needs to comply with. In contrary, the formulation of the conditions in the permit by the local administration makes it more flexible and possible to set up a system that fosters, motivates and facilitates for companies to take further action.

The IPPC Directive in all cases contains the need to issue the permit, with a focus on continuous improvements. We will now focus on how the licensing authority can use the procedure to foster, motivate and facilitate for a company to take action on their environmental impacts. As mentioned above, the OECD has some ideas and recommendations regarding these matters.

7.4.2 The Licensing Process as a Dynamic Cycle

As mentioned, the IPPC Directive contains a requirement to periodically review the permits in respect to innovation in BAT, advances in science etc. This means that the licensing procedure should strive to secure sustained improvements of the facilities. In spite of the fact that this sets the stage for powerful dynamism, it is not incorporated as a basic principle underlying the entire framework. The OECD has picked up this thread and formulated the dynamic approach much stronger. The OECD's set-up follows a cyclic process containing seven steps that are continuously repeated. In contrast to the IPPC Directive, the OECD interpretation of the dynamic of the permit system is not limited to the periodical review, however. The OECD emphasises that the dynamic approach must be a central aspect at all stages throughout the cycle.

7.4.3 Negotiation During the Licensing Process

The formulation of the conditions in a permit develops through the entire licensing scheme:

1. The operator's application including an environmental review of the facility;
2. Assessments of the facility and its environmental impacts;
3. Developing the guiding material;
4. Final formulation of the conditions and requirements in the permit.

In line with the above, the conditions should be formulated in a way that makes companies work to ensure continuous improvements of their environmental performance.

According to the OECD, the dynamic and improvement-oriented approach necessitates some kind of dialogue or negotiation between the authorities and the operator of the facility in question. The negotiation may continue throughout the whole process of formulating the requirements starting with a pre-application to determine the scope of the permit all the way to the final licence. Thus, the licensing process is the primary interface between regulations and the actual environmental performance of industrial operations.

The OECD states that the purpose of these negotiations is to exchange information to find the best measures and optimal solutions with a long-term perspective, and not to settle on compromises. That is, the information should concern the conduction of permit conditions (ELVs, BATs etc.) that stimulate technological and process-innovation to achieve improvements in the overall environmental performance. In those negotiations, the OECD points out the importance of a mutual understanding of each other's role, which should not be doubted or taken over by the counterpart.

7.4.4 Developing Conditions

The objective of the licensing scheme is to facilitate for each company to innovate for improvements. The licensing requirement should therefore contain an obligation for the company to continuously improve its environmental performance. The competent authorities should use the permit to launch reduction goals formulated as performance-based requirements, which leave room for the firms to choose the technology path. The stipulation of goals and requirements needs to take into consideration the existing technological state and environmental performance of the company in question and the possibilities for improvements. If the requirements are set too strict, beyond the reasonable reach of the company, it is likely that the requirements won't be met or the company will even try to bypass it in different ways e.g. by diluting effluents. On the other hand, if the requirements are too low, they won't help to foster any substantial changes and improvements in production.

Effective strategies are based on pragmatic assessments from case to case when it comes to identifying the environmental performance of industrial activities and possibilities for improvements. This means that the authorities must both foster the companies performing better than what is considered BAT at the sector level. BAT should thus be interpreted as a minimum criterion for setting the requirements in the permit.

The requirements in the permit should also incorporate long-term goals and timetables for implementing improve-

ments, as well as monitoring programs and reporting requirements that clearly show the environmental results and economic aspects of the implementation of the different improvement options. To ensure that the requirements conducted in the permit are attainable for the firms, the authorities should set a timetable for compliance that corresponds to the firm's internal economic investment cycle.

Having knowledge about these investment cycles is thus of great importance to setting the requirement for investments at the right time. If the requirements are formulated in regard to the normal change and investment in production technology and design, the firms will more easily be able to incorporate these requirements in their investments planning, to identify more optimal solutions. In this way the firms can avoid putting up some end-of-pipe cleaning provisions which could be the outcome if requirements that are stipulated without any regard and understanding of a company's behaviour in a capitalist society.

In this process it is important to remember that technology is defined more broadly than production techniques; it may also include management, procedures etc. It is evident that the facilitating of innovation and performance improvements should also contain these aspects.

7.4.5 Information

To perform all these different assessments, it is of great importance that the competent authority collect sufficient information – especially concerning the information included in the application from the companies. The competent authority thus needs to consider if the company has been asked the most relevant questions.

What is sufficient information obviously differs in the different steps in question, and also when it comes to the procedure of formulating the conditions in the permit. As the application should contain an environmental review of the company, the operator has access to most of the information, since it concerns the company's internal processes. However, the operator could need further information on which substances might be included in the processes of the company. For this purpose, substance flow analysis (SFA), emission registers etc. could be useful. For the competent authority, additional knowledge needed is information about possible alternative technological choices in order to assess if the technology of the firm is BAT, and possibilities for improvements. Finally legal knowledge is necessary for the final formulation of the conditions.

Not only the authority but also the public in general have the right to information on the environmental performance of larger industries, as the legal support for a proper access to information on environmental impacts and hazards are getting stronger with the EU. The Aarhus Convention, which guaran-

tees all citizens access to relevant environmental information, came into force in 2001. It has since been expanded and detailed as a directive, which came into force in 2006. This is in the spirit of the IPPC. The need to incorporate parties and make the application and permit public, will help to get firms involved in taking responsibility for their environmental impacts.

7.4.6 The Weak Point – Lack of Systems View

An IPPC licence only considers one specific installation. However, an installation is never isolated in real life. It is part of an industrial system. It is connected to an upstream supply side and a downstream demand side, and how these two work has a major impact on the real environmental performance of the installation. There are many forceful cases of this. These circumstances may, or may not, be included in the licence.

The cement industry offers an illustration. A cement kiln may use all kinds of organic material as fuel since the temperature in the kiln is up to 1,250°C. Some kilns are therefore used to incinerate hazardous waste. The capacity of a large industry may well be enough to take care of all hazardous waste of a country. On the other hand, the ash remaining after clinker formation may be used for soil improvement. This is done e.g. in Estonia, where the soils in general are too acid, and are thus improved by this measure. The cement kiln in this way has considerable environmental advantages which are not in the installation itself, but rather in the system.

Another case is that of industrial symbiosis, that is, several industries working together as the output from one of them is used as a resource in another. Even if these circumstances are not always mentioned in a licence, the conditions of the “downstream” waste side are normally included.

A further weakness of the IPPC licensing system is that alternative installations are seldom considered. The application for a permit is considered from the point of view of the installation in question. The possible existence of completely different and environmentally better ways to e.g. provide a product is normally not considered. The application is judged on its own merits. Optimisation is thus local and not systemic.

7.5 Licensing and Other Regulatory Instruments

7.5.1 Goals and Policies in the Licence

One way to foster and facilitate for companies to undertake environmental innovations and improvements could be to conduct the licensing procedure in a way that motivates and facilitates them to discover the potentials in eco-efficiency. In this way Cleaner Production and Pollution Prevention strategies, may be introduced, and environmental impact becomes a parameter that needs to be optimized.

As outlined in Chapter 3, industries have different tools to use in optimizing their production in an eco-efficient manner, which incorporates their environmental impacts into their business and management strategies. These different tools may be organised in some kind of Environmental Management System (EMS) in which companies can keep track of their environmental performance and set up goals about continuous improvements. Setting up the licensing procedure and requirements properly may spur the companies to implement some kind of Environmental Management System to continuously overlook their performance in order to identify achievable improvements.

The licensing of the specific firms should also be seen in connection with the different political planning documents and the goals and objectives for the area or sector in question. These should be considered when formulating the long-term directions and obligations in the permit. The licence in this way becomes a legal document that obligates a company to the goals and objectives formulated in overall development plans for an

area, as well as goals and objectives agreed on at the sector level. The licensing procedure in this way interlinks the political goals for the specific sector formulated at political levels, and the internal organization of the production of a facility.

7.5.2 Licensing Supporting EMS

As described in earlier, an EMS is a tool for companies to manage their environmental performance. The system can be either a self-created or a certified system, accredited by an accreditation company.

One of the essential parts in the EMS is the environmental mapping of the company's production. Environmental mapping is an assessment of the production and the potential environmental impacts of the operations. Based on this, the company can assess the most vital environmental issues, thereby focusing their actions towards issues that are the most environmentally damaging. However, as it is an internal tool, it would be reasonable to expect that only actions that are economically viable are taken into account.

In order to evaluate the progress towards the goals, companies need to decide on some indicators and need to keep track of their performance according to these indicators. Typically, the indicators are "performance-based", i.e. performance indicators, based on relative measures expressed in relation to the number of units produced.

As an EMS basically is a system for a company to keep track of their environmental impacts, the EMS thus have some overlaps with the licensing scheme. This especially concerns the environmental review; the formulation of goals and objectives/requirements and obligations on behalf of the review; the formulation of indicators; and the follow-up on the goals and conditions. If the two systems are interlinked so that the data collected in the one system is feasible for the other, an EMS

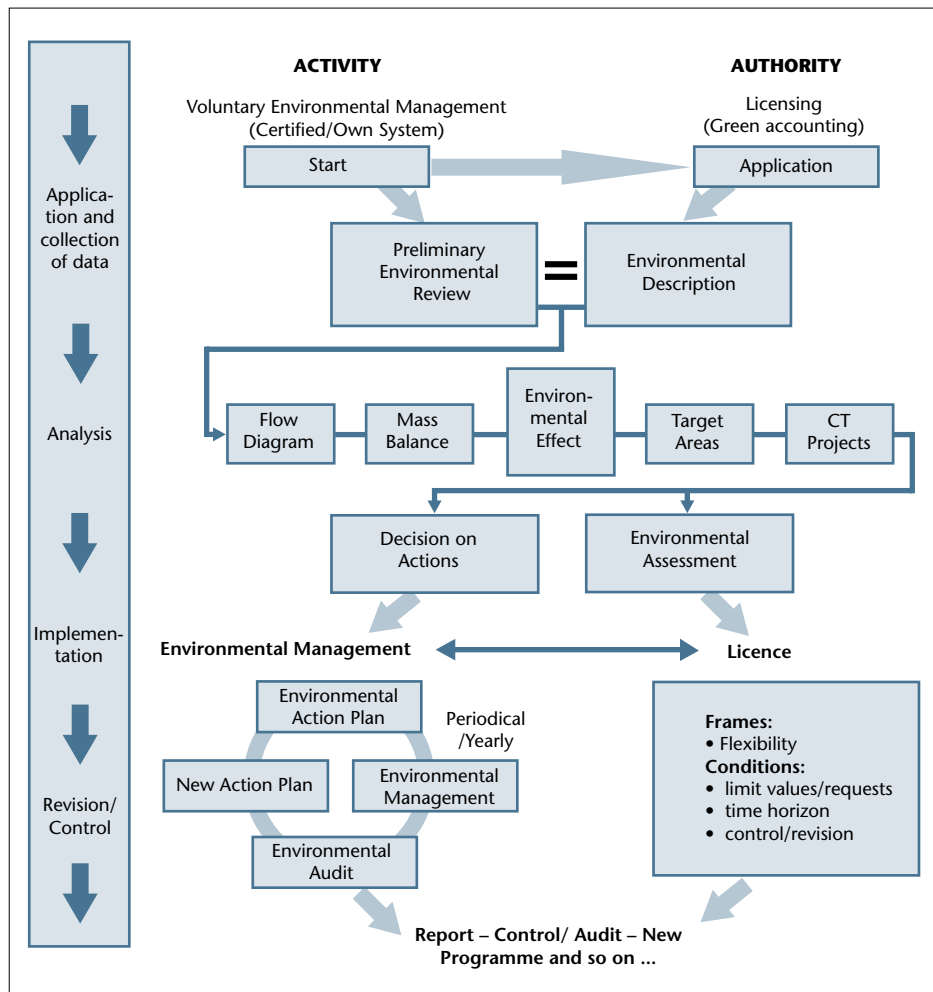


Figure 7.6 Integration of environmental management and licensing. *The EMS of the company (to the left) is coordinated with the licensing cycle (to the right) to facilitate both processes. [Figure from Kjaer 1996, p 32]*

can ease the work needed to follow up the licensing procedure both for the authority and the company. The information collected for the EMS can be used in the permitting procedure as well. Furthermore, the introduction of an EMS can increase the credibility of the data provided in the application by the company. Lastly, an EMS can help to make companies aware of economic potentials and thus – themselves – take action to go beyond the requirements in the permit.

We therefore argue that the licensing procedure should be performed so that it spurs companies to implement an EMS or similar procedures to keep track of their environmental aspects. It especially seems obvious to coordinate the IPPC framework and the EMAS scheme, as they both are EU regulations, even though the latter is voluntary. The EU's network for the Implementation and Enforcement of Environmental Law (IMPEL) has actually prepared a report showing the similarities and overlaps of the IPPC and the EMAS requirements.

7.5.3 Differences Between Licensing and EMS

It is, however, important to keep in mind that the permitting and environmental management systems represent two different approaches. The permitting system is based on formulating requirements that ensure the best possible protection of the environment, whereas the EMS is a voluntary system for the companies whose main purpose is to provide possibilities for the company to gain profit [Kjær 1996: 25ff.] for example by more efficient use of resources. The main reason for getting a certified management system, such as ISO 14001 and EMAS, may also be to improve the reputation of the company.

The environmental permit, on the other hand, is part of the legal system and has to consider different issues when stipulating the requirements of the permit such as the protection of the local environment, the interests of the local population etc.

An EMS is furthermore an internal system that needs to be very flexible as it must correspond to the actual procedures at all time and thus may be reviewed at all times, whereas that would be overkill in a licensing procedure. The argumentation is thus not that the two systems should be coordinated so that the permit corresponds to specific procedures in the EMS. Our argumentation is that the licensing should be performed so that it fosters and supports the company to keep track of its environmental performance in a similar way as an EMS.

In order to interlink the two systems, the permitting system must be designed in a way that leaves the possibility open for the EMS to support the permitting process. The link between the two systems can be established by setting goals based on the environmental mapping. Furthermore the conditions can be formulated in correspondence with the indicators normally used by the industry. This implies performance-based condi-

tions rather than emission limit values, defining pollution levels (inputs or emissions) per produced unit.

The performance-based indicators can be used to monitor the production and performance as a part of the self-monitoring. The application for an integrated permit should contain an assessment of the environmental effects of the installation, which is basically what the environmental mapping of the installation is. Furthermore, the conditions for performance-based self-monitoring can help promote environmental issues within the company. This might make companies realise the potential for cost savings [Kjær 1996: 31ff].

7.5.4 Development and Environmental Plans

A central element in the recommendations of the OECD is that the requirements in the permit should also have a long-term perspective and point out some areas of concern that should be improved in the long run. We furthermore argue that it is important to see the licensing in connection with other regulations and objectives laid down.

We therefore suggest that the long-term requirements in the permit be interlinked with the political goals and objectives laid down in different political documents. These could be local development plans or environmental plans for the area in question, formulated by local councils etc. It could further evolve objectives at sector level laid down in agreements between national or regional (EU) government and the sector/industry organization in question.

The interlinking of the requirements to the goals and objectives laid down in these development and environmental plans, whether it concerns the local community or the sector in general, mean that the permit shall be the legal document that obligates the companies to contribute to reach these goals and objectives.

Study Questions

1. Compare the approaches of issuing a permit using media specific ELVs or EQSs and the IPPC Directive.
2. Discuss in what way BAT can limit the development of some industries and encourage others. How may these difficulties be circumvented?
3. Look up the BREF document for the chlor-alkali or cement industry and discuss what level of technical competence is needed to discuss these documents with an industry representative.
4. In what way is an environmental authority able to include questions of upstream and downstream impacts of a production in a licensing process?
5. Describe the permitting cycle according to OECD and explain why it is cyclic.
6. Describe how the formulation of the conditions in a permit is dealt with in several stages and at which stage there is an opportunity for the company to negotiate conditions.
7. How does the request for information to the public have to be met?
8. Explain in what ways the lack of a systems approach to environmental permitting (that is a permit is valid only for a specific plant) is a weak point in combating environmental impacts from industry.
9. In what ways does an Environmental Management System and an environmental licensing process interact with and support each other?
10. Why is the performance-based approach (based on performance indicators) to environmental protection not acceptable as a base for environmental licensing?

Abbreviations

BACT	Best Available Cleaning Technology
BAT	Best Available Techniques
BREF	BAT Reference Document
CT	Cleaner Technology
EIA	Environmental Impact Assessment
ELVs	Emission Limit Values
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
EPR	Extended Producer Responsibility
EQS	Environmental Quality Standard
IMPEL	European Union Network for the Implementation and Enforcement of Environmental Law
IPPC	Integrated Pollution Prevention and Control
LCA	Life Cycle Assessment
OECD	Organisation for Economic Co-operation and Development
OSPARCOM	OSPAR Commission
R&D	Research and Development
SFA	Substance Flow Analysis

Internet Resources

DG Environment webpage on the IPPC Directive
<http://ec.europa.eu/environment/ippc/index.htm>

The consolidated IPPC Directive full text (pdf document)
<http://eur-lex.europa.eu/LexUriServ/site/en/consleg/1996/L/01996L0061-20031120-en.pdf>

Documentation of BREFs by the European IPPC Bureau
<http://eippcb.jrc.es/pages/FActivities.htm>

OECD on Environmental permitting in Eastern European countries
http://www.oecd.org/document/49/0,2340,en_2649_34173_26397169_1_1_1_1,00.html

Environmental quality standards in Swedish environmental legislation
<http://www.internat.naturvardsverket.se/index.php3?main=/documents/legal/standard/quality.htm>

Material Flow Accounting/Substance Flow Analysis (MFA/SFA) at Leiden University
<http://www.leidenuniv.nl/interfac/cml/ssp/projects/chainet/tools-mfa.html>

Compliance Monitoring and Continuous Improvement

8.1 Factors which Promote Compliance

8.1.1 From Implementation to Control

The previous chapters described the environmental licence as the key regulatory instrument in relation to all sectors of industry. This chapter is concerned with the follow-up activities, that the authorities can make use of in order to ensure a thorough implementation of the licence. Thereby the environmental regulation as such is implemented in practice within each licensed company. A structured overview of these follow-up activities is presented in Box 8.1.

The IPPC Directive offers an additional perspective on the implementation control measures. It asks from the company's continuous environmental improvement, starting from or based upon the requirements and conditions in the licence issued to the company by the environmental authorities.

This request means that the follow-up measures have a double function: firstly, and in the first instance, to help make sure that the current regulation is thoroughly implemented, and secondly to look ahead towards the next licence by pointing out the scope for improvements and more sustainable company practices.

8.1.2 Compliance Programme

The implementation measures are normally organised by the relevant authorities as a compliance programme. Using a programme structure allows the authority to have an organised and more comprehensive approach to setting priorities when following up on compliance. It defines which sectors and companies to target first and the most, as well as how to allocate personnel and other internal resources.

The activities carried out in a compliance programme are manifold and can be organised and structured in many different

ways. It depends on what is defined as the overall objective, on the content, that is, the number and types of facilities subject to the regulation, on the regulative framework provided by higher authority levels, and on internally available competences and resources, etc. It is therefore of crucial importance that clear strategies be developed in order to tailor the activities to be carried out in the compliance programme.

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A strategy and a plan must determine the objective of the compliance programme. It should clarify the content of the programme, that is, what kind of industrial facilities are present in the jurisdiction, and how to approach the different types of facilities.

Add to this the fact that most compliance programmes are bound to an administrative system with limited access to resources. The strategy therefore needs to balance the overall objectives with the available resources. Setting priorities is

Box 8.1 Elements of a Compliance Programme

Compliance means the full implementation of environmental requirements by the companies. Compliance occurs when requirements are met and desired changes are achieved.

- *Compliance Programme* is the structured and comprehensive organisation of the available set of approaches and activities, that the responsible authority has decided to use to achieve compliance within its jurisdiction.
- *Compliance Promotion* means activities to facilitate or encourage voluntary compliance with environmental requirements.
- *Compliance Monitoring* means the collection, measurement and analysis of information regarding environmental performance and compliance status.

The actions taken in relation to monitoring normally involves:

- *Self-monitoring* where the companies themselves keep track of their environmental performance.
- *Inspection* where the competent authority checks up on the compliance situation, either as a desk-check or a field-check, the latter by paying a visit to the company. The field check means a dialogue and opens for pointing at ways of improving the environmental performance.
- *Negotiations* with individuals or site managers, who are out of compliance on mutually acceptable schedules and approaches for achieving compliance.
- *Compliance Enforcement* normally is taken to mean the set of actions that governments (or others) take to correct or halt behaviour that fails to comply with environmental requirements or that endanger environment or public health.
- *Legal action*, where necessary, to enforce compliance and to inflict consequence in terms of fines, criminal action against management and/or closure of the parts or all of the facility.

Source: IMPEL 1999, p 34 ff and p 70 ff

therefore an integral part of developing a strategy. It should be clear how one may reach the goals by effectively balancing preventive actions and legal, punitive, measures. At the same time one should make efficient use of scarce resources.

As the world is a dynamic place, the strategy should be evaluated and reviewed periodically and systematically. In this way one may improve the strategy by learning from past experience, as well as readjust to changes in conditions.

8.1.3 The Competent Authorities

The authority in charge of the local administration and the implementation of the compliance programme has the responsibility for providing the compliance programme strategy. The authority may be local, regional or national. The local authority has the insight and knowledge about the local environment, the local economic actors and about the resources available to it. This is all needed background for setting necessary priorities. The level of the authority in charge of the implementation varies considerably across countries. We shall return to this in section 8.2.

Regardless of which level of authority, it is best if the authority with the power of making strategies and priorities for compliance also possesses the power and obligation to implement this legislation. It should also have the power to decide on the allocation of the resources needed to fulfil this task. It should be mentioned, however, that placing these powers with the local authority may generate a conflict of interest between creating a favourable climate for business and thereby securing jobs for the local citizens, and a rigorous implementation of the environmental regulation. If the local authority is identical with the local government, and thus an elected political body, it will belong to an established democratic tradition and have proven integrity. These will be important prerequisites to securing proper handling of this – latent – conflict of interests.

If there are doubts at this point, the local authority might be better placed within a more hierarchical, state authority structure, which will tend to make the local authority operate more rule-oriented and according to instructions from ‘above’ on how to handle different types of cases. This will, in short, mean less flexibility in the application of, but better compliance with, the environmental regulation. It is at the same time in line with the intended outcome of the regulation in the first place.

The general legal regulatory framework is nowadays to a great extent provided by the EU, taking effect in the now 27 member states and 3 EEA states. The structure and distribution of power within the national public administration is decided by the national political authorities, parliaments and governments, according to the constitution of the individual states. Historical as well as structural matters thus decide the distri-

Box 8.2 Minimum Criteria for a Compliance Program Strategy

- Industries to be inspected
- Data management
- Resources available
- Time available for inspections
- Guidelines
- Frequency of inspections
- Estimating resources to complete inspections
- Prioritisation
- Revision of the plan

Source: IMPEL 1999b, p. 6

bution of administrative roles and power in any nation state. They thereby also decide which authority at which level will be in charge of promoting and securing compliance with environmental regulations.

When the competent authority for the compliance, monitoring and enforcement establishes its compliance programme and the strategy for putting it into practice, a checklist, making up the minimum criteria for such a programme, has been provided by the IMPEL group (Box 8.2).

The purpose of a compliance program is to make the target group comply with the regulation, and do so at the lowest level of costs possible. A first approach to achieving this is that of promoting compliance with the licences and other regulation, made for a given target group, first of all within private industry. A number of ways and tools are available for authorities to promote compliance in a given sector or type of industry. These include

- Supply of relevant information.
- Creation of a standing positive personal relation between company and authority personnel.
- A consensus-oriented and dialogue-based approach.

8.1.4 Role of 'Policing' and 'Deterrence'

Despite all efforts to promote compliance, it is – like in other areas of regulation – closely linked to the effectiveness of the control. It is necessary to be ready to act on non-compliance when discovered. Control is therefore the second approach to making sure the regulations are complied with. Control can be taken so far as to establishing a sense of 'deterrence'. It should be made clear that violations will not be tolerated. An 'atmosphere of deterrence' is aimed at, and will only be felt by, those companies, which are in general reacting slowly and minimally to the requirements. The 'deterrence' may therefore reduce

that group of companies all together and thereby reduce the number of inspections and related administrative work by the authorities spent on enforcement.

This approach, having much in common with the general role of the police in most of the regulated areas in society, has to be carefully balanced to avoid becoming outright counterproductive. It might create an atmosphere of hostility and distrust, which in the end will lead to more, not less, use of resources and possibly to less compliance.

This 'balance' will be different in different societies, depending on the general relationship between citizens and authorities, including the effectiveness of the 'rule of law' versus presence of corruption. This in turn has to do with the position of and the salary level for civil servants and thereby influences the moral standard of the civil servants. In some countries a tougher, 'policing' type of approach might therefore be necessary, at least for some time and to some considerable extent. In other countries with a longer tradition for an impeccable civil service and a well-established legal system, a more flexible and consensus-oriented and dialogue-based approach might come out favourably for the compliance – even at lower cost.

There are certain preconditions to be met in order to establish a credible feeling of 'deterrence' on the side of the companies. Box 8.3 sums up the ways to achieve deterrence.

8.1.5 The Role of the Market and the Public

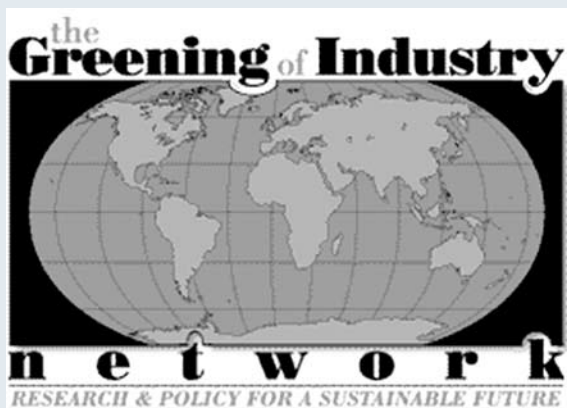
In recent years market forces have provided an essential support for the promotion of compliance. Non-compliance may have serious repercussions for first of all consumer-oriented companies (retailers), which make them comply from the outset. This effect is, however, quite unpredictable and the 'triggers' work somewhat haphazardly. It is therefore something, which the authorities may stimulate and try to help organise somehow.

Box 8.3 Ways to Achieve Deterrence

- Providing strict and timely response to non-compliance;
- Establishing social disapproval of violators, resulting from public awareness of regulation of environmental performance;
- Publicising successful enforcement actions;
- Addressing with perseverance minor but widespread violations and by creating incentives to improve compliance and reward good behaviour.

Source: OECD 1999, p. 10

Box 8.4 Green Networking



Our Mission

The Greening of Industry Network develops knowledge and transforms practice to accelerate progress toward a sustainable society.

Our Vision

The Network seeks to create new concepts and a new language that will make it possible to extend our horizons and communicate across disciplines, nations, and sectors.

The Network:

- Mobilizes a community of researchers to stimulate the emergence of a new strategic research area on the greening of industry.
- Creates a dialogue between this new research community and leaders in business, labour, civil society organizations, government.
- Provides an opportunity for all stakeholders, with equal voice, to develop research and action agendas on issues of industry, environment, and society.

Source: <http://www.greeningofindustry.org/>

Foundation for Sustainable Agriculture and Forestry
Foundation for Sustainable Agriculture and Forestry in Developing Countries (FSAF), was created in 2005 by the Von Der Otto group in Germany.

The Project Cotton made in Africa is one out of several projects run by FSAF. It is supported by an alliance of industrialists. The group include the following partners: Otto Group, Deutsche Entwicklungsgesellschaft (DEG), Deutsche Welthungerhilfe (DWHH), Gesellschaft für technische Zusammenarbeit (GTZ), NABU, Tom Tailor GmbH and WWF Deutschland:

Source: <http://www.fsaf.de>

‘Green Networking’ at all levels from local and national levels to regional and global levels is one case of successful cooperation between authority and industry. Essentially green networking brings industry and authorities at the relevant level together to promote good environmental practices. NGOs and the Academic side quite often have a role to play here. The preparation for the ‘Earth Summit’ in Rio in 1992 is one case. With a base in the Brundtland Report on ‘Environment and Development’, industry also became active (see Chapter 5 on “Shared Responsibilities”), and formed the ‘Greening of Industry Network’ in 1990. Here Industry, Authorities, NGO’s and Academia came together to discuss, develop and share ideas and experiences on how to make production and the economy as a whole more ‘green’ and ultimately more sustainable. This network is still active and has in recent years managed to get a strong presence from the South East Asian countries and other rapidly growing newly industrialised countries.

8.1.6 Green Networking Provides Support

At the national and local level ‘green networking’ of a different kind has been established in many countries. It brings industry and authorities together to promote and encourage not only compliance with current legislation, including environmental licences like the EU-IPPC-licences. That is a precondition for becoming a member at all. The wider ambitions are about creating the background for ‘going beyond compliance’. This means knowledge sharing and promoting new technology projects and best practices. Thus there is the Danish local ‘Green Networks’, which have been around for now 12-15 years. In Sweden there is the organisation Swedish Environmental Directors including many of the big companies, and there is a corresponding organisation in Finland.

There are also quite a few examples of companies entering into formal co-operation with one or more, typically nationally based, green NGOs. The subject of the cooperation is to develop an ‘Environmental Code of Conduct’ or ‘Environmentally best practices’ in company matters like packaging, transport, waste handling, energy and water conservation etc. In this co-operation the company gets the ‘blue stamp’ from the NGO on its operations, when the agreed conduct or practices are complied with. It is the ethics of co-responsibility on the side of the NGOs which quite often makes NGOs hesitate to engage in such arrangements. But there are several examples from Germany.

Still, the awareness of the general public of the environmental behaviour and performance of major industrial companies is as important as ever. A strong and rigorous pro-environment attitude of the general public is important to make industry comply with legislation. It is equally important for the political will to actually act and insist on compliance with cur-

rent regulation in the countries where the companies operate. The NGOs have an important part to play in keeping people aware and on the alert on issues of environmental protection and sustainability and their violation. The NGOs are accepted as an influential and therefore important ‘player’ and partner at national, regional and international levels. NGOs are being asked for opinions on proposals, to sit on committees and help promote programmes and regulations. They also organise protests of different kinds as an instrument to influence especially regional and global, political decision-making on environmental protection issues.

8.2 The Competent Authorities

8.2.1 From the European Union to Member States

In all European Union member states the EU-Treaty means that a considerable part of the legal regulations for activities impacting the environment are decided upon at the EU-level in cooperation between the Council, the Parliament and the Commission. The EU-level law takes the form of either a “Directive” or a “Regulation”. In both cases the EU-level legislation has precedence over the (existing) national legislation.

A *Regulation* takes effect and must be implemented directly and without any additional ‘transposing’ of its content into national legislation. And if national legislation contradicts the EU Regulation, national legislation must be changed.

A *Directive* must be transposed – or transferred – into national regulation before it takes effect. Member States have normally two years to get that in place, and if this is not done, the Member State faces a court case at the European Court, opened by the EU Commission, which checks that all Member States get the EU-directives transferred. The content and spirit of the Directive must be adhered to, but the exact transfer or location of the rules in national legislation is up to the Member State itself, either by changing one or more laws, which will require a decision by the national Parliament, or by changing lower level, national “regulations”, which will then be made by the government and the minister in charge.

The implementation of these legal regulations, originating from the EU, is the responsibility of the government, as is the case for legal regulations, originating in the Member State itself. Previously environmental issues were quite often the responsibility of the ministry of agriculture, industry, or energy. Since the 1980’s governments typically have ministries of the environment.

8.2.2 State Level Environmental Authorities

While the ministry is preoccupied with forming environmental policies at the national level as well as giving input to EU-level

law-making, a series of public authorities implement the actual environmental regulation. The main authority on the state level is the Environmental Protection Agency, EPA. An EPA was the first authority on the state level formed to deal with environmental issues often back in the 1970’s. Today typically there are several authorities on the state level with responsibilities in the environmental sector. For example in Sweden the offices dealing with chemicals control left the EPA many years ago to form its own agency, the Chemicals Inspectorate. This is on the same level as EPA and the division of tasks between them is important. Thus for example the implementation of the Waste Directive is the responsibility of the EPA while the implementation of the REACH Regulation is the responsibility of the Chemicals Inspectorate.

Other state authorities in Sweden with responsibilities in the environmental sector include the Health Authority, the Food Authority, the National Energy Authority, the state authority in the transport sector, in the building sector etc. The Energy Authority e.g. implements the Kyoto Protocol and carbon dioxide emission trading.

The authorities on the national level typically have the task of developing detailed national rules, to give input to the Ministry and the Ministers involvement in EU-level law-making or new national legislation, to survey the state of the environment in the nation, to carry out commissioned reports to the ministry, and to develop knowledge needed for environmental protection. National authorities in some countries carry out inspections at individual plants or organisations or grant permits and licences. They may also, for example, negotiate with industrial sectors to agree on covenants in the environmental sector.

8.2.3 The Regional and Municipal Level

All states have a three-level division of public administration: the state (country), regional (county) and local (municipal) levels. In the Baltic Sea region Germany and Russia also have above these three a federal level. Some states, such as Poland and Finland, have different kinds of local authorities, where typically large cities are on one level and smaller rural communities on another. Associations of municipalities or counties with certain tasks have been formed in some countries, e.g. in Finland, when local authorities are small.

On the County level there is typically an office for nature protection which has responsibility for inspection and control. It includes for example the Natura 2000 areas and protected species. There may also be an office for inspection and control of industrial activities dealing with environmental issues.

On the local level the municipal authorities have since long been responsible for simple environmental inspections,

regarding e.g. with water and waste. This responsibility has developed in some countries today into inspection and control of a large number of activities, from car shops to large industries. This is most typical in the Nordic countries in which the importance of the local level has been strong for more than a hundred years, and is still increasing. Municipal offices with responsibilities for environmental inspection and with authority to issue permits and licences are found in all Nordic countries.

In Eastern Europe, on the other hand we find a tradition of strong centralisation, and the city or village was always weak in this respect, as was local taxation, local regulation and local competence. Since the systems change in the early 1990s the importance of the local level is rapidly increasing in Central and Eastern Europe. Through fusions and administrative reforms the units have grown to become fewer, larger and stronger. Today in all the new EU countries the tasks of common services such as wastewater treatment, landfills and district heating is increasing for the municipalities, and so is the local taxation. Thus although increasing, their role in environmental inspection and control is still limited. The exception is the Russian Federation, where a strong central level is the rule.

For inspection and control of environmental legislation in Eastern Europe the state has typically local offices to execute that responsibility. For example in Poland all inspection and control is carried out by one authority, the Polish State Environmental Protection Inspectorate. This authority has 33 offices in all 16 voivodeships (counties) in the country and a total of 49 laboratories to support monitoring schemes. The authority had in year 2000 a total of 41,000 entities in its register and carried out about 16,000 inspections that year. Local/regional offices of state authorities are present in several other CEE countries.

8.2.4 Power in Public Administration

Power in public administration is an issue that need a book of its own to be dealt with at any depth. There are many differences across the different countries in the Baltic Sea region as to the exact organisation and allocation of power and responsibilities. However, implementation of complex, normative regulation, aiming at protecting the physical environment, will need an administrative structure, covering a not too big geographical area. Regardless of administrative organisation it is only on the local level that it is possible to establish concrete knowledge about an area and its economic activities for which the regulation is meant to be applied.

In most countries primary responsibility for the implementation will be allocated to the regional and/or at the municipal/

local level. Responsibilities are quite often divided between these two levels so that facilities with a wider, regional impact and with an environmentally potentially more dangerous activity will be handled at the regional level, and the rest at the local level.

Still, there is an important distinction to be made between authorities at a given level that are parts of the state administration and authorities that constitute parts of the regional or local (self)government administration. The way to execute environmental inspections and to issue permits may be quite different. But it depends on the competence to implement the environmental legislation when it is decentralized. Does the decentralized administration have the power to issue the environmental permits? Does it also have the duty to monitor and – in the end – enforce the regulation in case of non-compliance? If punishment of any importance is possible, how does it relate to the systems of prosecutors and the court system?

Any administration of the local authority will be in the hands of the local politicians, albeit subject to state level instructions and guidelines on how to apply the rules. Local politicians will typically be very concerned about for e.g. economic development. If a regional/local office is part of the state administration the loyalty will be with the state administration where it belongs and from where it gets its instructions and its competence. In this case we should expect less concern for other local considerations. The distinction between centralized or decentralized responsibility for the implementation should therefore always be qualified with a closer look at which kind of decentralized authority, we have before us.

8.2.5 The Pros and Cons of Decentralization

Immediately after the sweeping changes in CEE in 1990-91 some countries like e.g. Poland decided to establish a state administrative monitoring, control and enforcement system. Previously this was the responsibility of the regional government. The primary implementation of the regulation, such as permits, use of natural resources, waste-handling systems etc. remained with the regional administrative system. In the west, e.g. in Sweden and Denmark, the implementation powers lie at the decentralized level with the self-government administration, which has both the competence to implement the regulation and the competence to monitor the observance of the regulation, i.e. the compliance.

This difference reflects the difference in political and administrative history. Strong decentralization and wide competence with considerable discretionary elements included requires a well-established administrative system, well founded on the principles of the 'rule of law' and a well-trained and well-paid set of civil servants [Guy Peters, 1999]. This was

not at hand in Poland in 1990, which motivated the division of powers and establishment of a new, state environmental ‘police’ for the monitoring and control functions [Polish EPA, 1991].

The advantages of a local administration in the environmental field are many. It is able to keep the activities together and the handling of the cases is very integrated. Another advantage is that the civil servants develop a considerable knowledge and a good understanding of ‘his/her’ company. Furthermore the integration of the tasks creates an interaction between company and authority and automatic feedback on progress and problems. This will increase the authority’s insight and understanding of a company and its activities and ways to reduce impacts on the environment.

A drawback of local administration also exists. At least in smaller local administrative units, there may be a ‘rule of law’ issue. The company which applies for, or is running under, a locally issued environmental permit will become dependent on a very small group of civil servants dealing with all issues and all aspects of the company’s environmental impact. For the society at large there is in this practice a possible temptation of corruption. The small group of civil servants – which may in reality consist of only one person – might be offered a tip for ‘closing his, her, or their eyes’ about things, that would not pass the normal test. Even if there is not any direct corruption involved, there might still be a problem of this nature. Local interests in a wider sense, such as a new factory under consideration with great benefits for the town in terms of jobs and



Figure 8.1 Environmental campaign inspection. *The inspectors have the task of monitoring activities that constitute a potential threat to the environment and human health. This monitoring, conducted by the Swedish Labour Inspectorate at a car repair workshop in late 1999, was part of a program where 800 companies in Stockholm area and Gotland were checked for management of chemicals containing isocyanate, a carcinogen common in many work places. (Photo: Jack Mikrut/ Pressens bild.)*

bigger tax-potential for the local authority, may play a role in the consideration of a permit.

On the other hand a state administrative unit would not so easily become involved in these local interests. A state administrative unit would most likely lead to less difference in conditions for companies located just on different sides of a municipal border. Such differences may be considerable if different local authorities are responsible for surveillance of legislation, and they may be very difficult to equalize, as they are a consequence of that very decentralization.

8.3 Compliance and Management Systems

8.3.1 The Scope of the IPPC Directive

The EU-directive on Integrated Pollution Prevention and Control (the IPPC directive) now provides the general environmental norms as well as the framework for implementation of environmental regulation for all countries around the Baltic Sea, except Russia, Belarus and Ukraine. But also in these countries the development of EU Directives has a strong influence. Their exports to the European Union are important and dependent on their environmental performance. For example the REACH Regulation will require that also imported chemicals are tested according to this directive.

The IPPC directive targets the bigger and environmentally more risky part of industry, which is positively listed in the annex to the directive. Industrial production which is not listed in the directive is not affected by the directive. This production is regulated by domestic law in each individual EU Member State. These production facilities will be dealt with in more standardised way due to their size and – presumed – low potential environmental impact. But they will normally be included in the compliance programme and handled by the same authorities in countries with extensive decentralization, especially the local authorities. In the end it is expected that the IPPC directive will have a wider impact, as it asks for its basic principles to be used for environmental regulations in general, not only for the larger installations and the listed sectors.

The key instrument in this regulation is the environmental permit (licence) as we have seen in Chapter 7 above. The directive requires in article 14 that the Member States take the necessary measures to ensure compliance with the conditions set out in the permit. The national compliance program is therefore an important component of the IPPC directive, helping out on the implementation and ultimately the enforcement of this regulation.

In line with the principles in the directive, carried on into the company’s internal operations by the IPPC-permit, a compliance program needs to have a comprehensive approach

paralleling the demands for the permit. The programme must include an evaluation of the overall performance of the company technology used in production and the appropriateness of measures to prevent and control pollution emissions of different kinds from the facility, including measuring and taking samples to be analyzed in the laboratory.

The comprehensiveness, combined with the dynamic understanding of the licensing itself with the permit to be reviewed minimum every ten years and at any time, where more than marginal changes in throughput and/or technology take place, spills over to the compliance programme. It must be seen as part of, and must support the dynamic approach to, regulation. It should focus on constant improvements in company environmental impact, while at the same time securing compliance with current regulation.

This twofold dimension of the compliance programme has to be taken into account when prioritisation of resources is done within Authorities in charge of the programme.

8.3.2 Compliance Typology and EMS

Even if compliance must be achieved to the greatest extent possible, there is some scope for differentiation while implementing the law.

Compliance is an obligation for the relevant authorities from a purely formal point of view. Applying the law is not a power handed to the authorities by the Parliament at National and at EU-level as well as by the EU-Council for discretionary use. It must be enforced. Besides that, law implementation hampers the credibility of environmental regulation altogether, as well as the credibility of the authorities themselves.

Still, it is possible – and relevant – to differentiate the way and the extent to which different types of companies are moni-

tored. It has in recent years become quite common to distinguish between three types of companies, depending on their attitude towards the environment and their subsequent company environmental policy.

The best group includes companies with a documented environmental record, often by having an EMS in place (EMAS or ISO 14000) and a pro-active approach to the problems arising. The middle group is made up of companies, which want to comply with the regulation and do what is needed, including reacting to requests from the authorities in relation to compliance control inspections. The third group is made up of the laggards, which include companies wanting to do the least possible, just paying ‘lip-service’ to the authorities and all the way to companies, actively looking for ‘loop-holes’ and/or are actively resisting compliance with the regulation. This compliance spectrum is illustrated in Figure 8.2.

According to this typology, most efforts in terms of inspection and monitoring should be allocated to the laggards, while the middle group should be encouraged to improve their position, first of all by putting an EMS in place, though not necessarily having it certified, with all the costs related to that. And time and resources can be saved in the best group as their systems, usually an EMS, will supply the necessary data on the environmental performance of the company and in itself mean transparency in relation to company activities, technology, etc.

8.3.3 Differentiated Inspections

While this way of thinking is commonplace, and to a great extend both relevant and needed, a different approach to the issue of differentiation could be envisaged. The key to this understanding lies with the principle, that each and every company is unique. It has a unique combination of technology,

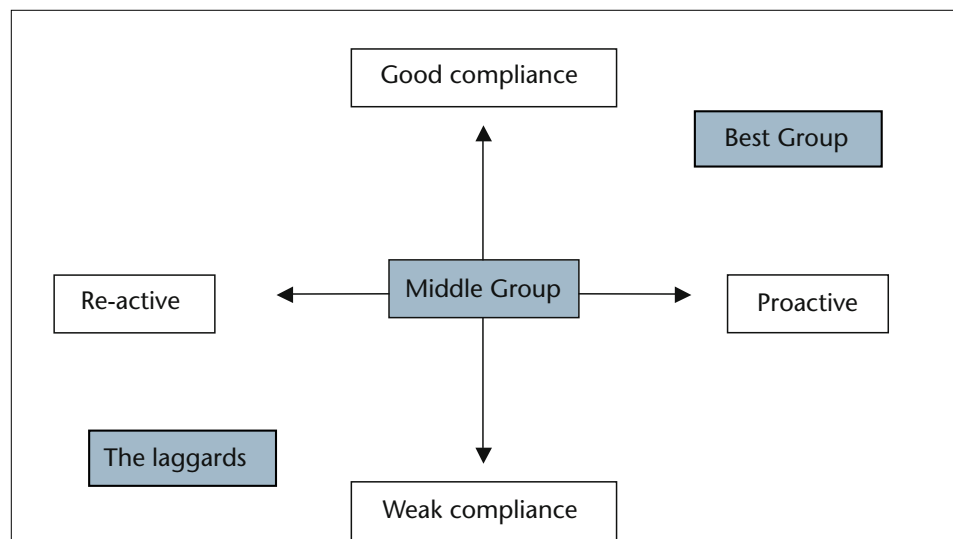


Figure 8.2 The compliance spectrum

materials put through, workforce and organisation. Therefore each company should be dealt with individually to best catch their situation and their motivation. Then it is easier to understand the background for their position towards requirements in protection of the environment and also to advice and guide them towards better solutions and a better approach towards the environment.

This kind of approach combines the compliance inspection with the continuous improvement inspection. It applies tough control measures and severe fines to those of the laggards beyond 'therapeutical' reach. For the remaining as well as to the middle group, it gives dialogue-based counselling on everything from emission details to EMS-implementation. Finally it leaves the best group for desk inspection and check up on in-coming environmental (performance) data.

This approach does not pose severe problems for making priorities for the resources available to any one authority. The problem lies rather in the demands on qualifications on the side of the authority and its employees, the inspectors. In addition, this approach implies intimate insight into the activity of each company in question. This points to a strong decentralization of the implementation and control functions of the environmental authority. However, this in turn often means, that the competence is not available in these as decentralized units. Manning is normally very limited in numbers and therefore also in areas of knowledge covered. Further, time and therefore total resources are not available to actually perform this type of strongly differentiated inspections.

Still, the strategy is very tempting and for the future. As more and more companies are getting a better grip on their environmental impact and are getting systems in place, less time will be needed for inspections. However, as these prospects are long-term benefits, while the costs in terms of resources and qualifications are needed now, the outlook for this kind of strategy is quite bleak.

8.3.4 The Compliance Cycle

Monitoring and enforcement are the two key instruments in securing compliance. They represent the work directed at and focused upon one particular company, its licence, its sites and the production activities going on there. They include field-work as well as desk activities. And enforcement comes, of course, after the monitoring, as monitoring is the check on the company activities in terms of the environmental licence, the company was allocated and whereby the environmental legislation was applied on this potentially environmentally damaging economic activity.

Given the environmental licence, where that is necessary according to the IPPC Directive and possible additional na-

tional regulation, the complete implementation and compliance sequence can be understood as a – never ending – cycle of programming, practising and feed back. This in turn means revising of programme and initiating a new cycle.

The quality achieved at each stage affects what can be achieved at all later stages. Attention to quality is needed throughout the sequence to avoid "soft spots", which will influence not only that sequence itself but potentially the next sequences as well.

8.4 Monitoring

8.4.1 The Role of Monitoring

Monitoring of compliance with the licence is a matter of continuous checking of the processes as well as the input to the processes and the output from the processes of a given production. As licensing requires a great deal of often very detailed information on all operational aspects, it often leads to a number of equally detailed requirements for data, e.g. on emission and generation of waste to be monitored to prove, that the company stays within the license.

Much of this monitoring is very close to the daily operational routine. The IPPC Directive obliges (Article 14) the company, operating the plant, to constantly monitor and inform the authorities about the releases from the site. The requirement for self-monitoring by the company, as one of the requirements in the licence itself, has therefore grown dramatically in recent years. This is one reason why putting an EMS in place is favoured by the authorities. A proper EMS will more or less automatically provide not only most of data on company performance but often much more than formally required or needed in all environmentally related aspects. Given the right format for transferring the data from the EMS, they will 'pour' into the authority database easily.

Still, monitoring by the authorities themselves of a production site on a site visit, referred to normally as doing an Environmental Inspection, gives the necessary first-hand impression of the level and quality of the environmental management, practised at the company. Further, the site visit opens the dialogue (where possible at all) with the management e.g. on possibilities for solutions to problems they face and/or for suggesting improvements, based on experiences from other companies, which the inspector will know much about. Going on inspection at the site is therefore an important prerequisite for securing compliance with current regulation and for support of continuous improvements of the company's environmental performance. This is also support of the dynamic perspective on regulation, imbedded in the IPPC Directive and related regulations. And yet again, this does not exclude the differen-

tiation among the companies according to e.g. a typology as the one shown in section 8.3.2 above. On the contrary. We will address the two types of monitoring in this order.

8.4.2 Self-monitoring

As already mentioned the IPPC directive requires that the permit include conditions regarding self-monitoring and reporting. The key purpose of self-monitoring and reporting is to make the operators track their own environmental performance and present the results for governmental review.

At the same time effective self-monitoring can help prompt internal response to irregular situations and can inspire the management of enterprises to improve environmental efficiency and prevent pollution.

Self-monitoring primarily relates to measurements of process conditions and releases and other output from the process. However, self-monitoring of an operator's performance with regard to environmental targets, process/plant improvements and overall compliance is also considered to some extent.

Self-monitoring does not constitute self-regulation. The competent authorities are still responsible for ensuring that the

operator complies with the environmental regulation and the permit conditions, including those specifying the requirements for self-monitoring.

Requiring self-monitoring can offer benefits to the competent authorities through:

- Utilising the operator's knowledge and experience when planning and carrying out a monitoring programme that can lead to improved control over releases to the environment.
- Providing a mechanism for educating the operator about the requirements for complying with relevant laws, regulations and permits, and for increasing management responsibility for compliance and the impact of process releases to the environment.

8.5 Evaluation of Compliance Programmes

8.5.1 Evaluation as Feedback

In order to keep a compliance program effective, regular procedures for evaluation of the effectiveness of the applied strategy should be implemented. A compliance program is only as good as the strategy applied, and the strategy is only as good as the achievement it generates.

The authority in charge should make sure that an evaluation is taking place periodically with the aim to evaluate the appropriation of the strategy, especially how it relates to:

- The established policy and objectives.
- The strategy and the approaches laid out.
- The financial and human resources used.

This evaluation plays an important role in the process of developing future goals and planning the use of resources.

An important part of the evaluation is providing the ministerial level, which has the overall responsibility for design and implementation of the environmental legislation, with feedback on compliance-oriented activities performed as well as with problems encountered by the implementation related to the regulation itself. And where issuance of the environmental licences is handled by another section or unit of the system of public authorities than the authority in charge of the compliance programme, the feed-back at a quite detailed level to the licensing department is absolutely vital for effectiveness of the licensing instrument as such. When we come into the more severe enforcement instruments like closure of a site – or part of a site – the license department will be involved in the case. This is also the case in any kind of criminal charge against the company and/or the site management. Criminal charges will normally be handled by the prosecutor's office, but drawing

Box 8.5 Self-monitoring Regimes

Self-monitoring regimes may cover:

- emissions of waste gases and airborne particulate to air via chimney stacks;
- discharges of waste water via sewers to and from effluent treatment plants, directly to receiving waters such as the sea, lakes, rivers and streams, and to land via septic tanks and soakaways;
- disposals of solid waste to landfill sites;
- disposals of solid and liquid wastes, including organics, to incinerators;
- industrial process raw material inputs (such as trace contaminants) and operating conditions (such as process temperature, pressure and flowrate);
- fugitive releases to air, water and land;
- receiving environments such as ambient air, grass, soil surface and ground waters;
- use of raw materials and energy (IPPC);
- noise and vibration;
- odour;
- process/plant conditions that are relevant to the time when measurements are taken or that may affect releases, such as down-time of plant or percentage of full utilisation of plant;
- operation and maintenance of monitoring and other relevant equipment.

Source: IMPEL 1999b, p. 5ff

heavily on the environmental authorities in the preparation of the case.

The ordinary reporting provides at the same time the general public with easy access to information about the environmental problems and how they are handled by the authorities in relation to industry, agriculture, the service sector and all other regulated economic activities, including the widespread public services, which are also affected and covered by the environmental regulation. The reporting and the open evaluation underline the accountability of the authorities towards the general public.

To help in the direction of ‘good reporting’ and thereby the best possible base for the evaluation of the compliance programmes IMPEL has developed a guide for the structure of and the topics to be covered by the report. They can be summarised [IMPEL 1999b, p. 13] in the following main points:

- Evaluation of the success/failure to meet the goals and priorities of the plan.
- Conclusions on the adequacy, quantitative as well as qualitative, of resources to carry out the planned inspection policy to ensure compliance by industrial installations.
- Conclusions on the level of compliance by installations with the regulations and a comparison with previous reporting periods in addition to the effects of actions taken to enforce compliance.
- Identification of specific legal requirements not complied with, and evaluation of possible methods to ensure greater compliance e.g. promotion, special campaigns, change of rules, practising other enforcement measures.
- Recommendations for future planning.

8.5.2 Compliance as Continuous Improvement

Parliamentary democracy, legislative decision-making and principles of ‘rule of law’ make sense only when the targeted citizens and companies are in compliance with the legislation in question. In addition, compliance is vital for the legitimacy of political institutions and political decision making as such. Securing compliance is therefore at the core of environmental regulation as well. This does not affect the need to respect the individual rights guaranteed for citizens, physical or legal alike, in all democratic societies. On the contrary, these are equally important for the legitimacy as is compliance.

We have presented key instruments in the drive for securing compliance. It is a complex task the authorities are facing here. In line with the understanding behind the EU-based environmental regulation, compliance has to be seen not only as a fundamental principle for the proper functioning of democratic societies. Environmental regulation is understood as needing

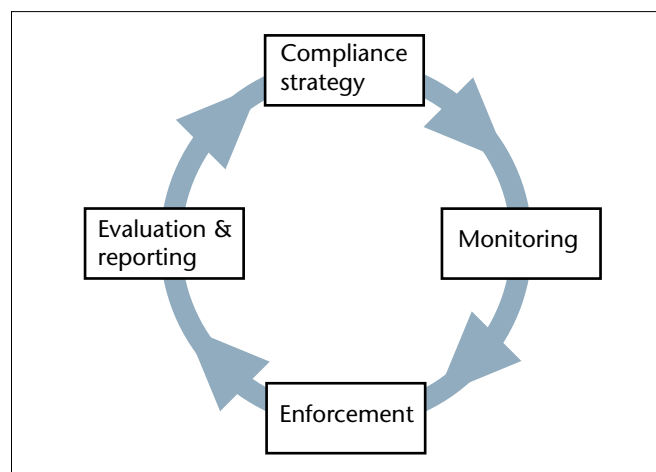


Figure 8. 3 The compliance cycle. [Based on IMPEL 1999, p 2]

a comprehensive and holistic approach and as being an ongoing process, continuously looking for improvements. This understanding adds or inserts the perspective of ‘continuous improvements’ into the authorities’ striving for compliance.

While monitoring for compliance with current regulation, inspectors in the best-planned compliance systems will seek to deal with problems and outright violations in the perspective of improvements. That is, they will enter into a dialogue on how remedying the violation can turn into or include prospects for an even better, and often cheaper, solution than the one they had before.

In this way, pushing for compliance becomes a platform for the next improvements and, eventually, becomes an ongoing process – a cycle, where you go through the different steps of the cycle one by one, arranging the feed-back where relevant, and ending up with the base for a new start, the next cycle. This understanding of the compliance is summarised in Figure 8.3.

Study Questions

1. Describe the different components of a compliance programme. Why is the evaluation of a compliance programme so important?
2. Give some examples of support a company may have to achieve compliance with environmental legislation and licensing. Discuss the roles of Authorities, Media, Public, Market and Green networking.
3. How could authorities in charge of inspections encourage companies to be more proactive towards environmental issues?
4. Describe what competent authorities exist in your country on the local, regional and national level. Especially explain if a regional authority is a regional office of a state authority or part of the regional administration such as the county.
5. Explain the dilemmas a local/regional authority may face in pursuing compliance in a company, located in the region.
6. Is it appropriate to reduce inspection frequency and intensity with companies with an EMS in place – why/why not?
7. Describe how a company may conduct self-monitoring – required by the IPPC directive – in the simplest way.
8. Describe the compliance typology of companies.
9. What are the components of the compliance cycle?
10. How should one conduct an evaluation of the success/failure to meet the goals and priorities of the compliance plan?

Abbreviations

CEE	Central and Eastern Europe
EEA	European Economic Area
EMS	Environmental Management System
EMAS	Eco-Management and Audit Scheme
EPA	Environmental Protection Agency
IMPEL	European Union Network for the Implementation and Enforcement of Environmental Law
IPPC	Integrated Pollution Prevention and Control
REACH	Registration, Evaluation and Authorisation of Chemicals

Internet Resources

Introduction to IMPEL

<http://ec.europa.eu/environment/impel/introduction.htm>

IMPEL Reports related to Minimum Criteria for Environmental Inspections

http://ec.europa.eu/environment/impel/reports_minimum.htm

IMPEL Reports related to permitting, monitoring and the 6th EAP

http://ec.europa.eu/environment/impel/reports_maximum.htm

The International Network for Environmental Compliance and Enforcement (INECE)

<http://www.inece.org/>

Making Law Work: Environmental Compliance & Sustainable Development. (INECE)

<http://www.inece.org/makinglawwork.html>

The Greening of Industry Network (GIN)

<http://www.greeningofindustry.org/>

Foundation for Sustainable Agriculture and Forestry (FSAF)

<http://www.fsaf.de/index.php?en-home>

Environmental Self-Monitoring in EECCA

http://www.oecd.org/document/45/0,2340,en_2649_34339_26408557_1_1_1_1,00.html

DG Environment webpage on the IPPC Directive

<http://ec.europa.eu/environment/ippc/index.htm>

Inspection, Enforcement and Court Processes

9.1 Inspection

9.1.1 The Role of Inspections

The prime objective of inspection is to monitor compliance among the regulated production sites and to identify possible violations of the regulation.

The site visit will also have to look into the ways the data from self-monitoring is provided and thereby assess the appropriateness, quality and reliability of these data.

If violations are identified, inspections also serve to document the non-compliance situation and thus provide the legal documentation to support any follow-up enforcement actions or any other appropriate consequences drawn.

An additional purpose of inspection may be to establish an atmosphere of ‘deterrence’, whereby a particular company – and in wider context all companies – is made aware of, that compliance with environmental regulation is taken very seriously by the authorities. Finally the very presence of inspectors in the field increases compliance rates by both the facilities that are repeatedly inspected and by others who may fear inspection – exactly as is the case with the traffic police.

As mentioned above a new role for inspections has emerged in recent years. Inspections are used as an opportunity and a means to encourage production management to improve the environmental performance of the company, also beyond a narrow compliance with current licence. It is important however to stress that inspectors should not give specific advice about how to come into or maintain compliance. Such actions could shift responsibility for compliance from the regulated source to the government inspector. For example, if the source relies on the advice of an inspector and this does not result in compliance, the responsibility for ensuring its own compliance is lessened because they “did what they were told to do” by a government agent.

9.1.2 Four Types of Inspections

Historically inspections were made as a response to complaints received typically from neighbours and/or downstream economic activities dependent on the same watercourse or odour free air. Quite a few of the typical neighbour problems have, however, been overcome or significantly reduced. For example sewage systems have been built and linked to effective wastewater treatment plants, and noise and other direct impacts have been taken care of by the licensing system. The nature of the

In this Chapter

1. Inspection
 - The Role of Inspections
 - Four Types of Inspections
 - The Functions of Inspections
 - Form and Intensity of Inspections
2. Enforcement
 - Enforcement Actions
 - The Range of Response Mechanisms
 - The Enforcement Process – Selection of the Appropriate Enforcement Response
3. The Court Process
 - Appeals within the Administrative System
 - Protection of Citizens Rights – rule of Law
 - The Role of the Courts
 - Courts to be Involved in Case of Criminal Charges
4. Agreements, Compensation and Damage
 - Agreements
 - Proportionality and the Consequences of Violations
 - Compensation for Damages

main environmental issues has at the same time changed, and has become increasingly systemic and global.

This development requires a more planned and strategic answer also at the level of inspections to support solutions and improvements for the new kind of problems. Planned interventions are today mainly made on demand from government and the political system at large. Their purpose is to document efforts and to keep costs under control. Inspections are therefore increasingly an integrated part of a Compliance programme along the lines discussed in the previous chapter.

A typology for inspections has been developed, based upon the reason and/or the aim of the inspection. The *reactive* inspection takes place after a complaint to the authorities. The *routine* inspection takes place in accordance with the compliance programme, set up by the particular authority.

Box 9.1 Inspection Goals

Environmental inspections may have one or several of the following goals:

- Identifying specific environmental problems.
- Making the source aware of any problems.
- Gathering information to determine a facility's compliance status.
- Collecting evidence for enforcement.
- Ensuring the quality of self-reported data.
- Demonstrating the government's commitment to compliance by creating a credible presence.
- Checking whether facilities that have been ordered to comply have done so.
- Promote sustained improvement beyond compliance.

Inspections may focus on one or more of the following:

- Does the facility have an up-to-date permit or licence?
- Has required pollution monitoring or control equipment been installed?
- Is the equipment being correctly operated?
- Are records of self-reported data properly prepared and maintained?
- Is the facility properly conducting any required sampling and analysis?
- Do the facility's management plans and practices support the required compliance activities?
- Are there any signs of willful violation of regulations and/or falsification of data?
- Is there some opportunities for process and technological improvement of the facility?

Source: IMPEL 1999 p. 62-64

A third type of inspections are the so-called *campaign* inspections. They are performed as a concerted action at many or all regions or municipalities to highlight and target a certain type of installations, or made to control a specific, normally quite serious, environmental problem.

Finally, one talks about the *follow-up* inspection, to check that violations identified at a routine inspection, have been corrected in a way that was ordered and within the time limit given by the authority.

9.1.3 The Functions of Inspections

These different types of inspections have been defined and described in some more detail by IMPEL. Routine inspections are carried out periodically to:

- Ascertain compliance with valid regulations.
- Check proper operation.
- Control self and independent monitoring systems and their results.
- Establish further inspection activities.

In addition to the routine periodic inspections, there are other circumstances in which inspections should be carried out. These [IMPEL, 1999c, p. 6f] are reactive and immediate inspections such as:

- Inspection concerning failures in operation of the installation such as after an incident; where permit conditions have been infringed; or where an infringement is anticipated without additional controls being implemented.
- Inspection after complaints – where the responsible authority gets complaints from local people, competitors, non-governmental organisations or other authorities to ascertain the source and cause of the complaints.
- Inspection after an accidental release, an explosion or a fire to assess the causes, effects and the measures taken to mitigate environmental effects.

Additionally, specific inspection campaigns may be held in the following circumstances:

- To investigate or follow up a certain environmental issue.
- To prepare for the introduction of new regulations.
- After a number of permit infringements, operational failures or incidents of a similar nature at installations of a particular type.
- On grounds of public outcry.
- To establish mass-balances, reports, plans or registers.

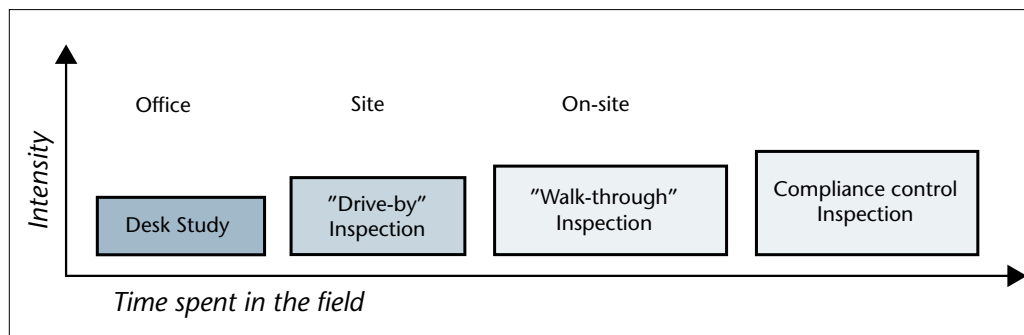


Figure 9.1 Form and intensity of inspections. *The inspections change character, and require more time and resources, depending on the task.*

9.1.4 Form and Intensity of Inspections

The different types of inspections can be carried out at different levels of intensity, that is, with varying use of time in total and on the site. The differentiated use of inspections depends on the categorization of companies as to their general environmental performance and transparency (see previous chapter). We distinguish between five types of inspections as to form and intensity. Apart from the distinction between going on site visit or not, the difference across the four types of inspections at or on the site is clearly related to the intensity of the inspection.

A *desk study* is a paper- or data-check exercise taking place at the authority premises. If this is all done it is a pure desk study. All site visits however – and more so the more intense – need preparation at the desk before going out. In this preparation the data provided by self-monitoring as well as previous inspection reports are important.

The *drive-by inspection* is something between the desk study and the site-visit. This inspection may take the form of a visual examination of a site without entering the site, e.g. performed from an anonymous car. It may include observing working hours, waste management practices, the presence or absence of visible air emissions or odours or noise, or other visual aspects of a facility operation. A drive-by inspection is useful in revealing information helping to decide whether to follow-up with a proper on site compliance control inspection. Drive-by in an area can also be used as a way of identifying facilities or operations potentially subject to regulatory requirements for which they have not (been) registered.

A *walk-through inspection* involves entry into the facility, possibly review of a few relevant documents with emission data, a quick ‘glance’ at regulated operations or practices, and then exit. Walk-through inspections are useful in establishing presence (“showing the flag”) and as a follow-up on earlier requirements and agreements. They also serve to ensure, that there have been no unauthorized expansions or changes in operations or processes, and verify that there are no ‘hidden’ operations. Inspectors can often conduct multiple walk-throughs in a day, particularly of smaller companies.

A *compliance control inspection* is a full-fledged check on, in principle, the whole operation and on all points included in the environmental licence. It is therefore very structured, and generally involves multiple steps and elements from interviews, observations of installations and processes till document review and emission samplings. Time is spent on checking and verifying self-monitoring data and the relevance and appropriateness of critical elements of present requirements to the operation as well as on options for improvements of the environmental performance.

A *beyond compliance inspection* is normally linked to – or is an aspect of – the compliance control inspection. It represents a perspective of prevention and (continuous) improvement of the company’s environmental performance, very much in line with the EMAS and EMS certification, which includes this pledge. An inspection can be a good opportunity to present more wide-ranging perspectives for changes in technology or installations, which has to be modified to stay in compliance of present licence. For example instead of installing a new and more effective filter at the outlet of wastewater from a process, it might be worthwhile to think about getting a water recycling system established. While recycling means saving water it might at the same time recover other raw materials, till now going into the sewage system together with the wastewater. Finally, the recycling will make the company able to comply with any foreseeable upcoming regulation on wastewater quality and limit values for e.g. heavy metal content and at the same time use the ‘green’ process in its marketing for new customers.

These inspections and related evaluations require a wide range of knowledge, skills, and abilities on the side of the inspectors. Time range for this type of inspection go from a few hours up to two weeks or more for very large and complex production facilities.

All the above inspection can be conducted with or without prior notice to the facility manager. Inspection with prior notice is termed ‘announced’, and without prior notice ‘unannounced’. The advantage with announced inspection is that besides the management representative, employees in charge

of the targeted processes and operations can be present and the processes actually running. Further, the company representative has had time to prepare all data and documentation needed and required. The major drawback is the possibility of removing installations or hiding processes or emissions that represent violations of current licenses and other relevant environmental regulation. Here again the differentiation according to the company record on compliance and transparency will influence the tactic used by the inspection.

The criteria, relevant to consider prior to any site visit, and, indeed, during site visits, have been summarized by IMPEL.

Box 9.2 Minimum Criteria for Site Visits

1. As a minimum criterion, on-site visits should be carried out through an integrated approach, which examines the full range of environmental impacts, as far as organisational arrangements allow. If site visits are carried out by more than one inspectorate, co-ordination between the authorities should be assured by mutual knowledge of each other's plans for site inspections. The findings of site visits should be exchanged between the relevant authorities.
2. A minimum criterion for site visits is that every site visit should be recorded, and the record filed.
3. Programmed, systematic site visits should cover:
 - Checking compliance with laws, regulations and/or permits etc.
 - Promote and improve the understanding by operators (of industrial installations) of the relevant environmental requirements and of the environmental impacts of their activities in order to secure compliance with the underlying objectives of environmental legislation.
 - Consider the impact on the environment of the installation in order to evaluate impacts, current control requirements and the need for improvement in either or both.
4. Ad-hoc site visits in response to complaints, incidents and non-compliances should occur for:
 - The investigation of the serious complaints, where appropriate.
 - The issue or renewal or modification etc of permits, which is particularly important at the start of the permitting process.
 - The investigation of significant accidents and incidents and non-compliances.

Source: IMPEL 1997, p. 4f

The practice of environmental inspections is discussed in detail in the special section on Inspections.

9.2 Enforcement

9.2.1 Enforcement Actions

Enforcement are actions that government officials take in order to correct violations. The means of enforcement is to command the facilities to get into compliance by imposing different sanctions. It usually begins with a request of correction within a given time limit. If this is not achieved then economic penalties may result. In the extreme cases non-compliance may lead to forced closing of an activity. If it is considered a criminal offence the case is handed over to the police.

The threat of sanctions can create an atmosphere in which the regulated community is stimulated to comply as government has shown willingness to act when non-compliance is detected.

9.2.2 The Range of Response Mechanisms

Enforcement can be controversial because so much is at stake environmentally and economically. The legal basis for enforcement is thus essential to the power and credibility of an enforcement programme. The given environmental or related laws need to provide the regulators with the needed warrants/authorities to act on non-compliance and enforce the implementation of given requirements.

In a country, based upon 'rule of law', the range and type of response mechanisms to non-compliance situations depends ultimately on the authorities/warrants provided by laws. These vary from country to country, but need to provide the enforcement authorities with access to the full range of informal, administrative, civil and criminal remedies. These [OECD p. 21] may include, but are not limited to, the following:

- Informal responses, such as recommendations, mutual agreements and warning phone calls and letters.
- Formal warning letters, including recommendations, and notices of violation.
- Mandatory corrective actions required by administrative orders to correct violations and bring non-compliance situations back in compliance.
- Changes in permit(s) conditions and suspension or cancellation (withdrawal) of the permit(s).
- Financial penalties (fines), administrative or judicial, accumulating as long as the illegal situation persists.
- Negative publicity.
- Attachment of property, facility shut down, which may be required by administrative or judicial order (and may

be effected by executive coercion, when authorities take remedial action at the expense of the offender).

- Criminal punishment, including imprisonment and confiscation of gains from being out of compliance.

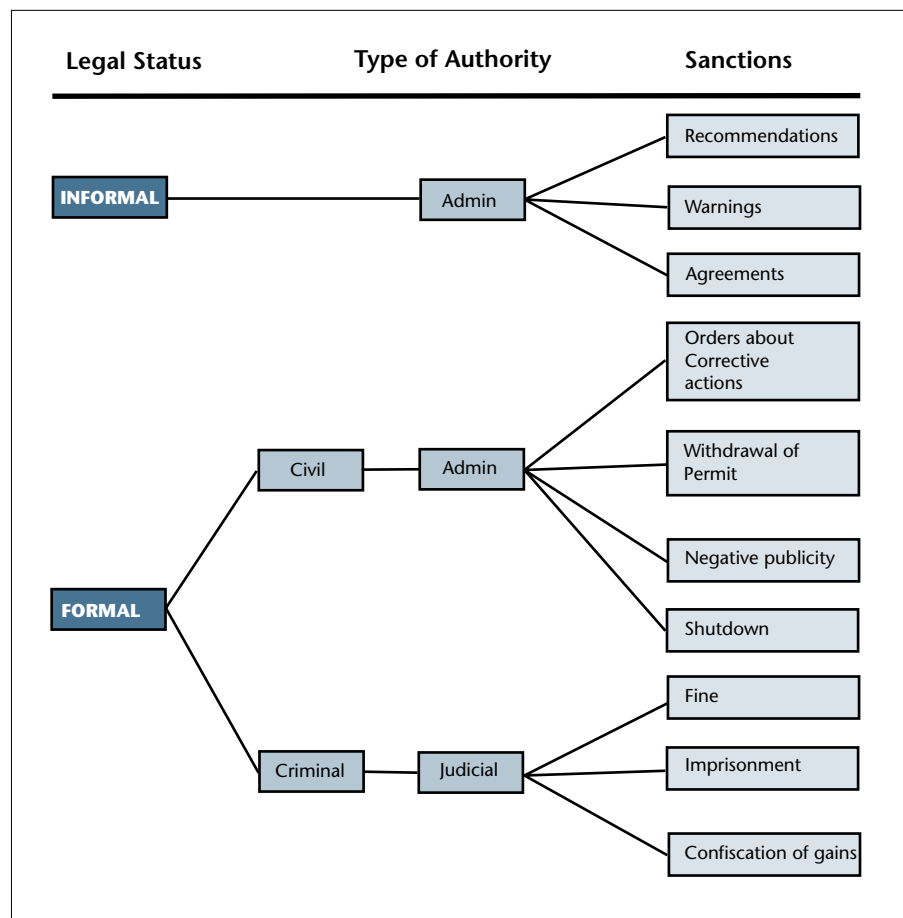
9.2.3 The Enforcement Process – Selection of the Appropriate Enforcement Response

The above described response mechanisms can broadly be pictured as shown in Figure 9.2. The scheme cannot, however, include all possible national variations. The key lesson from the figure is the very strong position, the government and/or a more decentralized level of public authority possess, although it will vary across the EU Member States.

The informal reaction is also an enforcement response. The enforcement therefore starts already during the compliance check site visit – and in the immediate follow-up on that by the written report made. This is informal, but may well have an influence, not least when the immediate outlook otherwise is a charge in the criminal court for violations of environmental regulation.

Having these different response mechanisms available, it raises the question of how to select an appropriate enforcement response to promote the facility to get into compliance. In general, enforcement usually follows the following sequence: warnings and recommendations (informal and/or formal), orders to take corrective actions, change or withdrawal of permit, monetary sanctions (fines, compensation), attachment of property, and, where appropriate and possible, criminal prosecution (confiscation of gains and imprisonment). There are certain conditions and time allowances for the company to react before the next step can be taken. That again has to do with the ‘legal rights’ in a society based on the

Figure 9.2 Actions taken by the authority in case of non-compliance. *The first response by the inspectors is normally an informal, such as a warning (above). If the company does not comply formal actions continue in the administrative system (middle), which still may be very serious. In a few cases the inspection authority regards the non-compliance to be an environmental crime, and address the case to the police. Here the case will continue to the prosecutor and become a court case (below).*



rule of law. And it is wise from the perspective of protection of the environment, as the aim of enforcement is not to punish anybody and use a lot of authority resources to that end. The aim of enforcement is to get the facility to comply with the environmental regulation. It should therefore be given the opportunity at each stage to choose the compliance itself instead of (more) punishment.

The seriousness of offence determines the escalation of the process as can be seen from the figure. The ‘appropriate’ response should be in proportion to the violation and take into consideration aggravating or mitigating factors. (See on proportionality 9.4.2. below).

9.3 The Court Process

9.3.1 Appeals within the Administrative System

The right to appeal means that there are one or several points in an enforcement process where a violator can appeal, that is protest against, the findings of an authority regarding the violation. It may concern in the first place the remedial action required by the enforcement program, and secondly the

Box 9.3 Agreements or Settlements with Violators of Environmental Law in the United States

In the United States agreements between the company and authority are often used to address non-compliance. Agreements can include any provisions that the compliance program officials is authorized to impose on a violator. Depending on their legal authority, environmental officials may have some latitude to develop creative approaches to solving environmental problems.

Creative settlements can also be used to leverage a single case to gain either greater environmental benefit or greater deterrence than would have occurred with a conventional settlement. Examples of creative settlements are described below.

Monetary penalty

Creative settlements are often linked to some limited reduction in *monetary penalty* or an agreement to extend compliance schedules. Creative settlements may also be sought for violators with limited ability to pay or violators that demonstrate a strong level of cooperation with the government. U.S. policy limits the amount of penalty reduction allowed in creative settlements because of need to maintain some level of penalty to preserve deterrence and recover the economic benefit of noncompliance.

Pollution prevention

Pollution Prevention settlements involve an agreement by the facility to convert to practices or processes that reduce or eliminate the generation of pollutants and wastes at the source. Pollution is prevented when the volume and/or the toxicity of pollutants is reduced. In manufacturing, for example, pollution prevention includes activities such as substituting chemicals, reformulating products, modifying processes, improving housekeeping, and recycling on site.

Pollution prevention projects may directly correct the violation or may reduce pollution not connected with the original violation. Pollution prevention settlements help ensure that violations will not recur and/or they reduce the total risk that a facility's operation poses to public health or the environment.

Pollution Reductions beyond Compliance settlements can be negotiated in which the violator agrees to reduce pollution further than the level required complying with the requirements. For example, a violator may agree to install more effective control technologies that reduce the overall discharge of pollutants.

Environmental auditing

Environmental Auditing is a periodic, systematic, documented and objective review at a regulated facility of its compliance status, management systems and/or overall environmental risk. Auditing has been encouraged by many nations and by the International Chamber of Commerce as an essential tool for regulated facilities to ensure compliance and to effectively manage their environmental risks.

Environmental audits have been required in several enforcement actions in the United States for one of two purposes. First, they have been used where a source shows a clear pattern of violations that suggests a management problem. In such cases, a settlement may include an agreement that the source pay for an environmental audit to identify and correct the internal management problems that led to the repeated violations.

Second, if a violation is likely to be repeated at other operations owned by the same company, a settlement may include an agreement (1) that the company or a third-party auditor will audit for that violation at the other facilities owned by the company, and (2) that any violations will be reported and corrected.

Restoration of damage

Environmental Restoration settlements not only repair the damage done to the environment because of the violation, but also further enhance the environment around the facility. If the environmental damage caused cannot be restored, the settlement may require the facility to restore a comparable environment in another location.

Public settlement

In the United States, violators who sponsor public awareness projects must also agree to clearly state to the public that the project was undertaken as part of the settlement of a lawsuit brought by the government.

Publicity settlements (*public awareness settlement*) involve that the violator agrees to undertake some activity to increase the awareness by the regulated community of the need for compliance and/or ways to achieve compliance. For example, the violator could sponsor a series of seminars to provide information to a specific industry group about how to correct violations common to that industry. The violator could also sponsor public announcements on television and radio to discourage violations or to describe how new technologies can be used to correct violations.

Training settlements can be used to correct internal compliance problems within a company or organization. Violators that are industry leaders may be required to design and conduct compliance training for others within the same industry group.

Escrow or Bond for Sources Unable to Pay Penalties settlement is useful for facilities that cannot afford to pay the monetary penalty normally imposed for the particular type of violation. In such cases, the facility agrees to put some money into an escrow or bond account which will be used to fund remediation or other activities to improve environmental quality.

Source: US EPA 1992

sanctions imposed. Appeal systems vary across countries, but two appeals within the administrative system are quite usual. The first appeal is often heard and decided on by a ‘court-like’ panel, manned by a mix of judges and technical experts. After the administrative appeal is exhausted the violator may turn to the court system, where he/she will normally have one appeal to bring the case before the next level of court.

As seen above enforcement responses are bound to create disputes between program officials and company representatives throughout the enforcement process. This might even start by the officials trying to gain access to the facility and might be disputed all the way through three appeals up to the supreme court. Enforcement officials [US EPA, 1992] should therefore always be prepared to:

- Prove that a violation has occurred.
- Establish that the procedures and policies were fairly and equitably followed and that the violator is not being wrongly accused.
- Demonstrate the underlying environmental or public health need for the requirement being respected.
- Demonstrate that a remedy for the violation is available (e.g. affordable pollution control equipment). (Even though this is not usually the responsibility of the government, this information can be important to negotiations.)
- Demonstrate the ability of the violator to pay, e.g. showing that a “poor” facility is owned by a wealthy parent company.

9.3.2 Protection of Citizens Rights – Rule of Law

Democratic societies, subscribing to the ‘rule of law’ must balance the need for, often, swift action by the authorities in the best public interest with the fundamental rights of the individual citizen.

The decisions made by governmental officials, affecting private interests, are therefore subject to appeal and can eventually be taken to court for a final verdict on the matter. The court system will not be used very often as it takes time and can be quite expensive in case you lose. But court rulings will, on the other hand, have effect as precedence in a much stronger and wider sense, than will rulings from administrative appeal panels.

The rule of law and legal rights issue sets a general limit on what the environmental authority, is allowed to do as a government authority. As an authority it acts unilaterally within its competence – and its obligation – to implement current law and derived regulation. A citizen or a company will have to comply with the final decision of the government authority, i.e. when administrative appeal is exempted. Or challenge the decision – that is challenge the interpretation of the law, that

lies behind – by taking the authority to court and have the decision tried in court trial. This option of appeal and in the end of taking the authority to court and have a court ruling, which must be respected also by any government authority, is a fundamental element of the ‘rule of law’ concept.

9.3.3 The Role of the Courts

The courts are normally organised according to principles, written in a country’s constitution. They are state institutions, partly financed by the state budget and partly by the fee, paid by the parties for opening the case. The courts should in a democratic state be independent from government decision-making, not only on how to decide in particular cases, of course, but also in how to organise their activities and, most importantly, on ‘hiring and firing’. A judge can be fired only by the court itself. That principle is there to protect the judges, and thereby the court system, against government pressure. When politically important cases are brought to court by people or organisations, disagreeing with the interpretation of the law and the administration of a political majority, the court should be independent from other power-holders in the society.

The court system can be organised differently, but has normally three stages with the right to have one’s case tried at least twice, i.e. having at least one court of appeal. One might also have a second appeal, and thereby a third court hearing for the case. This will normally be decided on by an independent body, set up to evaluate the nature of the case. A second appeal is normally only granted if some principle questions are involved for which a final ruling by the highest court would be important, as that will work as precedence. Precedence cases set the norm for future decision making within the government administration in the area. But also first and second level court rulings will have important an impact as precedence, if they are not questioned by any of the two parties’ decision-making in that area for the future.

9.3.4 Courts to be Involved in Cases of Criminal Charges

As soon as criminal charges, whether fines, based on the environmental act itself or criminal charges with the possibility of imprisonment become relevant, the case has to be handed over from the environmental authorities to the police and – later on – to the prosecutor, who will then, when decided to proceed, take the case to court. For fines, the police can decide a level and ask the offender to accept to pay that fine. If accepted, there will be no court case. If refused, the case will have to be taken to court, regardless of the size of the fine proposed.

So, when a case is considered by the environmental authorities to be serious enough and/or compliance has not been

possible to establish by the means available to the authority, it will report the case to the police and hand over all information and evidence available. The police will start an investigation and probably during the investigation ask for additional information. At the end of the investigation the police will discuss its opinion with the environmental authorities whether to push the case or not, which pretty much is a matter of assessing the scope for winning the case. If it is decided to go on, the prosecutor will take court action and charge the person and/or the company with fines – and for a person possibly also with imprisonment, where indicated and made possible by the law.

9.4 Agreements, Compensation and Damage

9.4.1 Agreements

The instrument of an agreement is on the borderline between sanctions and compliance. It may be seen as in ‘both worlds’, depending on the way it is made and thereby the legal status it acquires. It is important in which general legal regime it is made. Within the EU an agreement or ‘deal’ between the owner of a non-compliant facility and the authority does not mean anything legally. Here the authority will have the power to push things on an authoritative basis anyway. On the other hand they cannot extend performance beyond the legal base by making an agreement and getting acceptance for more. That agreement would be void. Still, in practice, making an agreement can be important. The owner of the facility may think, a fair(er) deal was made. Because of the signature or just clear acceptance of the deal he/she may feel a sincere obligation to actually act accordingly.

In the USA the situation for the agreement can be completely different. Here there is much greater scope for civil law and thereby leeway for an authority to stage unilateral actions and negotiate enforcement. Still, also in the USA, the agreement cannot go beyond the competence of the authority to push requirements through. The role of the agreement – or creative settlements – in US enforcement practice is shown in Box 9.3. As shown it may have quite a wide range of issues and obligations, including some ‘rebate’ on penalties for quick compliance by complementary action or investment by the company in violence.

The April 1998 update lists eight categories or subject areas for action by a non-complying company, able to replace (substantial) part of a fine that is otherwise looming. The term for these agreements is Supplemental Environmental Projects (SEPs). As they are made as part of an enforcement settlement, an SEP must advance at least one of the objectives of the environmental statute violated. Thereby they include a relationship

between the underlying violation and the health or environmental benefits, that will result from the SEP [EPA/1998 and Case in Box 9.4].

9.4.2 Proportionality and the Consequences of Violations

It should be underlined, that the appropriate reaction within the range of sanctions available is guided first of all by proportionality, i.e. the sanction must correspond in seriousness with the seriousness of the violation assessed by the environmental objectives of the regulation violated.

The steps taken may have very much more serious consequences for a company than those stated in an authority decision. In general one looks upon the sanctions applied by the environmental authorities (civil sanctions) as less severe than the sanctions, applied in the criminal justice system (criminal sanctions). That view is most likely related to the moral standing in the court system. Becoming a defendant in a criminal case is generally very damaging for the reputation of a company and for its business image. Reduced goodwill will reduce business opportunities.

Box 9.4 A Settlement of Environmental Violation at the University of Virgin Islands

In a creative settlement of violations under EPA’s colleges and universities compliance program, the University of the Virgin Islands (UVI) agreed to help improve environmental performance at all schools on the Virgin Islands.

The inspectors had at UVI uncovered violations of federal hazardous waste requirements, including failure to store incompatible waste chemicals separately. They also missed out on minimising risks of fire, explosions and the release of hazardous wastes. EPA also noticed that UVI had not properly labeled containers of hazardous waste, and had not provided proper training to employees.

The settlement included that UVI must spend at least \$99,000 to help all U.S. Virgin Islands schools comply with environmental rules. UVI has agreed to do this partly by training their staff and faculty from both campuses and conduct a series of assessments, reports, mentoring activities, and seminars to help other schools better handle their own environmental obligations.

Additionally, the UVI had to pay a penalty of \$20,000.

Source: <http://enviro.blr.com/display.cfm/id/76437> - 04/26/2007

Secondly, sanctions like withdrawal of the permit or, ultimately, shutting down the whole operation till the violation has been removed, can be very serious economically. The break in production may lead to violated business contracts. In addition to the economic consequences, these inabilities to deliver may have an equally damaging impact on reputation as a criminal case.

9.4.3 Compensation for Damages

A serious breakage of environmental law normally occurs in a situation where emissions into water, air or soil takes place and considerable damage has occurred. This may be a violation of environmental law but also causes damage to a third party. This party, be it a company or private individuals or even more often a large group of individuals, normally claim compensation for the damages caused. Fairly large sums of money may be involved in the claim and also here there is the possibility of taking the violator to court or reaching an agreement outside the court.

The most spectacular cases of claims on companies have occurred in the USA, where there is a tradition of suing companies for large sums of money, even if the damage from a European perspective not is large. But also in Europe it is clear that damage compensation is very important in environmental legal offences. They may be much higher sums of money than the fines imposed for breaking environmental law or failing to comply with the licence.

Study Questions

1. Describe the different types of environmental inspection and list their major advantages and drawbacks, as well as resources needed for each of them. What are the advantages and drawbacks of site visits compared to desk study inspections?
2. Which are the purposes of inspections? Make a list of 5-10 important goals, and questions which may be asked the company representatives.
3. Describe how a site visit may be prepared and legally conducted. Which are the main differences between “drive-by”, “ad hoc” and “compliance control” types of site visits?
4. Should inspections always be announced, like a newly passed regulation in Denmark requires – why/why not?
5. How could authorities in charge of inspections encourage companies to be more proactive towards environmental issues?
6. What are the advantages and disadvantages of an enforcement approach that takes into account the principle of proportionality and citizens rights and make use of the whole range of enforcement mechanisms, as opposed to a strategy that goes straight to the more severe enforcement mechanisms when a violation is identified?
7. When does an authority, in face of non-compliance, move from informal actions to formal actions and finally leaving the case to the police?
8. Which formal statements and documents does an authority need be able to provide when a case of non-compliance is handed over to the police?
9. Which are the roles of the courts in a lawsuit on environmental non-compliance and which rights do the party, charged for non-compliance, have?
10. What role is appropriate for “deals” – agreements and settlements between the authority and the non-compliant company – in relation to enforcement of compliance?

Abbreviations

EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
IMPEL	European Union Network for the Implementation and Enforcement of Environmental Law
INECE	International Network for Environmental Compliance and Enforcement
OECD	Organisation for Economic Co-operation and Development
SEP	Supplemental Environmental Projects
US EPA	United States Environmental Protection Agency

Environmental settlement between US EPA and University of the Virgin Islands

<http://enviro.blr.com/display.cfm/id/76437>

US EPA Environmental law Enforcement Business and Legal Reports

http://enviro.blr.com/topic.cfm/topic/204/WT.cg_n/article_topic_link/WT.cg_s/enviro

US EPA Supplemental Environmental Projects

<http://cfpub.epa.gov/compliance/resources/policies/civil/seps/>

Internet Resources

IMPEL Reference Book for Environmental Inspection

<http://ec.europa.eu/comm/environment/impel/pdf/refbook.pdf>

IMPEL Reports related to Minimum Criteria for Environmental Inspections

http://ec.europa.eu/environment/impel/reports_minimum.htm

IMPEL Operator self-monitoring

<http://ec.europa.eu/comm/environment/impel/pdf/selfmon.pdf>

IMPEL Planning and Reporting of Inspections

http://ec.europa.eu/comm/environment/impel/pdf/plan_and_report.pdf

IMPEL Frequency of Inspections

<http://ec.europa.eu/environment/impel/pdf/freq.pdf>

IMPEL General Principles for Inspection

<http://ec.europa.eu/environment/impel/pdf/mincrit.pdf>

The International Network for Environmental Compliance and Enforcement (INECE)

<http://www.inece.org/>

The INECE International Environmental Compliance and Enforcement Library

<http://www.inece.org/library/proceedings.html>

INECE's 7th International Conference on Environmental Compliance and Enforcement, 2005

<http://www.inece.org/conference/7/index.html>

Licence Enforcement of EPA Ireland

<http://www.epa.ie/whatwedo/enforce/lic/>

Economic Policy Instruments

Taxes and Fees

10.1 The Economy of Environmental Protection

10.1.1 To Pay the Costs of Environmental Services

Environmental policy is about protecting the environment by reducing or removing environmentally adverse behaviour on the side of business, people at large and public activities alike. The need for environmental policy means, that this aim is not coming about all by itself. Environmental policy is, therefore, essentially about finding ways and means to influence behaviour of all kind of human actors in more environmentally friendly direction.

This book focuses on industry and thereby business. We have in the previous chapters seen key elements of regulatory policy instruments applied by policy makers to make industry minimize, or at least reduce, adverse environmental impact from their activities. Many of these instruments have a strong element of self-control and self-management. Where they are authoritative, i.e. determined by the environmental authorities, like an environmental licence according to the IPPC directive, there is a considerable element of consensus-making involved in establishing these licences.

When we now turn to the economic policy instruments, which make up an important – and increasing – part of the arsenal of environmental policy instruments, the basic assumption is that there are no “free lunches”. Resource use and waste emissions are services which cost something and those costs need to be paid. If the prices are right they would – according to the views of market economy – take care of all environmental protection needed. But it is not that simple, as we will see.

Economic instruments are general in their nature. For any unit performing the targeted activity or using the targeted commodity and once decided upon, there are no negotiations on their application. Economic instruments work by economic in-

centives. This is a particularly strong incentive in any business context. By changing behaviour, that is, by replacing one kind of material or process with environmentally less harmful materials or processes, the company can reduce the fee or avoid paying all together. Economic instruments therefore influence the behaviour of the business, that is, change the way the busi-

In this Chapter

1. The Economy of Environmental Protection
To Pay the Costs of Environmental Services
Why Economic Instruments?
Setting the Right Price for External Effects
The Polluter Pays Principle
2. Charges or User Fees
Charges
Setting a Price for Water Services
3. Environmental Taxes
Introducing Environmental Taxes
Pollution Fees and Product Taxes
Taxes on Waste
Energy Taxation
Taxes on Fuels
Car-related Taxes make up the Most
Making Passenger Car Taxation Environmentally Based
4. Subsidies
Subsidies as State Support
The European Union Subsidies Programmes
5. Role of Environmental Economic Policy
Tax Revenue or Environmental Protection.
Do the Polluters Pay?
Taxation does Reduce Pollution of the Environment.

ness is run to avoid the fee. Ideally, the policy intentions have been achieved, when no fee is paid. Then the policy has been successful.

For economic instruments the key property and peculiarity is, that complying fully with the policy brings the “free lunches” about at last. It might even be topped up by outright economics gains, at least in the long term. Reality is, however, also in this area, often quite a bit away from the ideal. Before expanding on that, we will take a somewhat closer look at the economic instruments and their application.

10.1.2 Why Economic Instruments?

Economic instruments are applied to change behaviour by economic incentives. But why do these incentives need to be imposed? Why do not companies and individuals see and go for these benefits on their own?

There are several reasons.

First a good deal of the natural environment, such as the air, is “common good”, i.e. it has no owner. There is then a risk of exploitation. The state comes in to play the role of the owner to protect this common good. It may do this by charging a fee for its use.

In other cases there is no possibility of charging for the use of a service, for example street lighting. But it costs something to provide it. In order to cover the costs again the public has to collect a tax.

Thirdly, and more importantly, environmental consequences of human activities are diffuse, wide-ranging, piece-meal and often dangerous only in the long term. A few examples may illustrate this:

- Particles from car exhaust in the city affect health seriously; people exposed to particles on the street will bear the consequences, far away from the car owners.
- Nutrients and pesticides leaking from agricultural land cause pollution of rivers and coastal waters; reduced water quality, reduced biodiversity etc will be felt far away from the polluter.
- Pollution of air by SO_x and NO_x cause degradation of buildings, monuments and corrosion of various installations due to acidification; owners of these monuments or equipments are far away from those emitting the acidifying gases.
- Release of CO_2 from power generation etc., create the enhanced green house effect; those suffering from the consequential climate change are often far away from the polluters.

Some of these impacts are regulated by regulatory policy instruments. Emission values, imposed by the environmental

licences for an activity and by specific product standards, set upper limits on the hazardous content. In other cases an original economic approach is replaced by a regulatory one. Regulation of cars is illustrative in this respect. Authorities started to phase out leaded petrol by introducing a differentiated petrol tax. Later they demanded catalytic converters on all new cars from a certain time. This ended the use of leaded petrol, since converters did not function with lead in the petrol. Another example is provided by agriculture. Here the use of fertilizer and pesticides were regulated via a quota-system and by quality requirements or outright ban on certain products.

Still, regulatory policy instruments are not sufficient. There is a limit to in how much detail you can regulate an activity. The resources needed for detailed control would be impossible. This is especially true for diffuse sources and/or diffuse and long-term effects. Further, the direct regulation approach does not promote changes and innovation very well. It holds no or limited incentives. In these cases economic instruments are more efficient.

10.1.3 Setting the Right Price for External Effects

The damaging effects of emissions exemplified above, remain external to the cost-calculations in companies and hence are not included in the prices of the products. This is where the economic instruments may play an important role. Such instruments can “internalize” the costs of this type of environmental impact by assigning a tax to each unit of exhaust, to each kg of fertilizer and to each ton of CO_2 . Such taxes will make the prices go up. Thereby they will create a dynamic (or continuous) incentive to innovate, to substitute or – at least – to try to reduce the use of the environmentally damaging products or methods to avoid paying or reduce the amount of the tax to be paid.

There are, in other words, some “social costs” of human activities, which are not automatically brought “into the equation”. The economic instruments, i.e. taxation, provide a way to internalize these costs into the private calculations. In this way private and social costs are added together to make up the full costs for the environment of human activity and thereby make the prices “tell the truth” [Weizäcker, 1997] about the environmental costs of a given commodity or service.

For micro-economic theory the internalization of social costs represents a problem of principle. It has correct (fair and firm) marginal pricing as a precondition for efficiency in cost distribution and resource re-allocation via the market. But the estimation and quantification of the social costs of different kinds of environmental damage are very difficult to establish, and any calculation will be full of uncertainties and reservations. Fixing the tax-level will therefore not come up to these micro-economic requirements, which are, by the way,

also hampered by many other uncertainties and reservations in their practical application. Rather, deciding the level of the taxation will be much more of a “trial and error” exercise, depending on political support and drawing on experiences from other areas and from other countries and then correcting the tax-level as experiences are gained.

10.1.4 The Polluter Pays Principle

Quite a few environmental policy principles have been developed over the recent 30 years and most notably since 1987,

Table 10.1 User fees/charges in Denmark for discharging/delivering wastewater and solid waste to treatment and handling facilities for years 1998 and 2004, compared with the environmental taxes for the same years. *Figures in Million DKK. The OECD defines charges and fees as “compulsory required payments to either general government or to bodies outside general government, such as for instance an environmental fund or a water management board” (OECD, 1999), and environmentally related tax as a “compulsory, unrequited payment to general government levied on tax-bases deemed to be of particular relevance. Taxes are unrequited in the sense that benefits provided by government to taxpayers are not normally in proportion to their payments” (OECD, 2001). [Sources: Danish Ministry of Finance and Danish Statistics Service].*

Tax	1998	2004
Energy- tax	22,964	31,768
CO ₂ /SO ₂ -tax	4,515	4,954
Packaging tax	864	921
CFC/Chlorinated compounds etc.	2	53
Pesticides	298	379
Raw-materials	157	161
Solid Waste-tax	889	1,005
Wastewater tax	273	197
Drinking-/Tap water tax	1,544	1,430
Miscellaneous	53	92
In Total	31,559	40,960
in EURO, million	4,236	5,498
User fees, same years:		
Waste water treatment	6,400	7,900
Solid waste handling	6,200	13,300
in Total	12,888	21,200
In EURO, million	1,730	2,845
User Fee, percentage of Taxes	40.8	51.7

when the Brundtland Commission Report Our common Future was published. For the economic instruments, the *polluter pays principle* is the oldest, the most widely recognized, taken up in legislation across the globe. It was adopted in the 1st EU Environmental Action Programme back in 1973 and included in the EU Treaty of 1992/93, Art. 174/EC. It was also included in the UNCED-Rio-Declaration from 1992. The key issue is, what should be included to fulfil this principle, i.e. when can the polluter be said to have paid (all the costs of his activity)? Like most other areas we have here witnessed a historical development, changing the notion and the understanding of the polluter pays principle as to what should be included for full cost coverage. The main distinction goes between environmental fees/charges and environmental taxes. Suggestions for moving into taxation were heard all the way from Pigou in the 1920’s till Baumol and Oates in the late 1970’s into the 1980’s. It was not until the latter half of the 1980’s that the first environmental taxes were actually introduced.

10.2 Charges or User Fees

10.2.1 Charges

Charges are defined as the payment which should cover the proven expenses for handling waste or providing a resource such as water. The charges include costs for collecting sewage and treatment of wastewater in treatment plants collecting and incineration of solid waste collecting and depositing solid waste on landfill collecting and managing hazardous waste, either by incineration, or storage cleaning or depositing polluted soil from so-called brown fields

The companies responsible for these services are in many EU-countries run by, or owned by, the municipality or by the regional government, but private companies are also involved, especially in the solid waste-handling sector.

As the handling cost for the clean-up operations are not taking into account the wider implications and wider social costs of the economic activity, they will never be able to achieve the full “internalization” of these social costs. Still, within their scope, the charges will have some internalization effect as these costs will influence the behaviour of companies and consumers in the direction of avoiding or minimizing the amount to be paid. If charges were not required there would be a social redistribution via the state for the benefit of those, creating the pollution. The costs would then have to be paid by the ordinary taxpayer.

Data on charges are not available in Eurostat, (the EU’s Statistics Bureau), or EEA, the European Environmental Agency, on the charges collected in the EU-countries on only the taxes. But they are available nationally. As an example the fees and charg-

es paid by Danish users in 1998 and 2004 are shown in Table 10.1 together with the environmental taxes paid these same years. It is clear from the table, that the relative increase in the charges is higher than the relative increase in the taxes. The main increase comes from charges for solid waste handling, which has actually doubled within these 6 years with the biggest “jump” from 1998-2000. The reasons seems to be cost increase at the handling utilities, including expansion of the handling capacity, a rise in the amount received and a slight increase in the proportion of private companies, active in the solid waste sector.

10.2.2 Setting a Price for Water Services

For the publicly owned utilities the charges may cover the actual costs of running the operations, but may not exceed that level. Then they would turn into profit making, i.e. act as a hidden and non-decided taxation. The charges must, put differently, not move beyond making the services “expense-neutral”.

The responsibility for defining the charges is normally that of the municipality or region. The city council or regional council in these cases appoints and constitutes the board of such companies, which decides the charges.

The charges may be fairly easy to calculate from the cost of operations. But it is less clear how to divide charges between a basic and a volume-dependent part of the charge. The cost for wastewater treatment is by far dominated by the basic cost for running the treatment plant, which is volume independent. Still, if the charge is volume-dependent, that is, dominated by costs per cubic meter, it will work as an incentive to decrease water use. This was dramatically illustrated when charges for water were introduced in Central and Eastern Europe. Water use decreased from more than 400 l/capita and day to less than 100 l/capita and day in a few years. A further complication is that normally the costs for water and wastewater management are combined into a single charge. The user pays for the volume of water used, regardless of how it is used and polluted. In addition many water companies do more than simply take care of water. They e.g. ferment their sludge to produce biogas, which is sold, and they may use residual heat in wastewater e.g. by a heat pump to feed into the district heating. It is not clear in which way the costs and gains from these activities enter into the definition of the charges.

In general only small industries use municipal water and municipal treatment plants. The larger industries most often have their own water supply and thus are independent of the municipal policy for setting charges. The cost for their water use is instead decided by the costs connected with fulfilling the conditions for water withdrawal and concentrations of pollutant in the effluents as decided in their licences. But in case

the country or the region has put a tax on water use, this tax will have to be paid also by companies with their own water supply, as the objective of the tax is reduced use of the water resource as such. This is yet another demonstration of the difference between the fee and the tax.

10.3 Environmental Taxes

10.3.1 Introducing Environmental Taxes

Environmental taxes have become increasingly popular with most governments in recent years. It all started in the late 1980's with an OECD declaration by the member countries' Environmental Ministers in June 1985. This was a pledge for the use of the polluter pays principle and initiated an extensive survey of the use of economic instruments among the member states. The study [Opschoor & Vos, 1989] found a number of charges but in reality no environmental taxes. The Japanese SO₂ tax was the only exception. In addition taxes on petrol in the Netherlands and Scandinavia were identified.

In Denmark, the petrol tax was introduced as far back as in 1927, but at a low level. Petrol taxes were, however, subsequently raised considerably. In conjunction with the first and the second “oil crises” in 1974 and 1979 respectively an increase of petrol tax was introduced to halt a rise in, or to reduce, the petrol consumption. At the same time a shift from oil-based to coal-based power generation was initiated. Both measures were made to reduce the Danish dependency on oil and the damaging influence on the balance of payment. These taxes were, therefore, not originally founded on environmental concerns, but were increasingly seen that way, as the concern for the environment came firmly on the agenda with the 1987 Brundtland Report and the Rio summit in 1992.

OECD has compiled information on the level and importance of the “environmentally related taxes” for its 30 member states. Table 10.2 A-C provides an overview of the taxes for selected countries, related to GDP, to total tax revenue and per capita.

10.3.2 Pollution Fees and Product Taxes

Environmentally related taxes or fees are of several kinds. They include:

- Emission charges or fees, e.g. on emitted SO_x.
- Non-compliance fees when exceeding permitted emissions.
- Product taxes on products causing an environmental impact, such as fertilizers.
- Product charges on petrol.
- Taxes for land-filling of waste.

A. Env. tax revenue per GDP (%)	1995	1999	2003	2004
Czech Republic	3.36	3.03	2.83	2.62
Denmark	4.36	5.19	4.96	5.10
Finland	2.93	3.49	3.29	3.12
Germany	2.41	2.29	2.64	2.53
Norway	3.54	3.26	2.98	3.03
Poland	1.52	1.94	1.94	na
Slovak Republic	2.41	1.99	0.14	na
Sweden	2.92	2.88	2.95	2.88
United Kingdom	2.93	3.21	2.68	2.65
United States	1.12	1.03	0.88	na
OECD average	1.94	1.89	1.73	na

B. Env. tax revenue per total tax (%)	1995	1999	2003	2004
Czech Republic	8.38	7.79	7.52	na
Denmark	8.83	10.08	10.27	na
Finland	6.52	7.42	7.37	na
Germany	6.30	6.07	7.44	na
Norway	8.52	8.07	6.86	na
Poland	3.83	5.54	5.67	na
Slovak Republic	na	5.79	na	na
Sweden	6.14	5.50	5.84	na
United Kingdom	8.33	8.88	7.57	na
United States	4.07	3.56	3.46	na
OECD average	7.07	7.42	7.07	na

C. Env. tax revenue per capita (USD/cap)	1995	1999	2003	2004
Czech Republic	169	162	251	274
Denmark	1501	1687	1945	2288
Finland	741	862	1024	1114
Germany	724	588	781	845
Norway	1189	1155	1440	1660
Poland	49	77	106	na
Slovak Republic	82	74	na	na
Sweden	794	817	993	1112
United Kingdom	568	800	814	950
United States	310	342	332	na
OECD average	597	619	725	505

The most direct form of environmental taxes is when a cost is charged on emissions. The fee for emission of sulphur dioxide provides an example. The taxation is done to stimulate the reduction of emissions. Charges for SO_x emissions should be compared to the cost of abatement. In this case it is rather cheap to remove the SO_x from the flue gases and, at least in several countries, the taxes are more expensive. This means that the taxation have been a rather efficient economic instrument to improve environmental protection. It is much less easy to abate NO_x and the reduction of NO_x in flue gases from industry or car exhausts decreases more slowly.

An IPPC licence usually gives the right to a company to emit a defined amount of each substance from its activity. If these amounts are exceeded the consequences is in the first place a non-compliance fee. It is an economic instrument with the purpose of reducing the likelihood of exceeding the allowed amount. The non-compliance fee is often progressive, that is, the first few kg or m³ are less costly and the additional kg or m³ cost more.

Taxes may also be put on products, which will cause environmental impact. Most typical is the charge on petrol, but there are several other taxes. Artificial fertilisers have a tax in Sweden, related to their nitrogen content. In this case it has been clearly shown that the use of fertilisers is dependent on the level of this tax. When it increases the amount of fertilisers decreases, which is exactly what the tax is meant to achieve.

10.3.3 Taxes on Waste

One of the environmental taxes, which have increased very considerably the last few years is a tax for landfilling. The base is the year 1999 EU Landfill Directive, which aims at reducing the waste ending up in landfill sites. For this reason a landfill tax has been introduced. The present tax on landfilling waste in Sweden is 435 SEK (50 Euro) and in England it is 24 GBP (36 Euro) per tonne. The level of the tax after its introduction in 2000 has increased yearly.

Table 10.2 Revenues from environmentally related taxes. *The table gives data from countries in the Baltic Sea region and, for comparison, data for the USA, UK, and average for the 30 OECD countries. The tax-bases covered include energy products, transport equipment and transport services, as well as measured or estimated emissions to air and water, ozone depleting substances, certain non-point sources of water pollution, waste management and noise, in addition to the management of water, land, soil, forests, biodiversity, wildlife and fish stocks. A: Revenues in % of GDP. B: Revenues in % of total tax revenue. C: Revenues per capita in US Dollars. The averages for 2003 and 2004 are calculated only across the countries for which 2003 and 2004 figures are available. [Source: EURO-STAT. <http://www2.oecd.org/ecoinst/queries/>]*

Specifically the Commission's policy is that the amount of biodegradable municipal waste (including household rubbish) in landfill should be reduced by 35% by 2020 compared to that of 1995. A main reason is to remove methane (a greenhouse gas) emissions from landfills. Composting and subsequent use for soil improvement is the preferred way. Composting is used all through Europe especially in the old EU-15 countries. The tax on landfill has again proved to be a very efficient instrument to promote a long series of projects to reduce landfilling. Most of these projects have been initiated and run by local authorities. An important option is solid waste incineration, which is increasing in Europe.

The taxes on landfilling have also stimulated the establishment of a market for recycled materials, such as paper, glass and scrap metal. This has, in a very considerable way, changed waste management in the European Union and in other parts of the world. Other kinds of waste may also be reused. For example volumes from building sites may be sent to road constructions. Waste taxation is thus one of a number of regulatory and economic instruments, which have been introduced to stop the galloping amounts of waste in Europe, and change our "wastei-sation" society into a society of good resource management.

10.3.4 Energy Taxation

Energy taxes are by far the oldest types of environmental taxes. Energy taxation has been a main instrument for a number of purposes, the most important being:

- To reduce oil dependency.
- To reduce emission caused by power production.
- To reduce car traffic.
- To increase fiscal revenues.

We will comment on each of these issues below to see to what extent they influence energy taxation.

Energy taxation is implemented for petrol and in general for fossil fuels for cars, for oil used for heating purposes, for gas and coal used for the same purposes, as well as for electricity. Energy taxation has not been introduced for international traffic, neither by boat nor by air. This is becoming an increasingly serious drawback in efforts to reduce carbon dioxide emissions. An added problem is that international ferry traffic does not have to pay fees for using high sulphur oil and is thus becoming a main contributor to acid rain. Some Baltic Sea ferry companies use low-sulphur oil anyhow to improve their goodwill, and due to customers requests.

Taxes are decided on nationally. They thus vary considerably, but all member states in the European Union have energy taxes. There have been efforts to harmonise energy taxes, and even more so, that there are carbon dioxide taxes, in the Euro-



Figure 10.1 The car and the environment. *Car traffic is a burden on the environment in several ways. Climate change due to the use of fossil fuels, air pollution, and the extensive infrastructure are the dominating categories. Car traffic also is heavily taxed and in fact contribute with about 85 % of all environmental taxes. (Photo: Credit © European Community, 2007)*

pean Union. Below we will see that there are rules for minimum taxation of fossil fuels in Europe.

Energy taxes are fairly high. As an example the Swedish price on 1 litre of petrol in March 2007 had a total cost of 1.3 euros per litre, of which about 2/3 is tax. This level is normal for western European countries. In 2006 the Swedish petrol taxation totalled 41 billion SEK (4.4 billion Euro). Petrol taxation has since increased.

10.3.5 Taxes on Fuels

A most important tax revenue provider is the fuel used for transportation, personal as well as commercial. We will see below that about 2/3 of all environmental tax revenue is coming from fuel taxation.

The EU-directive 2003/96/EC of 27 October 2003 sets minimum rates of taxation for motor fuel, motor fuel for industrial or commercial use, heating fuel and electricity (Table 10.3). The levels of taxation applied by the Member States must not be lower than the minimum rates set in the Directive. Under certain conditions, i.e. linked to product quality, quantity of energy used for heating purposes and e.g. for local public transport, waste collection and ambulances, the member states may have differentiated rates. Further, certain exemptions and reductions are allowed in limited and very special cases. Otherwise the member states should comply with the minimum price system, which has two stages, one to be implemented by 1st of January 2004, while the second stage (applicable to motor fuels only) takes effect from 2010.

These taxes will apply to and affect private households and private transportation, including the costs for commuting. The same is true about waste and water taxes, which are applied in

a number of member states, but with widely different amounts among its members.

Fuel for commercial use, i.e. non-car-related use, is making up about 6-8% of the household taxation. That is true also for the fuel used for producing heat and electricity.

10.3.6 Car-related Taxes make up the Most

A number of economic instruments have been introduced for car traffic. These have been motivated in at least three different ways:

- Cars should pay their costs for investments in infrastructure.
- Cars traffic should be moved over to public transport.
- Cars traffic should pay for their environmental impacts.

The economic instruments include energy tax on petrol, registration tax (accis), and road tax.

Petrol taxes started already in the 1970's in many western European countries, motivated by the search for means to ease the energy-dependency after the so-called oil price crisis. When this after a few years had lost much of its impetus, the petrol taxes had at the same time become an important income for the state. It was then convenient to be able to "rename" it "environmental". Still, the effect in terms of reducing or keeping the use of petrol stable was there and a directional effect along the ideas behind the environmental taxation therefore realized.

The registration tax on new cars is also counted as an environmental tax. This tax varies very much across the countries with Denmark having by far the highest level of that tax in all EU, making up 40% of all environmental taxes in Denmark. This is the only reason why Denmark has the highest share of environmental taxes to the GDP. Denmark would otherwise be close to the average level of environmental taxes.

More importantly, the registration tax should not be included in the environmental taxes at all, as it has very little to do with protecting the environment and even in some respect serves the opposite – it increases the pollution from cars. A high registration tax makes cars more expensive and hence makes people keep them longer, which make technological innovations, i.e. more energy-efficient motors and lighter materials, spread less quickly. Registration tax has no effect on how much you use your car. It is a "one-off" payment, made when you buy the car. It may, on the contrary, again, prompt you to use your expensive investment even more to justify it.

Till now, the dependence of the environmental taxation on car-related taxes becomes clear in Figure 10.2. It shows that 90% of the tax is related to cars. It is based on material from 1995, but the OECD underlines, that the overall picture is still valid. Petrol and registration taxes make up about 70% of all environmental taxes collected within the OECD countries, while another 20% relates to cars as "recurrent taxes". Some

Table 10.3 Minimum taxes for fuels/electricity in the EU. The table gives minimum levels for motor fuel, motor fuel for industrial or commercial use, heating fuel and electricity according to EU Directive 2003/96/EC.

Minimum levels of taxation for	Kind of fuel	Current minimum excise rates	Minimum excise rates from 1.1.2004	Minimum excise rates from 1.1.2010
Motor fuels	Petrol (/1,000 l)	337	421	421
	Unleaded petrol (/1,000 l)	287	359	359
	Diesel (/1,000 l)	245	302	330
	Kerosene (/1,000 l)	245	302	330
	LPG (/1,000 l)	100	125	125
	Natural gas	100 (/1,000 kg)	2.6 (/gigajoule)	2.6 (/gigajoule)
Fuels for industrial or commercial use	Diesel (/1,000 l)	18	21	
	Kerosene (/1,000 l)	18	21	
	LPG (/1,000 kg)	36	41	
	Natural gas	36 (/1,000 kg)	0.3 (/gigajoule)	
Heating fuels and electricity	Diesel (/1,000 l)	18	21	21
	Heavy fuel oil (/1,000 kg)	13	15	15
	Kerosene (/1,000 l)	0	0	0
	LPG (/1,000 kg)	0	0	0
	Natural gas /gigajoule)	-	0,15	0,3

Box 10.1 Environmental Taxes and Charges in Europe

Environmental taxes and charges are the most widely used market-based instrument for environmental policy in Europe, despite current interest in trading schemes. They are generally seen as the most cost-effective instruments for environmental improvements. Below is an overview extracted from a 2005 EEA report on the application of environmental taxes, charges and deposit-refund schemes across Europe. It is not complete, e.g. some car-related taxes are not included.

CO₂ taxes

While attempts to introduce a CO₂/energy tax at the EU level have failed, CO₂ taxes have been widely adopted in the Member States. The first CO₂ tax was levied in Finland in 1990, and there are now CO₂ taxes in Denmark, Finland, Germany, the Netherlands, Norway, Poland, Slovenia, Sweden and the UK. Estonia introduced a charge on CO₂ emissions in 2000. These taxes are often an additional tax levied on some energy carriers, not always differentiated according to their carbon content, and with many exemptions.

Air pollution

A levy on NO_x is in place in France, Italy and Sweden, and SO₂ levies are in place in Denmark, France, Norway, Sweden and Switzerland. More comprehensive, multi-pollutant systems of air pollution charging are in place in some of the new EU Member States (such as the Czech Republic, Estonia, Latvia, Lithuania and Poland) and candidate countries (Bulgaria and Romania) as well as in the eastern European countries (such as Russia where more than 200 different air pollutants and around 200 water pollutants are subject to a pollution charge). Switzerland has introduced a tax on volatile organic compounds (VOCs).

Agricultural inputs

There are taxes or charges on pesticides in Denmark, Norway and Sweden, and in Belgium, although not on products used in agriculture; and on fertilisers in Denmark (tax on phosphorus in animal food), the Netherlands (to be abandoned) and Sweden, and earlier (now abolished) in Austria, Norway and Finland.

Products

There are taxes or charges on a wide range of polluting products, including: batteries in Belgium, Bulgaria, Denmark, Italy, Latvia, Lithuania and Sweden, with a takeback scheme in place in Austria, Germany and Switzerland; plastic carrier bags in Denmark, Italy and Ireland; disposable beverage containers in Belgium, Denmark, Estonia, Finland, Latvia, Lithuania, Poland and Sweden and deposit-refund schemes in Austria, Germany and the Netherlands; tyres in Bulgaria, Denmark, Finland, Latvia and Sweden; chlorofluorocarbons (CFCs) and/or halons in Latvia and Denmark;

disposable cameras in Belgium; lubricant oil in Denmark (now abolished), Finland, Italy, Latvia, Norway, Slovenia, Spain and Sweden; and oil products (to combat and compensate oil pollution damage) in Finland and France.

Waste

User charges are in place in most EU Member States and Balkan as well as eastern European countries and in the EFTA countries (Norway and Switzerland). There are waste taxes (landfill tax) in many EU Member States; hazardous waste taxes or charges in a number of countries, notably Belgium, Denmark, Finland, France, Germany and Poland; and differentiated user charges in many municipalities in a wide range of Member States, with the aim of making this compulsory across all municipalities in Ireland and Italy.

Water

User charges for water are in place for all EU Member States and Balkan and eastern European countries, though with different levels of cost recovery implicit in the price. There are water abstraction tax/charges in Denmark, the Netherlands and the majority of the new EU Member States and applicant countries; wastewater tax/charge – effluent charges in several EU-15 Member States including Denmark, France, Germany and the Netherlands, and in several new EU Member States and Balkan as well as eastern European countries.

Fisheries

While not strictly speaking an environmental charge, there are economic instruments that apply to fisheries. The EU pays access charges on behalf of its long-distance fleet for access to the fisheries resources of some third countries. In some cases, these countries also levy additional charges directly on the boat owners. These may be flat rates or linked to catch levels. The levying of charges on recreational fishing is common throughout the EU.

Others

Aggregates taxes, covering sand, gravel and/or crushed rock, are in place in Belgium (Flanders), Bulgaria, Denmark, Russia, Sweden, Ukraine and the UK. In addition, there already are, or are seriously proposed, taxes/charges on: air transport (noise charge), chlorinated solvents, disposable tableware, light bulbs, PVC, phthalates, junk mail; vehicle scrapping charges (already in place in Norway, Slovenia and Sweden), electronic and electric waste (already in place in several EU countries), nuclear waste management, and air polluting emissions from incinerators.

Source: http://reports.eea.europa.eu/technical_report_2005_8/en/EEA_technical_report_8_2005.pdf

of this last 20% will be environmentally oriented, but the major part will be related to road maintenance and construction etc. The same figures are not available for the EU-15. It would probably show less dependency on the car for taxation, but the difference would be marginal.

10.3.7 Making Passenger Car Taxation Environmentally Based

The EU-commission has in the summer of 2005 presented a draft directive on a gradual shift of registration tax for a CO₂-based taxation system for passenger cars, with the least CO₂-emitting car models receiving the biggest tax rebate. The reason behind the proposed directive is a mix of harmonization of the EU-internal market, needed because substantial differences in registration tax across the member states hinders cross border trade, and environmental concerns, referring not least to the compliance with the EU obligations under the Kyoto Protocol. The proposed CO₂-based taxation should be tax revenue neutral. The registration tax should be abolished all together by 2016 and 50% of the revenue accounted for by CO₂-taxation as early as 2010. The proposal also includes taxation for use of passenger cars, termed “annual circulation taxes”. These taxes should be related to the CO₂-emission of the cars and reach the level of minimum 50% of all annual circulation taxes by 2010.

Unlike the registration tax, a full replacement of annual circulation taxes by CO₂-related taxes is not foreseen. As transportation is increasing and in all countries responsible for a substantial increase in energy consumption and hence in CO₂ emission, and as car-related taxation makes up the most of all environmentally related costs this proposed EU-regulation is turning an important part of the car-related taxes into real environmentally related taxation. The proposal relates to the two dark columns in Figure 10.2 and affects thereby the base for about 1/3 of the total environmentally related tax revenue.

Removing the registration tax will make it easier for more people to acquire a new and more energy efficient-car in those of the EU countries, which presently have a high registration tax. It might at the same time lead to more cars being sold and thereby more kilometres driven and hence higher energy consumption at the end. This is probably part of the reason for the car industry being enthusiastic about the proposal. Still, focusing on the CO₂ emission will affect all cars and if made high enough, the tax could mean a change in both models chosen by the consumers and gradually more focus at the car industry on developing more energy-efficient cars. The reason for “labelling” the proposal an internal market and an environmentally related piece of legislation has to do with the EU Treaty, demanding all taxation legislation to be decided upon unanimously. That has in taxation issues till now proven

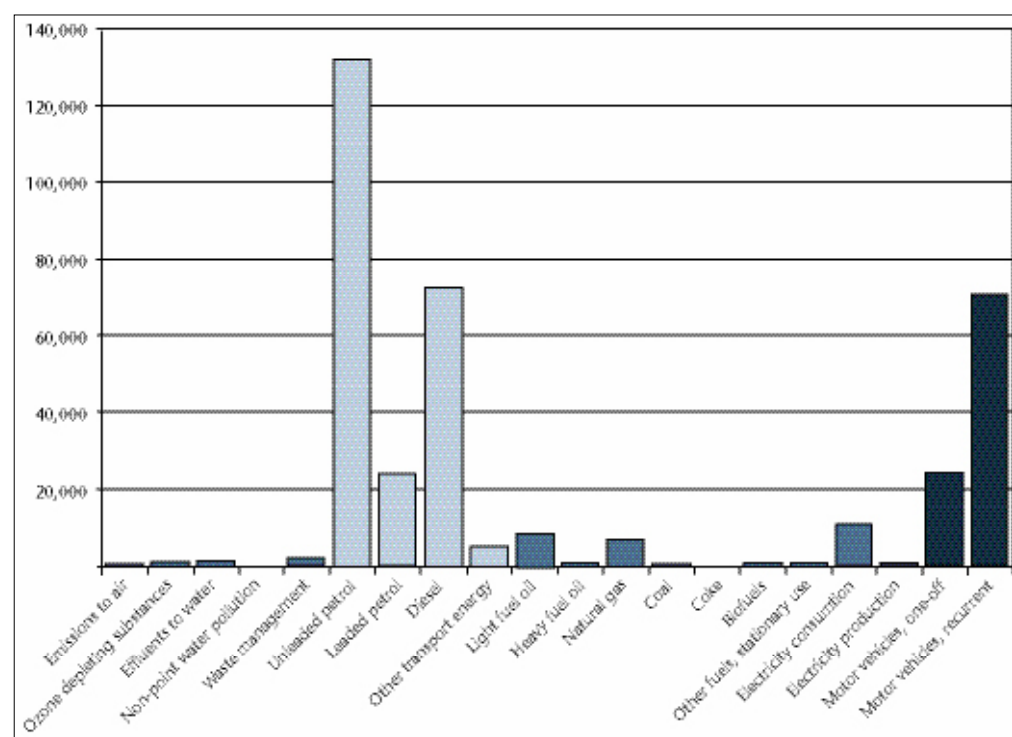


Figure 10.2. Revenues raised on different environmentally related tax bases. The graph shows estimates for the 30 OECD member countries based on 1995 data. The data are in general still valid with the exception that taxes on the final handling of waste have increased from 0.8% in 1995 to 2.5% in 2001, and are still increasing. Data shown in million 1995 US dollars [Source: <http://www2.oecd.org/ecoinst/queries/TaxInfo.htm>]

impossible. Further, the proposal does not decide the level of the taxes – only what kind of taxes are allowed and how they should be calculated or on what they should be based. The proposed directive may therefore be decided upon by the qualified majority decision-making procedure.

10.4 Subsidies

10.4.1 Subsidies as State Support

Subsidies are the opposite of charges. While charges correspond to the ‘stick’, subsidies constitute the ‘carrot’ in the carrot and stick metaphor. Subsidies by the state are widely used for a number of purposes, one of them being environmental protection.

Subsidies could be either direct or indirect. A direct subsidy is for example when a state partially finances an investment, which the state considers important. An example from the environmental field is a wastewater treatment plant. For the individual household state subsidies have been used for stimulating the change of heating equipment for individual houses. Thus in Sweden the state pays a constant subsidy (3,000 Euro) to those who change from direct electric heating or an oil-fuelled boiler to an environmentally better heating mode, such as district heating, pellet-fuelled boiler or heat pump. Most recently in spring 2007, the Swedish government introduced a subsidy of 1,000 Euro for buying a so-called “green car”. A green car is a car which has been labelled environmentally better by the road authority, for having low fuel consumption or being a hybrid car or a car using ethanol or biogas as fuel.

An indirect subsidy is a reduction of costs for a certain activity. For example tax reduction may be offered to a company which invests in a region of the country, which is in need of working places.

Subsidies are sometimes of key importance for a company which needs to invest to change technology, which may be required to obtain a permit or licence for an activity. It appears that the Danish government used subsidies more than any other European government to improve environmental management. In late 1998 there were a total of 36 subsidies schemes in effect in Denmark.

In Central and Eastern Europe it appears that indirect subsidies, such as tax reduction, are more commonly used, for stimulating investments asked for by the authorities.

10.4.2 The European Union Subsidies Programmes

The European Union has established several huge funds for promoting development in the so-called less developed areas of the Union, or stimulating certain activities rather than others.

The largest-scale subsidy program is in the area of agriculture. Thus subsidies constitute an important part of the income for any European farmer, and decide much over what he/she does. If a farmer has animals or not, or grows certain crops rather than others, is decided by the European Union Common Agricultural Policy, CAP. Only recently, with the more fundamental reshuffling of the CAP, the support for producing certain (amount of) agricultural products (e.g. meat, milk and eggs) was changed to support for being a good farmer, keeping your land in good agricultural and environmental conditions, so-called “cross compliance”. Like any other significant change, this will take effect over 10 years. The EU legislation was decided upon in 2003 and till 2013 the amount of money available for the CAP as a whole will be largely maintained. The interesting issues are in the actual priorities and how they will change during that period towards more environmental protection and with a perspective of achieving sustainable agricultural production in the EU. But the instruments are here: changing subsidies and not restructured taxation.

The European Union structural funds have been an important part of financing investments in several areas, and have contributed to industrial development in these areas. The structural funds have also been very important for infrastructure development, the building of roads, railroads and bridges. Of course such investments need to abide by the environmental legislation of the Union, but otherwise they are not particularly geared towards environmental objectives.

The European Union fund for improvements of environmental protection in its new member states is called Life. The Life programme supports investments for e.g. wastewater treatment plants, solid waste management and the building of landfills. The Life programme is an important policy element of the EU.

10.5 Role of Environmental Economic Policy

10.5.1 Tax Revenue or Environmental Protection

While energy taxation till now has had little to do with protection of the environment and has done little to implement the polluter pays principle as far as the wider social costs are concerned, fuel-taxation has, of course, had some effect as to putting some constraint on the consumption of fuel. But the fuel taxation has not been increased in accordance with the rise in the GDP. The overall trend for the OECD-countries as well as for the EU-15 is a relative decrease in the rate from 1998 and onwards, while the trend for the USA has been a decrease all the way from 1994. The USA fuel taxation rate, at some 40% of the average for all OECD-countries, is in addition by far at the lowest level of all nations.

While fossil energy is increasingly making up the main problem for the environment, the presently dominating type of environmental taxation has little or no effect on redirecting this adverse trend. Two recent EU-legislative initiatives may signal that changes are gradually underway. One is the new proposal for a directive on a passenger car taxation system with a clear CO₂ and environmentally oriented aim, which we dealt with just above. The other initiative is from 2003, where the directive, which will harmonize the minimum level for fuel prices in the member countries, was decided. That may have elements of equalization of the competitive framework with the EU, but it also has a distinct CO₂-taxation orientation and thereby an environmental perspective. This initiative on fuel prices we will include in the next chapter, where we will be taking a closer look at the UN Climate Convention and the subsequent Kyoto Protocol, based on the Convention in order to see, whether the protocol influences the CO₂ or green house gas policies in the EU and elsewhere.

10.5.2 Do the Polluters pay?

What effects do the environmental taxes have? Have they moved the burden of paying costs for environmental impact to the polluter? Do they reduce environmental impact?

It seems clear that environmental taxation never or very seldom makes the polluter pay for an environmental cost. The victim still has to take care of the cost of pollution. When acid rain decreases the productivity of a forest, it is the owner of the forest, who assumes the burden of decreased income. This cost can be calculated with some degree of precision, and the sums are very large. For example, the costs of all damage caused by acid rain in all of European Union were estimated in 1997 to be about 90 billion Euros. For sure those being victim of these losses had to carry these costs, from owners of forests to owners of individual cars destroyed by corrosion, to authorities responsible for maintenance of damaged public monuments etc.

There are a few cases, however, when the victim of an environmental impact does receive compensation. These are the court cases where damage compensation is part of the case. They all deal with very direct damages, e.g. an oil spill or a large sudden emission of a toxic substance, not at all with diffuse or long-term effects. Examples are the Seveso disaster or oil spills in the Baltic Sea. It should be added that only few of these kinds of events lead to compensation of costs. In general it is too difficult or costly to charge the polluter. To see charges filed against emitters of diffuse pollution is even further away. Damage compensation is decided on by a criminal court, and thus not part of the environmental legislation as such. Nevertheless it has an important role to play in environmental pro-

tection work, as these sums normally are far larger than the fines charged for non-compliance.

10.5.3 Taxation does Reduce Pollution of the Environment.

The main effect of environmental taxes has thus been to reduce emissions, rather than to compensate the victim for his/her costs for the damages the emissions may cause. Good environmental taxes are set in such a way that it is more profitable to avoid emissions than to pay the fees. In these cases the income from taxation decreases. This is caused by *price elasticity*. Price elasticity is how much consumption changes with the price. It is for prices with a high degree of elasticity that the tax really contributes to changed behaviour. For commodities with less price elasticity, such as energy, the tax provides more of an income for the state than an incentive for changed behaviour in the society.

Taxation and fees have reduced pollution and the material flows in our societies. The countries in Europe are slowly moving from waste to recycling societies. Important incentives in this process are taxation of resources, fees on landfill, markets on recycled material, regulation on end-of-life of products including producers' responsibility. These economic policy instruments have had an influence on the price of the products and stimulated environmentally better behaviour.

Study Questions

1. What is an external cost, and in what way is it external to the declared cost of a product or service?
2. The polluter pays principle is a main principle for developing environmental taxes and charges. Describe its history and how it has been received in policy-making.
3. Make a small list of the most common environmental charges for water, waste, etc. How are the charges set? What are the problems connected to setting charges?
4. What are the reasons for introducing environmental taxes?
5. List the most used environmental taxes and explain which are most important for the state (for state income), for companies (for company costs), and the environment (for reducing environmental load). What is the general level of environmental taxes compared to taxes as a whole?
6. Would people act rationally and purchase the least environmentally damaging products, if such products were least expensive, or would some products still signal great prestige and thereby still be selling greatly, in spite of a high price – or perhaps because of their high price?
7. Consider the alternatives to a registration tax on cars. Would it benefit the environment if user fees were set in relation to the use of cars instead of a tax on the purchase of cars?
8. Explain in what way energy is taxed and what importance it has had for energy management in society for industry, transport, and in households.
9. Give some examples on the use of subsidies in environmental policies.
10. Give a general summary on the role of economic policy instruments for environmental improvements. Mention specifically the Polluters Pays Principle, environmental pollution, and resource management.

Abbreviations

CAP	Common Agricultural Policy
CFC	Chlorofluorocarbons
EEA	European Environmental Agency
EFTA	European Free trade Association
Eurostat	EU Statistics Bureau
GBP	British Pound
GDP	Gross Domestic Product
IPPC	Integrated Pollution Prevention Control
LPG	Liquid Propylene Gas
OECD	Organisation for Economic Co-operation and Development
PPP	Polluter Pays Principle
SEK	Swedish Crowns
VOC	Volatile Organic Compounds

Internet Resources

Polluter pays principle (Encyclopedia Britannica)

<http://www.britannica.com/eb/article-224615/environmental-law>

OECD/EEA database on environmental policy and natural resources management instruments

<http://www2.oecd.org/ecoinst/queries/>

OECD/EEA information on environmentally related taxes, fees and charges

<http://www2.oecd.org/ecoinst/queries/TaxInfo.htm>

EEA report on environmental taxes, and charges, deposit-refund schemes

http://reports.eea.europa.eu/technical_report_2005_8/en/EEA_technical_report_8_2005.pdf

Ecological Economics A Cross-Disciplinary Conversation

http://forestpolicy.typepad.com/ecoecon/2006/03/economism_or_pl.html

European Commission's Taxation and Customs Union Directorate-General

http://ec.europa.eu/taxation_customs/taxation/excise_duties/energy_products/index_en.htm

EU Summaries of Legislation Framework for the taxation of energy products and electricity

<http://europa.eu/scadplus/leg/en/lvb/l27019.htm>

DG Agriculture EU's common agricultural policy (CAP)

http://ec.europa.eu/agriculture/publi/capleaflet/cap_en.htm

Market-based Economic Instruments

Emission Trading

11.1 Making Business of the Environment

11.1.1 The Role of Markets in Environmental Protection

The most natural economic instruments for business, including industrial companies, are market-based ones. If resources and environmental services are bought and sold just as other items a company manages, it is easy to include them in normal operations. As mentioned in Chapter 10 it is not possible to give all environmental services and resources a correct price and thereby introduce them to a functional market. They remain external to the operations. In these cases economic instrument such as taxes, fees or subsidies are used, or regulations are introduced to correct behaviour, which does not relate to the economy naturally. However in other cases markets, where services or resources are bought and sold, do work. This is the topic of this last chapter.

It should be mentioned from the beginning that the use of a market as a frame for economic transactions and decision-making is limited, not only in environmental matters but in general. Market values are not used in for example a family economy or for that matter in a national economy. Values other than money are much more important and the price is not so relevant or simply does not exist. For example health, the desire for a good life or where to live are values which steer the decisions individuals and families take, and e.g. security may be the more important for a nation than economic development.

Nevertheless, when market mechanisms can be used, they are simple and, if the prices are right, they should at least theoretically lead to the right decision, optimising all aspects which need to be considered in a process, including the protection of the environment.

11.1.2 Economic Tools Using Market Mechanisms

The most obvious tool for markets is when a resource has a price and there is a buyer and a seller. The best examples are when a company may improve the environment by turning waste into a resource via regenerating and recycling schemes for (previous) waste material. The simplest examples are the recycled materials, such as paper, glass or scrap metal. The market for waste will be described below. Another, less common, case appears in what is called industrial symbiosis. In

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 - The EU Obligations in the Kyoto Protocol
 - EU Emission Trading Scheme (EU-ETS)
3. Implementing the Emission Trading
 - Assessment of Allowances
 - The Results of Trading in the First Period
 - Following Periods – Beyond the Industrial Installations
 - Policy Measures – the EU Linking Directive.
4. Climate policy and Sustainable Development
 - Growth Versus Emissions
 - IPCC 4th Assessment Report – Taxing Carbon
 - Sustainable Development and the Concept of an Ecological Tax Reform
 - Towards a Sustainability Regime

this case one industrial plant sells an output which normally is not seen as a product, such as energy in the form of hot water or steam, to a neighbouring activity, most often another industrial plant. Some industries sell excess heat to the municipality where they are located, for use in district heating (See further book 2 in this series).

Another case is when a service is charged on more or less commercial conditions. The services from municipalities for management of water, waste or energy belong to this category. The deviation from market conditions is of course the fact that the provider, the municipality, in reality often has a monopoly, so that there is no well functioning market. It is, however, not always so. A company may find another solution if the service offered by the local or regional authority is considered too costly or not good enough for the needs at hand. For example most industrial plants provide their own source of water, rather than buying it from the municipal water company. The charges for such services were discussed in the previous chapter.

To sell or buy the right to emit a certain amount of pollutant has been implemented for carbon dioxide as will be described below. Again a market is established. The interesting aspect of this way to deal with environmental impacts is that it is possible to find out how much the environment can handle of each specific pollutant. The total amount, the ceiling, of each specific pollutant should in principle be established. Then it is up to those who pay most to use this capacity of the environment. However, on the existing emission markets the ceiling is not established on the basis of the capacity of the environment, but rather the capacity of industry to reduce its emissions.

11.1.3 A Market for Waste

Some categories of waste can be sold; they have a market value. This includes used paper, glass, and scrap metals but also some plastics. The establishment of a market for recycled materials and goods has been very important for the improvement of the environment, and the market for recycled materials is a key economic instrument. Today close to half of the paper produced in the European Union comes from recycled paper. A cellulose fibre can be used about six times before being too short to be suitable for making paper. It is obvious that very many trees have been saved by this recycling of paper. Very important, too, is that a huge reduction of energy use and pollution is the result of recycling.

A similar comment can be made both regarding glass and metal. Close to 50% of glass production in the European Union is based on recycled glass and a sizeable amount of the iron, copper and aluminium production. In both cases the big gain is connected to reduction of the energy required. For the case of copper the reduction of resource use for the production

of copper from scrap metal compared to virgin copper is about 30 times, for iron it is about six times. In a time when much effort is made to increase energy efficiency to reduce carbon dioxide emissions, this is obviously very important.

The introduction of collection and recycling of used paper, glass, metal etc was mentioned in chapter 4. Packaging waste makes up an important part of the glass and metal waste, not least in the form of beverage containers. Packaging waste is regulated by the European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste. It distinguishes between 'reuse', 'recovery' and 'recycling' in this order of priority and includes minimum targets of 50-65% of all packaging waste to be dealt with in either way by the member states. The directive authorizes use of Agreements with the relevant companies and/or business sectors as a possible instrument for reaching the targets set.

The Directive opens (article 7) for use of deposit and refunds systems to be used primarily with the general public as an incentive to return e.g. beverage containers but also used cars and other waste. Sweden has a well-elaborated deposit and refund system and manages to get more than 90% of aluminium containers returned, while the return level in countries without the deposit-refund component is much lower.

Environmental Agreements are used with companies and industrial sectors also on other types of waste than packaging waste.

The simple establishment of business operations for providing basic services in the sector of waste and solid waste management and the use of recycled material has been very important for a good environmental policy.

11.2 Emission Trading

11.2.1 The First Experiences

Tradable pollution permits are an alternative to setting emissions standards or using pollution fees. The tradable pollution permits involves the establishment of a trading system for the "right to pollute". It may be used among those living along a coast or a river, which has the capacity to adsorb a certain amount of exhausts, or more commonly among those emitting pollutants to the air in a region.

The use of pollution rights to be sold and bought on a market was first proposed in 1968 by the American economist Herman Daly. This arrangement became quite popular in the USA, in which several such markets have been established. It is mostly used for air pollutants. A condition is that it is not so important exactly where the pollutant is emitted.

The first European case seems to be that of the Polish city of Chorzow in Upper Silesia, where a trading scheme was

established between just two industries. One steel mill was in bad economic conditions with many emissions, but where these could be reduced by rather inexpensive actions. The other factory was in good economic conditions, but the reductions of emission would be comparatively expensive. The common trading scheme was successful and dramatic reductions in emissions of particles, CO, SO₂, NO_x and VOC were achieved.

The Polish scheme constituted a quite local so-called *bubble*. The maximum concentrations or amounts allowed according to the scheme set up by the authorities is called the *ceiling*.

The largest scale emission trading ever established is the EU carbon dioxide emission trading which we will now describe in some detail.

11.2.2 Trading Emissions Under the Climate Convention

The Framework Convention on Climate Change, FCCC, was signed during the UNCED Rio Conference in 1992 by 153 participating states. It entered into force in March 1994. Its intention was, and is, to stop climate change by reducing combustion of fossil fuels and the resulting green house gas emissions, but exactly how to do it was then left to further developments. A series of COPs (Conference of Parties) were staged, which,

piece by piece, have formed one of the most efficient conventions ever created. The 3rd COP in Kyoto, Japan, in 1997 was especially fruitful since the levels for decreased emission of CO₂ for the so-called Annex 1 states, basically the industrialised countries, were detailed in its protocol.

The Kyoto protocol states that by 2010 (as the average of the 2008-2012 window), the parties should have decreased their CO₂ emission by an average of 5.2% as compared to the chosen base year of 1990. The commitments were unevenly distributed and for the European Union members it was -8%, for the USA -7% and Japan -6%.

The Kyoto protocol entered into force on the 16th of February 2005 after the Russian Federation had ratified the protocol as one of more than 150 States. Thereby countries, representing the requested 55% of the 1990-emission of CO₂, had ratified the protocol, which was made a precondition for its entering into force. The USA, responsible for about 35% of the global CO₂-emission, is now the only major state, which has not ratified the protocol.

Later key COPs were the one in Marrakesh in which the so-called Clean Development Mechanisms measures were agreed on, and the one in Montreal, Canada, in which a sanc-

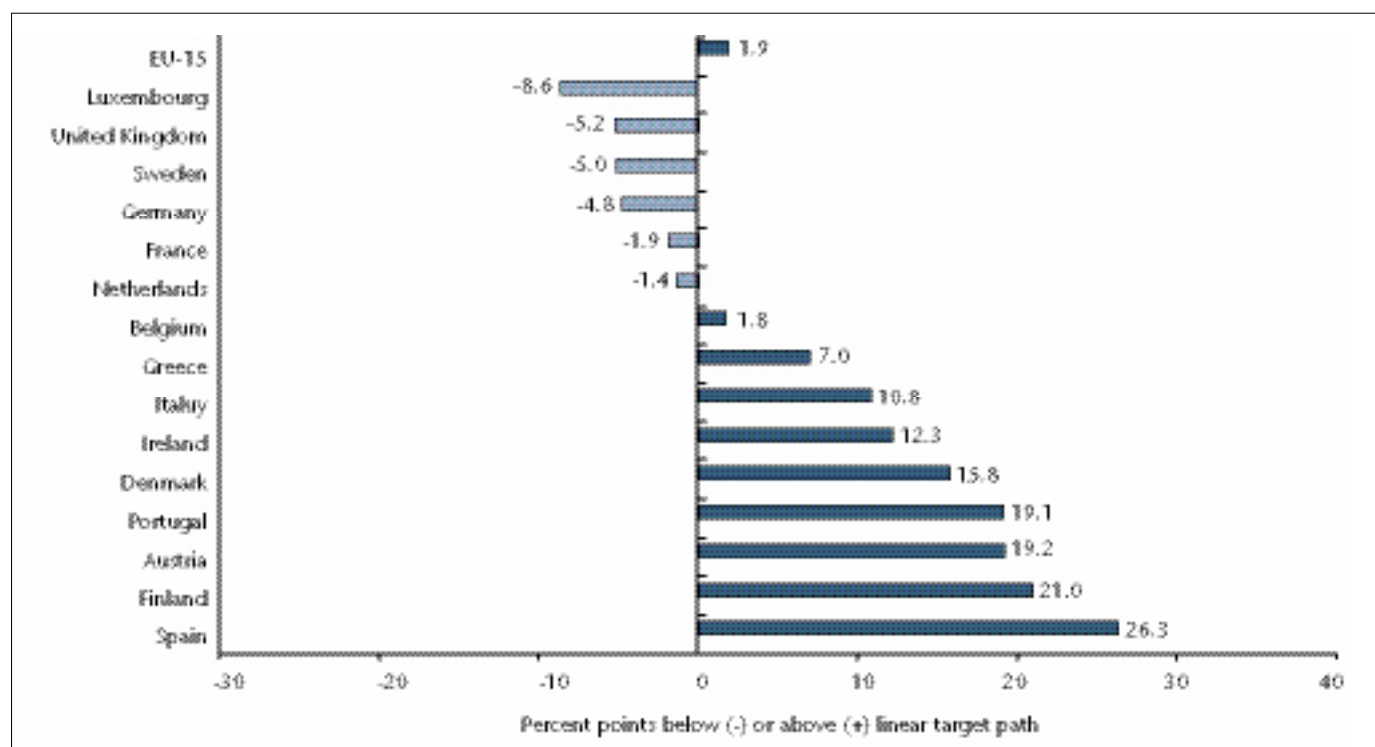


Figure 11.1 The distance-to-target indicator (DTI) measures for the Kyoto obligations. The table shows the deviation of actual emissions in 2003 from a (hypothetical) linear path between base-year emissions and the burden-sharing target for 2010. A positive value suggests an under-achievement and a negative value an over-achievement by 2003. The DTI is used as an early indication of progress towards the Kyoto and Member States' burden-sharing targets (Source: EEA, 2005).

tion system was outlined making the Climate Convention close to becoming a real global legal regime.

11.2.3 The EU Obligations in the Kyoto Protocol.

The EU member states (then the EU-15) have, as mentioned, made a joint plea for a reduction in CO₂ discharge of 8% by 2008-2012. The obligations were subsequently distributed among the member states with variations from reductions of 21% (Germany and Denmark) to an increase of 15-27% (Spain, Greece and Portugal). The 10 new member states had individual CO₂ targets, set under the Kyoto Protocol. They have between 6% and 8% reduction targets relative to the 1990-base line. As these countries have seen a profound economic restructuring over the 1990s with closure of a number of energy consuming industries, this reduction has been met – and more so – by this very economic restructuring. But the countries need to regain lost levels of economic performance and, in addition, continue to develop their economies to improve living conditions for their citizens, which may lead to some additional CO₂-emitting activities. This was an important part of the reason to become members of the EU anyway. A joint EU-25 plea on CO₂ emissions is therefore not foreseen.

Concerning the implementation of the Kyoto targets the EU-15 are behind schedule. Some of the countries are at this stage already unable to reach their targets, regardless of the (realistic) measures they might introduce for the remaining period up to 2012.

An EEA-report (Figure 11.1) shows substantial difference among the EU-15 countries as to attaining their target levels. The distance-to-target indicator (DTI) measures the deviation of actual emissions in 2003 from a (hypothetical) linear path between base-year emissions and the burden-sharing target for 2010. A positive value suggests an under-achievement and a negative value an over-achievement by 2003. The DTI is used as an early indication of progress towards the Kyoto and Member States' burden-sharing targets. For the following Member States the additional effects of the use of Kyoto mechanisms are included: Austria, Belgium, Denmark, Finland, Ireland, Italy, Luxembourg, the Netherlands and Spain. Additional measures are planned or already implemented to help those countries lagging behind – and thereby the EU as a whole – fulfilling or at least come closer to their target levels. The most significant initiative, already implemented, is the EU Emission Trading Scheme.

11.2.4 EU Emission Trading Scheme (EU-ETS)

The EU Emission Trading Scheme (EU-ETS) is an internal EU-emission trading system among the 25 EU member states. It was established by Directive 2003/87/EC and it is the first

multi-national emission-trading scheme worldwide. It can be considered as a forerunner for the global emission trading scheme, foreseen in the Kyoto Protocol, but not realized till now, as the protocol has just entered into force. The EU-ETS is prepared to become an integrated part of a future global system under the protocol.

The principle of the ETS is to help make sure, that CO₂ emission reductions take place at installations or companies, where these savings can be made at the lowest costs. The ETS does that by providing a framework or a marketplace for buying and selling allowances for emissions. In this way those able to make savings for low costs can go further than they need to meet their own target and sell the allowances via the ETS to those which need high investments to meet their target. These last types of installations will then buy allowances to cover what would otherwise bring them into exceeding their number of allowances, and face penalties.

The EU-ETS is based upon allocation of emission allowances to 11,500 energy intensive industrial companies and installations across EU like electrical power plants, oil refineries, iron and steel plants as well as factories e.g. making cement, glass, bricks and pulp and paper. Together they account for about half of the total CO₂ emissions within the EU.

Each of these 11,500 energy intensive installations receives an emission allowance when the trading begins. The allowances were first negotiated between the EU member states. Then the national allowances were distributed between the listed installations. This way to distribute allowances is commonly called *grandfathering*, since it is decided on from “above”, rather than bought, for example in an auction of emission rights.

The allocation of allowances is based on a National Allocation Plan (NAP), made by each member state and specifying for each installation the number of tons of CO₂ emissions allocated. The national plans are then checked and approved by the EU-Commission. There are three trading phases foreseen – the first in 2005-2007, due May 2004, the second in 2008-2012, due June 2007, and the third, starting 2013. Each of these will start with a total amount of CO₂ allocated. For each new phase the total amount will be reduced substantially.

The ET scheme has disadvantages in as much as it does not lead to any CO₂-emission reduction, neither short term nor long term. On the contrary, it leads to the use of a quota in the short term which should only have been used later in accordance with the actual economic development within the country, possessing it or – may be – never been used at all. This is why this Kyoto Protocol ET-scheme has been named “trading warm air”, i.e. trading emission reductions which are not real or nothing at all. There are different demands for a maximum

Box 11.1 Exemplifying the ETS Working Principles

Let's say that companies A and B both emit 100,000 tonnes of CO₂ per year. The government gives each of them 95,000 emission allowances. One allowance represents the right to emit 1 tonne of CO₂. So, neither company is fully covered for its emissions. At the end of each year, the companies have to surrender a number of allowances corresponding to their emissions during the year, whatever the emissions of the individual company are. If they fail to do so, they face a fine of 40 per missing allowance during the 2005-2007 trading period, and 100 during the second 2008-2012 trading period. Companies A and B do not want to pay the fine and both have to cover 5,000 tonnes of CO₂. They have two ways of doing this.

They can either reduce their emissions by 5,000 tonnes, or purchase 5,000 allowances in the market. In order to decide which option to pursue, they will compare the costs of reducing their emissions by 5,000 tonnes with the market price for allowances.

For the sake of the example, let's say that the allowance market price is 10 per tonne of CO₂. Company A's reduction

costs are 5 (i.e. lower than the market price). Company A will reduce its emissions, because it is cheaper than buying allowances. Company A may even reduce its emissions by more than 5,000 tonnes, say 10,000 tonnes. For Company B, the situation may be the opposite: its reduction costs are 15 (i.e. higher than the market price) so it will prefer to buy allowances instead of reducing emissions.

Company A spends 50,000 on reducing 10,000 tonnes at a cost of 5 per tonne and receives 50,000 from selling 5,000 tonnes at a price of 10. So Company A fully offsets its emission reduction costs by selling allowances, whereas without the Emissions Trading Scheme it would have had a net cost of 25,000 to bear. Company B spends 50,000 on buying 5,000 tonnes at a price of 10. In the absence of the flexibility provided by the Emissions Trading Scheme, company B would have had to spend 75,000.

Since only a company that has low reduction costs and therefore has chosen to reduce its emissions, like Company A, is able to sell, the allowances that Company B buys represent a reduction of emissions, even if Company B did not itself reduce emissions.

amount of a total quota to be sold to make sure that a country is not, in the short term, selling so much that it will get in trouble fulfilling its own obligation towards the Protocol later, when it has eventually had got the economy better under way.

11.3 Implementing Emission Trading

11.3.1 Assessment of Allowances

There are 12 criteria, listed in Annex 3 to the Directive, for the assessment and approval of the national plans by the EU Commission. The first and most important criterion is, that the allowances allocated in the NAP makes it possible for that state to fulfil its obligation towards the Kyoto Protocol. This will for most member states eventually mean, that the allowances in total will have to be smaller than the total present emission, as most member states have obliged themselves to bigger or smaller reductions.

The Commission demanded changes in 8 of the 25 member state NAP's for 2005-2007 with the following three types of problems as the main issues:

1. Allocations made it impossible to meet the Kyoto targets.
2. Allocations exceeded current emissions.
3. Reservations for redistribution of allowances after start of the EU-ETS, so called "ex-post adjustments", which are not acceptable.

When the ETS is running, the member states will operate an electronic registry of allowances to be able to follow the transfers of allowances, which takes place via the ETS in order to be able to keep track of where all national allowances belong at any possible time. The EU Commission is running a registry hub to be able to monitor, that the trading and transfer of allowances are in line with the directive.

The member states will collect allowances, which have to be given up by the installations in accordance with the allocation plan, and distribute allowances to new installations, being set up. It's also the member state responsibility to collect the data that each installations is obliged to produce currently on its CO₂ emission to prove that it stays within the allowances received. Finally, the member states will make a report annually to the EU Commission on the operation of the system, including the emission data collected.

Under the Kyoto Protocol, the EU-15 has to reduce its collective greenhouse gas emissions by 8% below 1990 levels during 2008-2012. This target is shared among the 15 Member States under a legally binding burden-sharing agreement [Council Decision 2002/358/EC of 25 April 2002]. The majority of the Member States that joined the EU on 1 May 2004 have individual targets under the Kyoto Protocol with the exception of Cyprus and Malta, which have no targets.

11.3.2 The Results of Trading in the First Period

The first phase began on 1 January 2005. In its first year, 362 million tonnes of CO₂ were traded on the market for a sum of 7.2 billion euros. The price of allowances increased more or less steadily to its peak level in April 2006 of ca. 30 euros per tonne CO₂, but came crashing down in May 2006 to under 10 euros/ton when it became clear that many countries had given their industries such generous emission caps (limits) that there was no need for them to reduce emissions. The prices then continued to drop through 2006 resulting in a trading price of 1.2 euros per tonne in March 2007 (Figure 11.2). NGOs have accused governments of abusing the system under industry pressure, and have urged far stricter caps in the second phase (2008-2012). Still during 2006 the total turnover of emission rights was 22.5 billion euros and 1.6 billion tonnes of CO₂. The Norwegian Consultancy Point Carbon reports that projected carbon trading for 2007 is 2.4 billion tonnes, and that the projected price for 2008 is 13.8 euros/tonne CO₂, a figure used when planning investments in European industry.

Presently an estimated 4,000 projects to reduce emissions are under way in Europe corresponding to total annual reductions of 2 billion tonnes of CO₂. The reported carbon trading is to a large extent financially motivated and corresponds only partly to actual reductions. Equally the planned projects are partly CDM projects, which neither corresponds to emission reductions within the European Union, although they are included in the Kyoto obligations.

11.3.3 Following Periods – beyond the Industrial Installations

Establishing the EU-EST is an important step forward in the efforts to attain the reductions which the EU-15 (and the 10 new members individually) undertook. But the installations, which the scheme deals with makes up less than 50% of the

total CO₂-emission in EU. Other important factors are transportation, household and agriculture. Directive 2003/96/EC establishes a common minimum taxation level on all kinds of fuels for private and commercial use (transport, industrial applications, machinery used in forestry and agriculture). It raises the minimum taxation level by some 25% from 2004 – for petrol from 359 to 421 euros/1,000 l, while a second stage, decided for 2010 only means a rise for few fuels.

The second phase (2008-12) is expected to expand the scope significantly:

- All greenhouse gases, and not only CO₂ will be included.
- CDM and JI credits are expected to be introduced in second phase through the Linking Directive.
- Aviation emissions will likely be included.
- Four non-EU members – Norway, Iceland, Liechtenstein, and Switzerland – are expected to join the scheme.

The inclusion of aviation is a move considered important due to the large and rapidly growing emissions of that sector. The inclusion of aviation is estimated to lead to an increase in demand of allowances of about 10-12 million tonnes of CO₂ per year in phase two. This in turn is expected to lead to an increased use of JI credits from projects in Russia and Ukraine, which would offset the increase in prices and eventually result in no discernible impact on average annual CO₂ prices.

Ultimately, the Commission wishes the post-2012 ETS to include all greenhouse gases and all sectors, including aviation, maritime transport and forestry. For the transport sector, the large number of individual users adds complexities, but could be implemented either as a cap-and-trade system for fuel suppliers or a baseline-and-credit system for car manufacturers.

The National Allocation Plans for Phase II, the first of which were announced on November 29, 2006, will result in an average cut of nearly 7% below the 2005 emission levels.

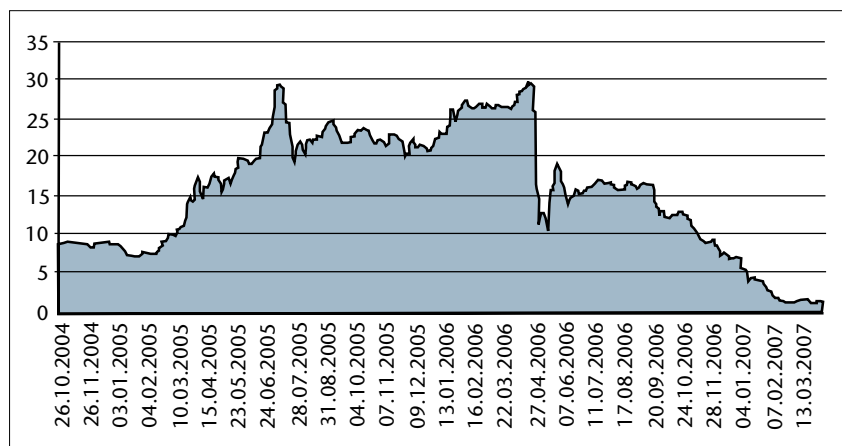


Figure 11.2 Prices of carbon emissions in Euros/tonne at the European carbon pool of the EU-ETS. Carbon Pool Europe provides access to the carbon market that companies need to be able to actively take part in the EU-ETS. The Carbon Pool in an international trading platform for EU allowances valid under the EU-ETS. The Carbon Pool website will report daily spot prices for carbon emissions (<http://www.carbonpool.eu>).

11.3.4 Policy Measures – the EU Linking Directive

Directive 2004/101/EC is called the *linking directive* because it was made to create connection between the EU-ETS and the “project-based mechanisms” in the Kyoto Protocol.

One of these mechanisms is *Joint Implementation Projects* (JI), regulated in article 6 of the protocol. It allows industrialized countries to do joint projects with other industrialized countries on at source reduction of CO₂ emissions and on creating sinks for the deposit of CO₂ and let the investing country count the reduction achieved as its own reduction and thereby serve as part of the investing country’s compliance with the Kyoto Protocol. This kind of projects are first of all expected

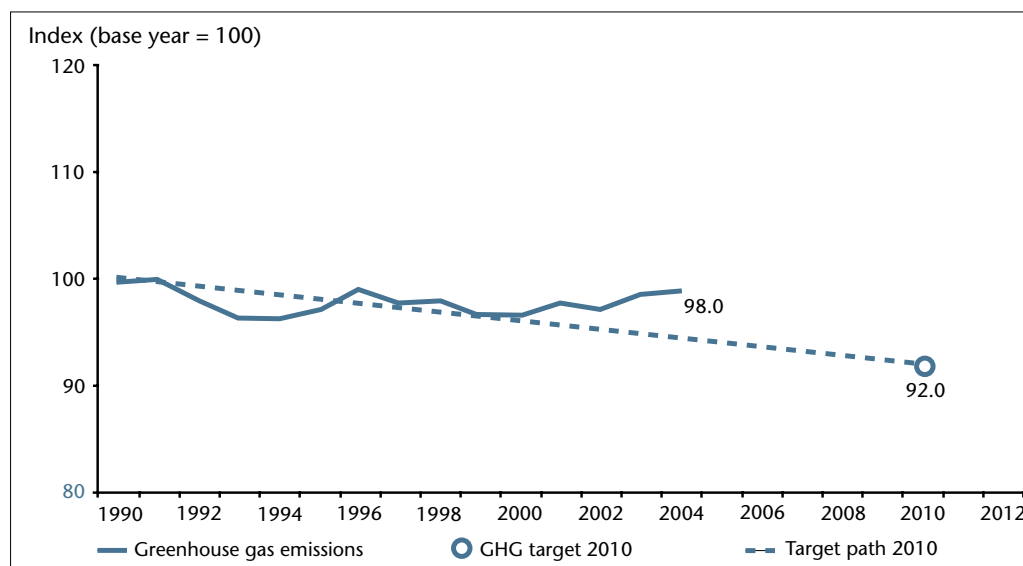
to take place in the Central and Eastern European transition economies, where the scope for reduction is high and at lower costs than in the western economies.

The next mechanism is the *Clean Development Mechanism* (CDM), regulated in article 12 of the protocol. It is designed to make industrialized countries invest in CO₂ reduction projects in developing countries, and grants the investing country the right to include documented reductions in its own CO₂-reduction budget. This mechanism was established, explicitly recalling the need to promote equitable geographic distribution of CDM’s at regional and sub-regional level. It is underlined that CDM-projects cannot be funded by develop-

Table 11.1 Overview of total Allowances for the three years 2005-2007 and Kyoto targets across member states. Divide by 3 to receive annual average. Opt-ins and opt-outs of installations in accordance with Article 24 and 27 of Directive 2003/87/EC (later used by Sweden, Finland and Estonia) are not included. Under the Kyoto Protocol, the EU15 has to reduce its collective greenhouse gas emissions by 8% below 1990 levels during 2008-2012.

Member State	CO ₂ allowances in mio. tonnes	Share in EU allowances	Installations covered	Registry functional	Kyoto target
Austria	99.0	1.5%	205	Yes	-13%*
Belgium	188.8	2.9%	363	No	-7.5%*
Czech Republic	292.8	4.4%	435	No	-8%
Cyprus	16.98	0.3%	13	No	-
Denmark	100.5	1.5%	378	Yes	-21%*
Estonia	56.85	0.9%	43	No	-8%
Finland	136.5	2.1%	535	Yes	0%*
France	469.5	7.1%	1,172	Yes	0%*
Germany	1,497.0	22.8%	1,849	Yes	-21%*
Greece	223.2	3.4%	141	No	+25%
Hungary	93.8	1.4%	261	No	-6%
Ireland	67.0	1.0%	143	No	+13%*
Italy	697.5	10.6%	1,240	No	-6.5%
Latvia	13.7	0.2%	95	No	-8%
Lithuania	36.8	0.6%	93	No	-8%
Luxembourg	10.07	0.2%	19	No	-28%*
Malta	8.83	0.1%	2	No	-
Netherlands	285.9	4.3%	333	Yes	-6%*
Poland	717.3	10.9%	1,166	No	-6%
Portugal	114.5	1.7%	239	No	+27%*
Slovak Republic	91.5	1.4%	209	No	-8%
Slovenia	26.3	0.4%	98	No	-8%
Spain	523.3	8.0%	819	Yes	+15%
Sweden	68.7	1.1%	499	Yes	+4%*
United Kingdom	736.0	11.2%	1,078	Yes	-12.5%*
Total	6,572	100.0%	11,428		

Figure 11.3 EU-15 Greenhouse gas emissions 1990–2004 compared with target for 2008–2012. The linear target path provides a simple measure of how close the EU-15 emissions in any year are to the linear path from emissions in 1990 to the EU Kyoto target, represented by 92 percent of base-year emissions in 2010. The presentation does not take into account the use of flexible mechanisms or activities under Article 3, land-use change, on the Kyoto Protocol. The unit is index points with base-year emissions being 100. [Source: EEA, Technical report 10/2006]



ment aid budgets in the industrialized country, but should be funded, provided extra and for the benefit of the particular CDM project.

Finally, Emission Trading (ET) is opened in the protocol by article 17. The trade is limited to take place between countries, which have got an emission limitation that is a CO₂ quota in Annex B to the Kyoto Protocol. In practice this means that countries, which had a quite high CO₂ emission in the base line year of 1990 and since then have undergone serious economic restructuring and transformation and therefore presently and within the 2012 target year will have an emission allowance surplus, can sell (part of) this surplus to industrially developed countries needing to reduce their emission. Most former Soviet Republics and some non-EU member states in Central and Eastern Europe have such a quota-surplus. The country buying emission quota or emission units from a country with a quota surplus can use the units bought in its own reduction budget.

The Linking directive is only regulating the relation to and use of the JI and CDM, because EU itself has set up the internal Emission Trading Scheme (see section 11.3.4 above), which has a clear CO₂ emission reduction perspective, underlined by the joint EU-15 plea towards the Kyoto Protocol for a joint total emission reduction of 8%. That is not possible to achieve by trading – short-term – surpluses among these same 15 countries. That can only be achieved by own reductions, and the EU-ETS is designed to support these efforts. The EU-Directive on ETS declares itself open to negotiations and possible joining of the EU-ETS and the Kyoto Protocol ET at a later stage, when the Kyoto-ET is up and running, i.e. established, based upon the same concept of contribution towards emission reduction as is the EU-ETS.

11.4 Climate Policy and Sustainable Development

11.4.1 Growth Versus Emissions

The data provided show, that there is a long way to go on the climate policy issues to reach the goals set – for EU-15 a joint reduction on 8% by 2012 of the 1990-CO₂ emission level. The IPCC 4th Assessment Report, released 4th of May 2007 underlines the problems, the current situation and recent trends. CO₂ emissions have grown between 1970 and 2004 by about 80%, and 28% between 1990 and 2004. The growth is different across sectors. The energy supply sector has increased by 145% and transport by 120%. (IPCC, Working Group III, 2007). The problems within the EU-15 is illustrated in Figure 11.3, showing the considerable deviation from the path towards the intended reduction.

The 2nd phase of the EU-ETR will mean some reductions in the caps for the NAP's and thereby for the total of EU-25. Till now about 20 of the 25 NAP's for the 2nd phase are accepted by the EU-commission. It will lead to a reduction in the overall level of CO₂ emissions from the EU-25. It is therefore responding to widespread criticism that the 1st phase caps were far too lax, voiced by NGO's and others. But it will not bring about the reduction needed for the EU-15 to reach their committed goal of the 8% reduction by 2012, while the situation is more mixed for the EU-10 (and now EU-12) having joined the EU within the last 3 years.

The EEA Report 1/2005 (EEA, 2005) 'Climate change and a European low-carbon energy system' is a very comprehensive and interesting analysis of the options available to the EU (EU-15 and EU-25/27) in order to fulfil the Kyoto-protocol obligations as well as the 2030 and 2050 requirements to stabi-

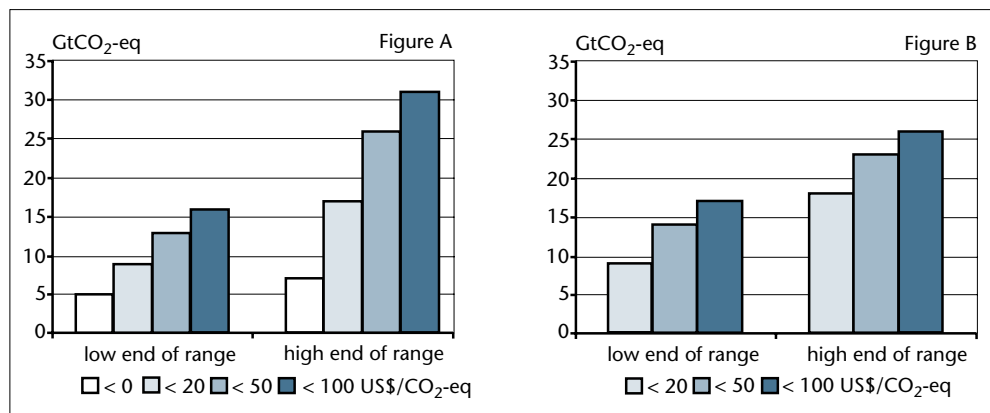


Figure 11.4. Global economic mitigation potential in 2030. The potential reduction of carbon dioxide emissions at three different levels of carbon prices: 20 USD, 50 USD and 100 USD/t CO₂-eq. The bottom-up study (left) represents sector-based estimations. The top-down study (right) assesses the potential through economy-wide mitigations options. The top-down model has been the base for the studies on mitigation options and macro-economic assessments.

lize the CO₂ concentrations in the atmosphere below 550 ppm. The analyses and the results in the report are very much in line with the recent IPCC 4th Assessment Report, including the calculation of the growth and general costs, this will mean for the EU member countries.

Extensive use of the connected policies in Directive 2004/101/EC (the linking directive) on Joint Implementation Projects and Clean Development Mechanisms, combined with direct purchase of surplus CO₂-emission quotas from the Central and Eastern European Countries having surpluses within the Kyoto-allocated quotas due to the profound economic restructuring after the collapse of the Soviet Union, might bring them close. But this does not bring about changes in the EU-15 countries themselves, meaning that the underlying trend here will remain unchanged, or, at least, insufficiently modified.

11.4.2 IPCC 4th Assessment Report – Taxing Carbon

The 4th IPCC-report on ‘Mitigation of Climate Change’ [page 4 and figure 4 / page 8] states, that:

“with the current climate change mitigation policies and related sustainable development practices global GHG emissions will continue to grow over the next few decades – the IPCC-scenarios showing an increase in 2030 relative to 2000 of between 25% and 90 %,

In the report, the IPCC panel presents the concept of ‘mitigation potential’, which has been developed to assess the scale of GHG reductions, relative to emission baselines, possible to achieve at a given level of carbon price, expressed in costs per unit of CO₂ equivalent emissions avoided or reduced. The potentials of this concept are described at three different levels of increased carbon price – 20 USD, 50 USD and 100 USD/t CO₂-eq (ton CO₂-equivalent) – summarized in Figure 11.4. The bottom-up approach is sector oriented while the top-down model assesses economy-wide potential of mitigations

options. The top-down model has been the base for the studies on mitigation options and macro-economic assessments.

The estimation in the report of the macro-economic consequences of stabilizing the level of atmospheric CO₂ between 445 and 710 ppm CO₂-eq in 2030 is a reduction in the average annual GDP-Growth between 0.06-0.12 percentage points. It is considered a ‘worst case’ scenario and some models actually show over all gains for the GDP as they consider the baseline situation less than optimal and that mitigation policies like the increase of carbon prices will improve market efficiency and/or lead to increased technological change (p. 16). The modelling does not consider the consequences of change of attitudes and life-style in continuation of the proposed mitigation measures and possible positive effect this might have. These are therefore not represented in the models. These models are, of course, very complex and a number of reservations are necessary. But the conclusion on the 0.06-0.12 percentage range of the negative impact on the average GDP growth rate is labelled with the comment ‘high agreement and medium evidence’ in terms of backing across the scientific panel (see also the EEA Report 1/2005).

These figures should be compared to the main conclusions by a team of economists in the so-called Stern Report, published in late 2006 by the World Bank economist Sir Nicholas Stern. They concluded that about 1% of global GDP needs to be invested to mitigate climate change to avoid major problems. If this is not invested the possibility remains that a major economic depression will eventually result.

When summarising the policies and instruments available to governments, the IPCC report points out that there is a wide variety of options at hand from ‘policy integration’ and ‘standards and regulations’ till ‘taxes’, ‘tradeable permits’ and ‘voluntary agreements’ as well as ‘R&D in support of technological advance, cost reduction and progress towards stabilization’. In consistence with the models and the mitigation concept, presented above, the report then points out that

“Policies that provide a real or implicit price of carbon could create incentives for producers and consumers to significantly invest in low-GHG products, technologies and processes. Such policies could include economic instruments, government funding and regulation (high agreement, much evidence).”

Further, it is stated in this context that an effective carbon-price signal could realize significant mitigation potential in all sectors. References are again made to the models, showing that carbon prices of 20-50 USD/t CO₂-eq, sustained long term, could lead to a power generation sector with low GHG-emissions by 2050 and make many mitigations options in the end-use sectors economically attractive.

The conclusion is, that the IPCC-panel considers an increase in the carbon price by taxation as a precondition for reaching the set goals. Taxation is therefore the most important policy instrument to achieve the CO₂-emission reduction (and reduction also of other GHG-gases) necessary to reach and to sustain the level of 550 ppm CO₂-eq by 2100. Other policy options and instruments, however useful and important, are supplementary or auxiliary to the carbon price increase by taxation in some form, if the key policy goal is to be achieved.

In this context it should be added that the rather “optimistic” view of fossil fuel availability that this model requires has been questioned. The Association for the Study of Peak Oil (ASPO) has predicted that the global peak of fossil fuel production – all categories – is imminent, and most likely will occur in 2008-2010. One should then expect an increase in the real price of fuels. This should make the carbon-free alternatives more attractive and thus lead to reduced emissions.

11.4.3 Sustainable Development and the Concept of an Ecological Tax Reform

The ecological tax reform (ETR) is a different concept compared to environmental taxation. The latter is about using the taxation to make people act environmentally sensibly, i.e. use economic incentives to achieve the goals for the environment which the legislation has set up. The ETR is about a completely new and comprehensive taxation strategy, shifting taxation away from labour to natural resources. The aim is still environmental, i.e. a sustainable production and a sustainable society. The higher taxation of natural resources, first of all energy resources, will put enormous pressure on industry, transportation and private households alike. The only solution will be higher energy and general resource efficiency, i.e. the introduction innovation and savings. The relation between fuel prices and fuel efficiency was shown by Weizäcker and Jeringhaus in their 1992-study on ETR (Figure 11.5).

The revenue should not be used for environmental protection. That is in principle delivered by the efficiency increase

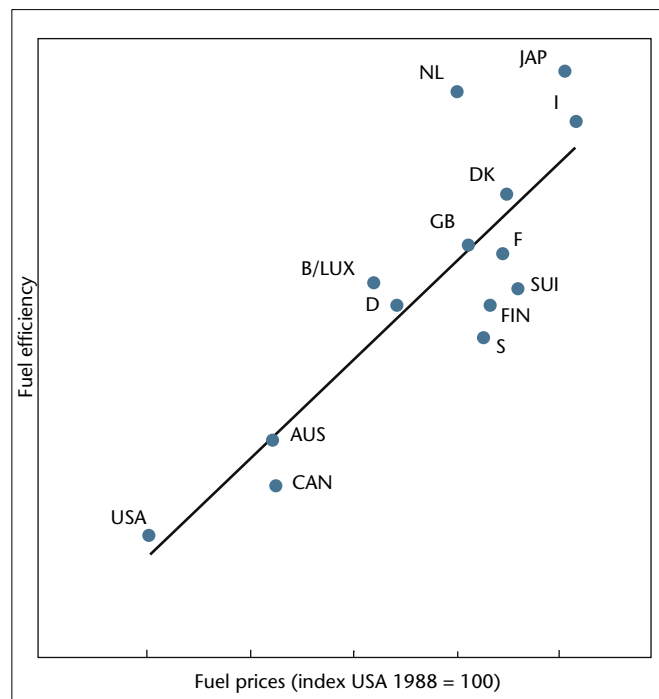


Figure 11.5. Relationship between macro-economic fuel efficiency and price. Data from 1988 are provided for OECD countries related to 1988 US dollars. Macro fuel efficiency is calculated as the reciprocal value of per capita fuel consumption, and understood as a measure of how efficient the inhabitants of countries of similar economic performance are in their use of fuel. The macro-economic fuel efficiency (specific fuel consumption) relates positively to the price with a correlation coefficient in of $r = 0.85$. [source http://esl.jrc.it/dc/etr/ecological_tax_reform.htm]

through innovation and savings, which is the expected outcome of the taxation itself. The revenue should be used to replace – wholly or to a great extent – the taxation of human activity, of labour. The concept is summarized in the following phrase: The Ecological Tax Reform (ETR) is about achieving “a wider use of labour and a wiser use of nature”. The source for the total state tax revenue should, in other words, to a much greater extent be natural resources instead of labour and other human activity.

There will be a need for compensation to a part of industry to allow for time to adapt. And there will be a need for social balancing towards people with low income and/or shortage of investment or mobility options [Weizsäcker & Jesinghaus, 1992; Axelsson, 1996]. But the overall credibility of the ETR approach is further shown by the same team by the following compilation:

The relations documented in this short representation of a very extensive and still ongoing discussion on ETR and the most realistic approach are important and promising. But they are the result of a quite long and, above all, piecemeal or incre-

mental transformation process. If ETR is to be realistic according to its principles, it will mean substantial efficiency increases, which in turn will be accompanied by drastic restructuring of all sectors of industry, transportation and the public sector as well as people private lives in terms of housing, heating, shopping and personal transportation etc.. It will mean more, not less employment, but within a framework of change. This will mean a higher degree of uncertainty and anxiety among the employee population.

This restructuring will be equally drastic and difficult to plan, forecast for and hence to control for capital. Capital is focused upon being able to calculate potential profits as well as – and not least – risks and uncertainties. The ETR project will entail all the features of unpredictability which capital doesn't want, and hence be opposed by large segments of industry.

The only way to bring about real progress for the ETR-approach will be market-driven, real and not managed, energy price hikes, documenting the approaching end to the “oil-based” industrial era.

11.4.4 Towards a Sustainability Regime

Economic instruments are so far more taxes to boost the state budget than environmental protection, although things like the CO₂ tax, waste tax, adopted in some countries, and the internal EU-emission trading system are pointing in the direction of environmental protection. The charges/fees are also making alternatives to ‘business as usual’ attractive in some areas.

What seems to be missing is a fuller exploitation of the potentials in a combination of normative regulation and economic incentives. We need to set a final deadline for phasing out of certain fuels, compounds and electrical appliances. We need to set demand for a certain performance level for a vehicle or for the volume of CO₂ per unit produced. This will allow us to push the development towards compliance even before the deadline by setting up economic incentives, that is, carefully designed taxes.

Taxes are, however, never popular. In a liberalist political climate, these years predominant all over the western hemisphere, taxes are considered the “root of all evil”. Raising environmental taxes to the level needed to offset the social costs – or to internalize fully the externalities – is therefore not likely in this political context. But a shift from tax on income to tax on use of energy and other resources could be tempting in a liberalist perspective, but only to the point where the tax burden in total would be as before, or less. In that case a reform might miss the point, as the view will be limited taxation instead of resource efficiency and a sustainable society.

If, in a less tax hostile political environment, clear goals and targets were set politically for an environmentally sustainable

society and the taxes designed so that they could convince citizens of their appropriateness, an ecological tax reform could create widespread support, even if it meant that the burden of tax would have to rise to meet the targets. No government has yet dared to do that, but we might see it in the near future.

Study Questions

1. List a few cases where market mechanisms can be used as policy instrument for environmental protection.
2. Find out the market prices for some common waste materials, such as paper, glass, and scrap metal.
3. For emission trading, explain the concepts of grandfathering, ceiling, bubble, and cap.
4. Describe the components of EU-ETS, how it is implemented, and check on the Internet the current spot price for carbon emissions (euros/tonne of carbon).
5. Would you say that the EU Emission Trading Scheme is a success of failure? Justify your position.
6. What are the major advantages and drawbacks of a tradable permit system?
7. Describe the intentions of the EU Linking Directive and discuss in which ways it might weaken the EU-ETS as an instrument for fulfilling the Kyoto obligations.
8. Give/find examples of successful and unsuccessful applications of economic instruments in environmental politics and discuss the reason for success and failure.
9. Explain the concept of an ecological tax reform. What would be the social consequences of introducing an ecological tax reform? Would the richer or the poorer benefit the most from such a reform?

Abbreviations

CDM	Clean Development Mechanism
COP	Conference of Parties
DTI	Distance-to-target Indicator
EEA	European Environmental Agency
ET	Emission Trading
ETR	Ecological Tax Reform
EUA	EU Allowances
EU-ETS	EU Emission Trading Scheme
CCC	Framework Convention on Climate Change
GHG	GreenHouse Gases
GDP	Gross Domestic Product
IPPC	Integrated Pollution Prevention Control
IPCC	Intergovernmental Panel on Climate Change
JJ	Joint Implementation
NAP	National Allocation Plan
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development

Internet Resources

Resource Recovery Forum

<http://www.resourcesnotwaste.org/>

European Union Greenhouse Gas Emission Trading Scheme (EU ETS)

<http://ec.europa.eu/environment/climat/emission.htm>

EU Emissions trading – National allocation plans

http://ec.europa.eu/environment/climat/emission_plans.htm

Point Carbon (company working with carbon trading)

<http://www.pointcarbon.com/>

Directive 2003/96/EC on the taxation of energy products and electricity

<http://www.managenergy.net/products/R538.htm>

Directive 2003/87/EC on a scheme for greenhouse gas emission allowance trading

http://ec.europa.eu/environment/climat/emission/implementation_en.htm

United Nations Framework Convention on Climate Change

<http://unfccc.int/2860.php>

The Kyoto Protocol

http://unfccc.int/kyoto_protocol/items/2830.php

Intergovernmental Panel for Climate Change (IPCC)

<http://www.ipcc.ch/>

IPCCs Fourth Assessment Report "Climate Change 2007"

<http://www.ipcc.ch/>

Stern Review final report

http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

Association for the Study of Peak Oil (ASPO)

<http://www.peakoil.net/>

The Ecological Tax Reform by Ernst Ulrich von Weizsäcker and Jochen Jesinghaus

http://esl.jrc.it/dc/etr/ecological_tax_reform.htm

Swedish Society for Nature Conservation's report of green tax shift (ETR)

<http://www.snf.se/pdf/rap-eng-ecotax.pdf>

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Inspection

*Environmental Inspection and Enforcement in
Theory and Practice*

A

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It is recommended that *part 1 – Theory and Framework* and *part 2 – Environmental Inspection in Practice* be studied as group work where the questions after each part are discussed, first in student groups and then with the teacher. The questions should be a starting point and preparation for the on-site inspection to come. Due to the different conditions between countries some of the questions may be irrelevant or difficult to answer.

If possible, the student group should visit one workplace of inspectors, an authority, and secondly an inspection object, such as a company. The aim of visiting the workplaces of inspectors and inspection objects is to get an understanding of the conditions under which inspectors work. Inspectors are civil servants that often work with limited resources.

IMPEL, the *European Union Network for the Implementation and Enforcement of Environmental Law*, is an informal network of the environmental authorities of EU Member States, acceding and candidate countries, and Norway. The core of IMPEL's activities concerns the training of inspectors, minimum criteria for environmental inspections, exchange of information and experience on implementation and enforcement of existing EU environmental legislation, development of common views on the coherence and practicality of current EU legislation, and on commenting issues of practicality and enforceability at an early stage in the development of new EU legislation, before a proposal is formally tabled.

IMPEL projects look at how legislation is currently implemented and enforced, and then at good practice for the inspection and/or permitting process is defined. IMPEL is introduced at <http://ec.europa.eu/environment/impel/> and a brochure is available at http://ec.europa.eu/environment/impel/pdf/brochure_en.pdf [Source IMPEL website].

The core of recommendations in this section is based on the IMPEL work, and IMPEL documents are important reading.

Part 1

Theory and Framework

1. Introduction

This part focuses on the role of authorities in environmental protection and serves as a short summary of recommendations for planning an inspection, preparing for on-site visits, and making an inspection report. The overall objective is to briefly explain authorities’:

- Legal basis for action.
- Organizational framework.
- Ways of working.
- Kinds of problems faced.

The laws and regulations, as well as the organization of authorities, differ across countries, as do the general working conditions and the problems faced by inspectors in their daily work. Thus, the role of authorities in environmental protection is based on national prerequisites and experiences. There is of course a common international objective of protecting the environment, though the framework varies. There are also guidelines issued by the European Union, which are or will be valid for most countries in Europe.

Laws and regulations determine the nature of an inspector’s job. An inspection has a clear mission with the purpose to compile facts and figures and to make observations. Inspection is a practical activity that requires several competencies, including technical, scientific, administrative, and social skills.

2. Objects of Inspection

In order to harmonise the environmental requirements imposed on industry within the EU, environmental policies and legislation have recently been developed. The member states have largely brought their national environmental legislation and policies in line with EU requirements. However, because of the harmonisation of national legislation with EU requirements and of the development of self-regulatory instruments like Environmental Management Systems, the tasks and responsibilities of environmental enforcement inspectorates have become more complicated.

The environmental code contains classification of different environmental hazardous activities, and points out which ones

have to have a permit, and which ones have to make a notification. The example below is only valid for Sweden.

A- and B-levels

Larger organisations and companies usually employ an environmental coordinator. The coordinator usually has a good knowledge on how the company affects the environment and publishes an environmental report each year, which is required by law. He or she also is familiar with all systematic work with environmental issues in the organisation, especially the supervision of self-monitoring schemes of operators of different activities. Some of these organizations are certified according to IPPC regulations. In the municipality of Umeå there are about ten of them. These have to apply for and get a license before the activity starts. This usually takes between a half and one year.

C-level

The C-level is a heterogeneous one, containing large companies with up to 200 employees to smaller companies with only 1-2 employees. The larger ones are similar to A/B-level in knowledge, self-monitoring and so on, while the smaller ones usually are less well informed about e.g. self-monitoring. Self-monitoring of operators is a useful tool when applied to larger companies with larger resources. Smaller companies need to be authority-controlled in the “old” way. That means more inspections and actual monitoring of hazardous points, like chemical storage, waste management etc. There is no general demand for an environmental report, but the supervising authority can issue an injunction with a requirement for an annual report on certain issues, for instance regarding use of chemicals, waste handling etc. This is common for petrol stations and vehicle scrapping. The C-level companies have to make a notification six weeks prior to the activity starts, according to Swedish law.

U-level

U-level companies are small companies with a low level of knowledge and resources. Some of these can have a considerable impact on the environment. For instance car repair shops

which usually handle oils and chemicals in relatively large amounts may pollute soil and water. Since the knowledge is on a low level, the storage and actual handling of chemicals can lead to discharges to the environment. The number of U companies is very large which means that the total impact of these companies can be quite high. U-level companies need to be monitored by inspections, and actual checking of hazardous points, like chemical storage, waste management etc are important. The authority also needs to inform and educate the companies on how they can improve on their risk of impact on the environment. These companies do not have to apply for a permit or make a notification before the activity starts. Therefore the authorities' knowledge of these companies is not complete. Some of them have never been inspected or visited by the environmental health officers. The authority gains knowledge of these companies through complaints from the public and by making inventories of certain sectors of industry (car shops, dentists etc etc).

3. Licences – IPPC and BREFs

IPPC=Integrated Pollution Prevention and Control
BREFs=Best Available Technique Reference documents

The Licences

The purpose of the EU IPPC (Integrated Pollution Prevention and Control) Directive (96/61/EC) is to prevent and limit pollution, mainly from large industry and other potential polluters. The directive regulates environmental demands on pollution from individual objects, but does not consider transports, possibilities for recycling, etc., that is, outside-the-plant activities.

According to IPPC, Best Available Technique (BAT) must be used, and an information system to ensure the use of BAT

is currently built up in the EU. Technical Working Groups, coordinated by the European IPPC Bureau based in Seville, have so far produced BAT Reference Documents (BREFs) for a large number (33) of sectors.

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an informal network of the environmental authorities of the European Union member states. The network, formed in 1992, is commonly known as the IMPEL network. The European Commission is also a member of IMPEL and shares the chairmanship at meetings. The objective of IMPEL is to create the necessary impetus in the European Community (including the potential future memberships) to make progress in ensuring a more effective application of environmental legislation. The network promotes the exchange of information and experience and the development of a greater consistency of approach in the implementation, application and enforcement of environmental legislation, with a special emphasis on environmental legislation.

There is a parallel network, AC-IMPEL, for the benefit of the EU candidate countries. Its main role is to support these countries in meeting their obligations in the field of environmental legislation, specifically in terms of implementation and enforcement. AC-IMPEL operates in close cooperation with the IMPEL network.

Environmental Inspections

The IMPEL Reference Book for Environmental Inspection is a central document for environmental inspectors in the European Union with the purposes to provide the inspectors with tools to develop a consistent approach to site visits (preparation, execution and follow-up) as well as reviewing of the impact of Environmental Management Systems (EMS). It is mainly meant for field inspectors, but is also useful to top and middle management of inspectorates.

Table 1.1 Chart of environmental activities and permits in Umeå, a medium-sized city in North Sweden. Four different levels of inspection exist. The largest require an A-permit, which is an IPPC license, the second largest a B-permit under national legislation, the next category a notification, and the smallest no special permit, although they still need to abide by environmental legislation. The permits are issued by the national Environmental Court, a regional authority or the municipal authority, Office of Environment and Health. The Office of Environment & Health can make a request to the County administration to take over the responsibility of supervision of A and B activities.

Level	Permits issued by	Supervision	No	Example
A-permit	National Environmental court	County administration/Office of Environment & Health	2	Waste treatment facility, power plant, paper mill
B-permit	County administration	County administration/Office of Environment & Health	50	Larger mechanical industries, oil depots
C-notification	Municipal Office of Environment & Health	Office of Environment & Health	150	Petrol station, chemical lab, dry cleaning
U	Municipal Office of Environment & Health	Office of Environment & Health	1,000	Car repair shop, dentist, building contractors

The tasks and responsibilities of environmental inspectorates are primarily the implementation and enforcement of environmental legislation. An inspector in Europe has also an important role in the regulatory cycle. This involves the development of legislation, licences permitting, implementation, compliance control, compliance promotion, and enforcement (Figure 1.1). In most member states the regulatory cycle is well developed. Nevertheless, it has been observed that enforcement may be neglected to some extent.

4. Authorities – Organization and Framework

The administrative and legal systems for environmental protection differ widely between countries and even among Member States of the EU. There are significant differences between the systems, in spite of efforts to harmonize environmental laws. Chapters 2-4 in the IMPEL Reference Book for Environmental Inspection are recommended reading for an overview of organizations, legislative frameworks and administrative routines within EU member states.

Figure 1.2 presents the institutional arrangement for Sweden.

5. Environmental Legislation

Usually, legislation related to permitting or licensing is developed by the central government (e.g. by the Ministry of Environment) decided on by the parliament and applied nationally. The legislation commonly takes the form of framework legislation, which establishes the general requirements, and implementing legislation, which provides details. How-

ever, in some Member States considerable legislative power is delegated to regions. Common for all EU Member States is that licences are required in order to set up and operate major industrial installations. In the licences there are specified detailed requirements for the individual installations, and it may be necessary to obtain several sectorised licences or a single integrated licence.

In the Member States, there may be separate pieces of legislation for the various environmental media, or, integrated legislation that covers all environmental media. However, the body of EU legislation is quite large and covers the main areas:

- Water
- Control of air pollution
- Solid waste
- Harmful substances: chemicals
- Noise

An overview of the most relevant EU-Directives, including the Seveso-Directive and the IPPC-Directive, is presented in Annex 6 of Part IV in the IMPEL Reference Book for Environmental Inspection. Up to this date, there has not been any Directive developed that specifically deals with inspection.

6. Law Enforcement

Public law enforcement can be divided into three categories, which are common among the EU Member States: administrative law, criminal law and private law enforcement. In cases of non-compliance at companies, an environmental inspector primarily uses administrative law enforcement. With the sup-

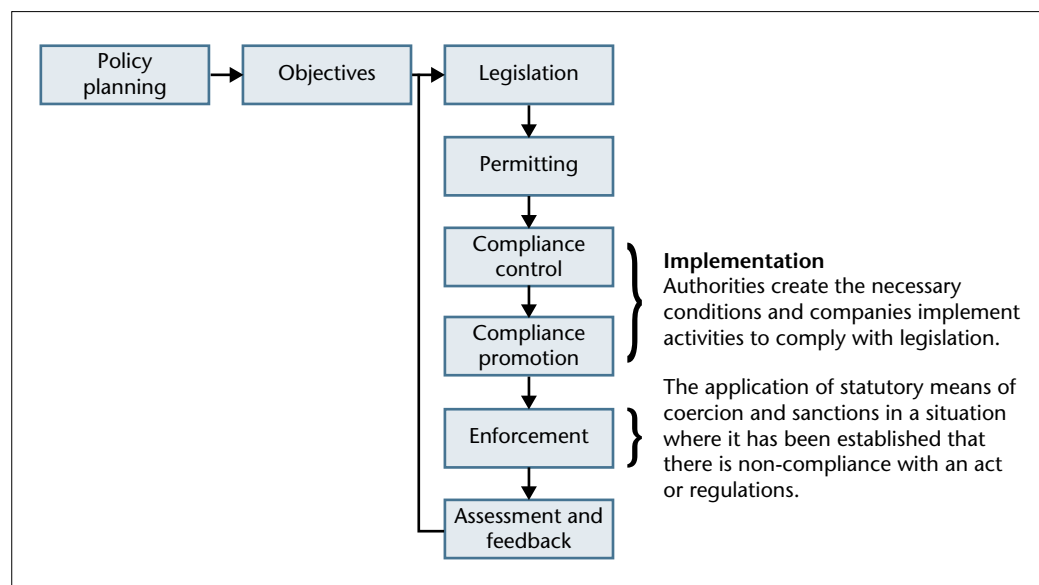


Figure 1.1 *The regulatory process by which the different competent authorities take action to implement acts and regulations.*

port of administrative law, officials at the competent authorities may:

- Demand to inspect and take copies of business records
- Halt transports and search cargoes
- Enter all places with equipment (except private houses)
- Arrange to be accompanied by other persons when entering the premises
- List, examine and take samples of goods
- Inspect processes and emissions

Enforcement, which can be either preventive or reactive, is the final active process that authorities undertake to ensure that licence requirements are met. Depending of the seriousness of a non-compliance of a company, various administrative sanctions and measures may be applicable. For example, warnings in the form of a formal letter to require the offender to take remedial action, penalty payment, change or withdrawal of licence, etc. It is also stated that compliance with the regulations must be achievable and not require the impossible.

7. Quality of the Inspection

The Working Methods

Every inspectorate should maintain high quality, and it should also be in the interest of each inspector to strive for a continuous improvement of his/hers inspection performance. In the IMPEL reference book, quality is defined as: “A body of well-defined instructions, working methods, control mechanisms and performance indicators, that result in pre-defined outputs and quality levels”. The quality management applied could, for example, be based on the methodology of ISO, or the inspectorate may even be certified by ISO. One way to reach and maintain a successfully inspectorate is to regularly perform assessment of:

- The quality of the inspection
- The consistency and quality of the inspection report
- The performance of the inspection body

By using a quality management system with well-defined instructions, working methods, control mechanisms, performance indicators and, of course, proper feedback, indicators for

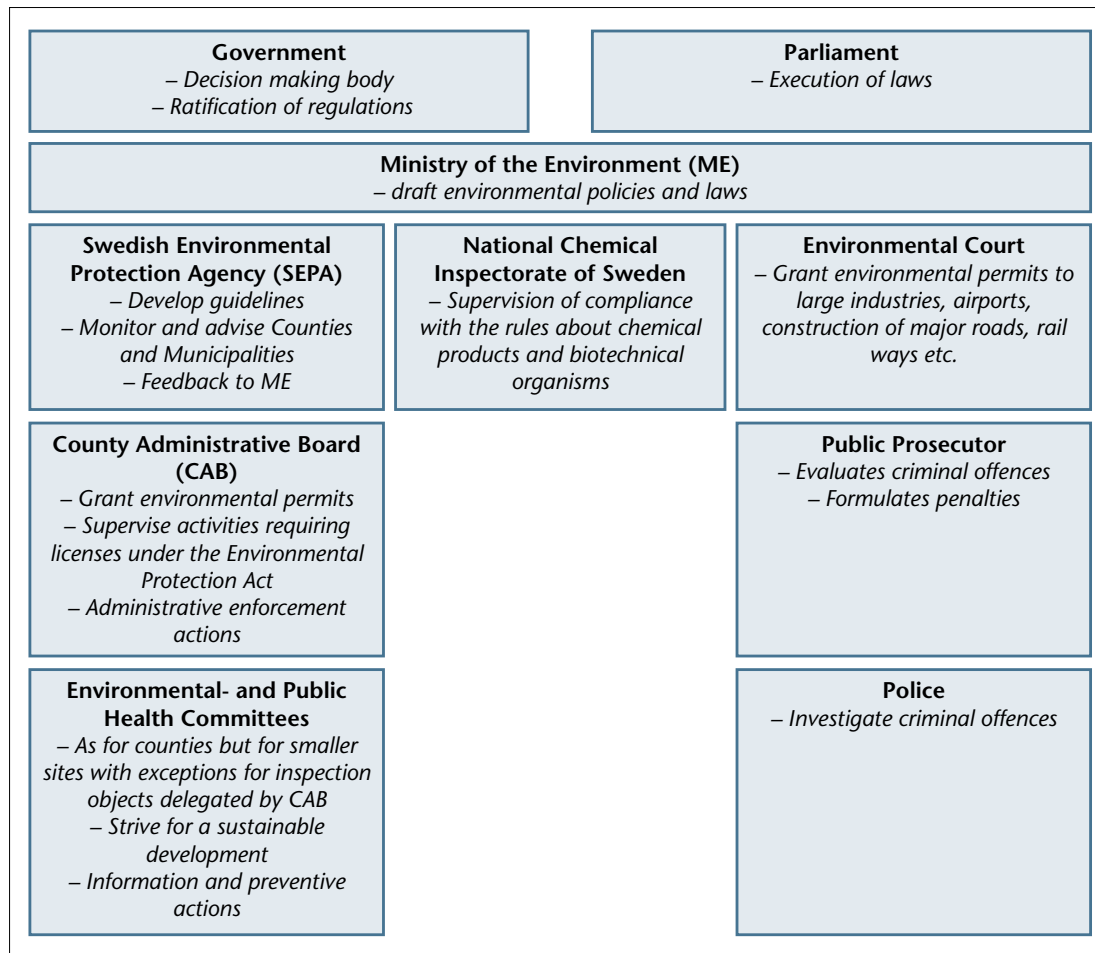


Figure 1.2 The institutional arrangement for permitting, inspection and enforcement in Sweden.

quality as well as quantity can be identified. Such an assessment may be performed either within the inspectorate, or by others.

The quality of inspections may be improved by regular evaluations of the:

- Performance of inspectors.
- Role of the inspector in the inspection process (monitoring, enforcing or advising role).
- Inspection procedures that are followed.
- Efficiency of the on-site visit.
- Time needed to carry out an inspection.
- Correctness and accuracy of the inspection.
- Frequency and timing of the inspection.
- Competence of and justification of the persons involved.
- Data storage.
- Arrangements on follow-up visits.

Management of the Quality of Inspections

The quality and consistency of the inspection report may be improved by evaluation of the:

- Completeness of the report. Does it contain all relevant general and specific information?
- Consistency and correctness of the report and the conclusions drawn. Reports should be structured in the same way so that relevant information can be extracted quickly.

Regarding the inspection body, two ways of improving the performance of the inspection body are presented.

Firstly the inspectorate may track the results back while looking for trends and changes in activities or results over time. This may be done by using local/regional reports in order to publish a yearly report on the authority's inspection performance. This report should also include inspecting resources (person-year and amount of money) used in previous years for inspection and permitting, number of inspection objects, number of inspections, enforcement actions. This provides a possibility for the government and the public to get an insight to the inspection body. It is also an opportunity for inspectors to learn from each other. It is important that authorities communicate and cooperate with each other in order to perform inspections equally.

Secondly the inspectorate may set targets and afterwards compare the results with the targets. This is a way to monitor the performance of the authority. Depending on the indicators chosen for monitoring, the quality and/or quantity of the performance is measured.

Indicators for quality include:

- Quality of self-reported data.
- Environmental improvements within companies.
- Changing non-compliance rates.

- Changing character of infringements.
- Changing number of required enforcement actions.
- Punctuality of enforcement responses.

Indicators for quantity include:

- Number of inspections.
- Number of fines issued.
- Quantity of self-reported data.
- Changing number of required enforcement actions.

An annual report in which the performance is reviewed, as well as deficiencies and required modifications are identified and listed, can be used as a tool in the assessment of the performance of the inspectorate and to identify further improvements.

8. Communication and Conflict Management

It is important for a successful visit that respect and credibility are created by the inspector showing appropriate knowledge and skills. At on-site visits, communication is a very important tool, and to cover the various items related to on-site visits an inspector should be trained in:

- Communication aspects.
- Inquiry and negotiation techniques.
- Conflict management and resolution

In order to:

- Establish a good contact with the contact persons at the inspected facilities.
- Improve public relations.
- Ensure compliance promotion.

In some EU Member States inspectors may need skills in negotiation and conflict management and resolution. For example, an industry has the main aim to operate its activities as efficiently and economically as possible. If they are dependent on environmental authorities for licences, they may consider enforcement bodies to be "on the opposing side". Environmental authorities have an interest in improving the environment and implementing laws and regulations, thus, they may have a similar view of industry. Negotiation techniques may come in handy in situations where there is a need to reach a position which is acceptable for both parties. In such situations the inspector may be required to negotiate with company representatives in order to achieve the conclusion required by the regulatory authority. The inspector must also be prepared that the representatives of the company may question the details of environmental regulations and compare them with those applied to the company's competitors.

In case of negotiation the inspector must have a clear understanding of what areas are flexible and what areas are fixed. It is of great importance that the inspector ensures that the position of the regulatory body is not compromised. By means of arguments, facts, views and conditions, an inspector can try to influence or persuade the company representatives. Further, other important aspects of communication are that the inspector is credible and reliable in order to make a good impression; he/she should also be polite and avoid verbally attacking the company representatives.

Conflicts should not always be seen as unwanted; they may lead to an opportunity for renewal and change. The inspector should try to be a part of the solution rather than part of the problem and strive for a win-win situation. Examples of ways to handle conflicts are:

- Co-operation which takes both interests into account.
- Searching for compromises to find suitable, mutual and acceptable solutions.

9. Social Skills

In spite of the differences in organization, legal framework, chain and delegation of responsibilities, etc, the basic conditions are similar for environmental inspectors in different countries. The competence of the individual inspector, or team of inspectors, must cover all aspects of the work, such as the administrative framework, the legal system, inspection methodology, issuing permits, technical skills, as well as a good ability to communicate with counterparts. In 2003, IMPEL published *Best Practices Concerning Training and Qualification for Environmental Inspectors*, which is an important document for the training of inspectors (see Internet Resources).

Apart from strictly theoretical knowledge, good social skills are always vital in order to perform a good inspection. Communication, i.e. a good ability to communicate a message and to understand the problems of the counterpart, is therefore an important part of the practical work. At best, an inspection not only checks for compliance and enforcement of laws, but also inspires confidence and encourages improvements. Another very important part of the social skill of an inspector is to listen and show interest. In an open-minded discussion between authorities and companies, it is often easier to find solutions that meet the demands of both parts. Also essential for improving the environmental performance of a company is a functional self-monitoring programme and good communication with authorities. This of course does not exclude the importance of traditional inspections made by authorities, including checking compliance with laws and permits.

Study Questions

1. What do IMPEL, IPPC, and BAT stand for?
2. What are the roles of an environmental inspector within the regulatory cycle?
3. Discuss problems and difficulties that can occur in connection with implementation and enforcement of environmental laws and recommendations. What can be done to improve the situation?
4. What courses of action can be taken in response to non-compliance connected to environmental inspections?
5. Define quality management connected to environmental inspections. Can quality be quantified?
6. Financial and human resources are usually limited. How can priorities be made when resources are limited?
7. Good communication is essential in all public inspections. How can a good climate for communication be created? Can enforcement be prevented in other ways than by communication only?
8. How can conflicts be handled? Conflicts are not necessarily destructive. Can conflicts be positive, and if so, how and why?
9. Briefly describe the organization and responsibilities of environmental authorities at different levels involved in inspection and enforcement (governmental bodies, regional/local administrations).
10. Describe the cooperation between authorities at different levels. Are there any delegations from higher authorities to lower levels?

In order to inspire further discussions about methods of inspection, communication, social issues and how to plan and perform an environmental inspection, two films have been produced. The film *Environmental Inspection* describes the roles and activities of a Municipality Inspectorate in a Swedish municipality, and the film from Lithuania shows a similar case.

The purpose of the films is not to learn details about Swedish or Lithuanian legal systems, etc., but merely to provide an impression of how the workplaces look.

The cases are typical and the purpose of the films is to illustrate the practical work of a civil servant, i.e. a day at work. The working conditions vary, of course, between different countries depending on the organization of the society in general. So, for obvious reasons, the Swedish case is only valid for Sweden as is the Lithuanian only for Lithuania.

Part 2

Environmental Inspection in Practice

1. Introduction

Although an inspection must be based on laws and permits, the inspector cannot merely use a simple checklist with clear regulations. Conditions vary widely between regions and companies, and the structure of a small company is not the same as that of a global industry. Permits and conditions shall, of course, be checked and documented, but to be successful the inspector/authority must also be able to communicate with the counterparts, to inspire and encourage. The greatest challenge in environmental inspection is to prevent pollution and encourage improvements, not just to enforce compliance.

The objective with this part is to give a framework for carrying out an environmental inspection of an industrial plant or other kind of activity subjected to public control under national, regional or local environmental laws. This part includes:

- A summary of preparation for on-site inspection visits, including planning and reports.
- A summary of the EU Parliament recommendations for Minimum Criteria for Environmental Inspection.
- Preparation and planning of study visits by answering and discussing the questions below.
- A study visit to a local inspection authority and discussing the questions.
- A study visit to an inspection object together with an inspector.

Students will be familiarized with the theoretical framework for inspection activities, experience practical inspections, and see the conditions under which inspections are performed. The purpose of the questions below is to address the following issues:

- The prerogatives, restrictions and obligations of an inspector.
- The kind of information needed before an inspection.
- The way of carrying out an inspection.
- The kind of measures that can/should be taken after an inspection.
- The kind of competence (e.g. technical, social, etc.) necessary to be successful.

Even if the conditions under which the inspectors work differ widely between countries, these are fundamental prerequisites for everyone involved as a civil servant in public monitoring activities. In order to decide what information is necessary, a definition of the concept of environmental inspection is needed. The IMPEL publication *Minimum Criteria for Inspections* (see Internet Resources) gives the following definition:

“An inspection is an activity which, in the broadest sense, entails:

- Checking and promoting the compliance of installations within requirements stated in laws, regulations, ordinances, directives, prohibitions and/or permits etc.
- Monitoring the general impacts of specific installations on environment that might lead to enforcement action or further inspection.”

2. EU Parliament Recommendations for Minimum Criteria for Environmental Inspection

The reason for describing minimum criteria for environmental inspection is to set a base line for the quality of inspection activities, i.e. describe the basic requirements for a proper inspection of, in this case, industrial plants, including power stations and waste treatment/disposal facilities. The background for setting up a basic level is mainly that different countries have different systems for inspection and control, legal systems and furthermore not the same capacity and economical support. Hence, there is a need for a minimum level that all countries should reach. It is the responsibility of each member state to report that the minimum criteria have been implemented and to make these reports available to the public.

The responsible authority must have a plan for their inspection covering a certain time and area, what sites to visit, how often and what to achieve during the inspections. A plan for inspection should be based on the following:

- A database of industrial installations.
- A survey of regulations and conditions to be complied with.

- A general survey of major environmental problems and a general survey of the state of compliance by industrial facilities with regulatory and other requirements.
- Performance indicators and data on previous inspections, e.g. frequency, resources used, non-compliances etc.

Further, plans for inspections should include the procedure for inspection in reaction to accidents, complaints, non-compliance situations and permitting processes.

The minimum criteria applied to site visits states that on-site visits should be carried out through an integrated approach to examine the full range of environmental impacts. Every site

visit must be recorded and the findings should be evaluated and conclusions drawn regarding further action. The reports must be properly filed in a database for easy retrieval and the information should be exchanged between the relevant authorities.

In short, minimum criteria are described for the important parts of what should be done before, during and after an inspection, including:

- Plans for inspection.
- Site visits, analysis.
- Follow-up and reporting at the site/company level.
- Evaluation and reporting of inspection activities.

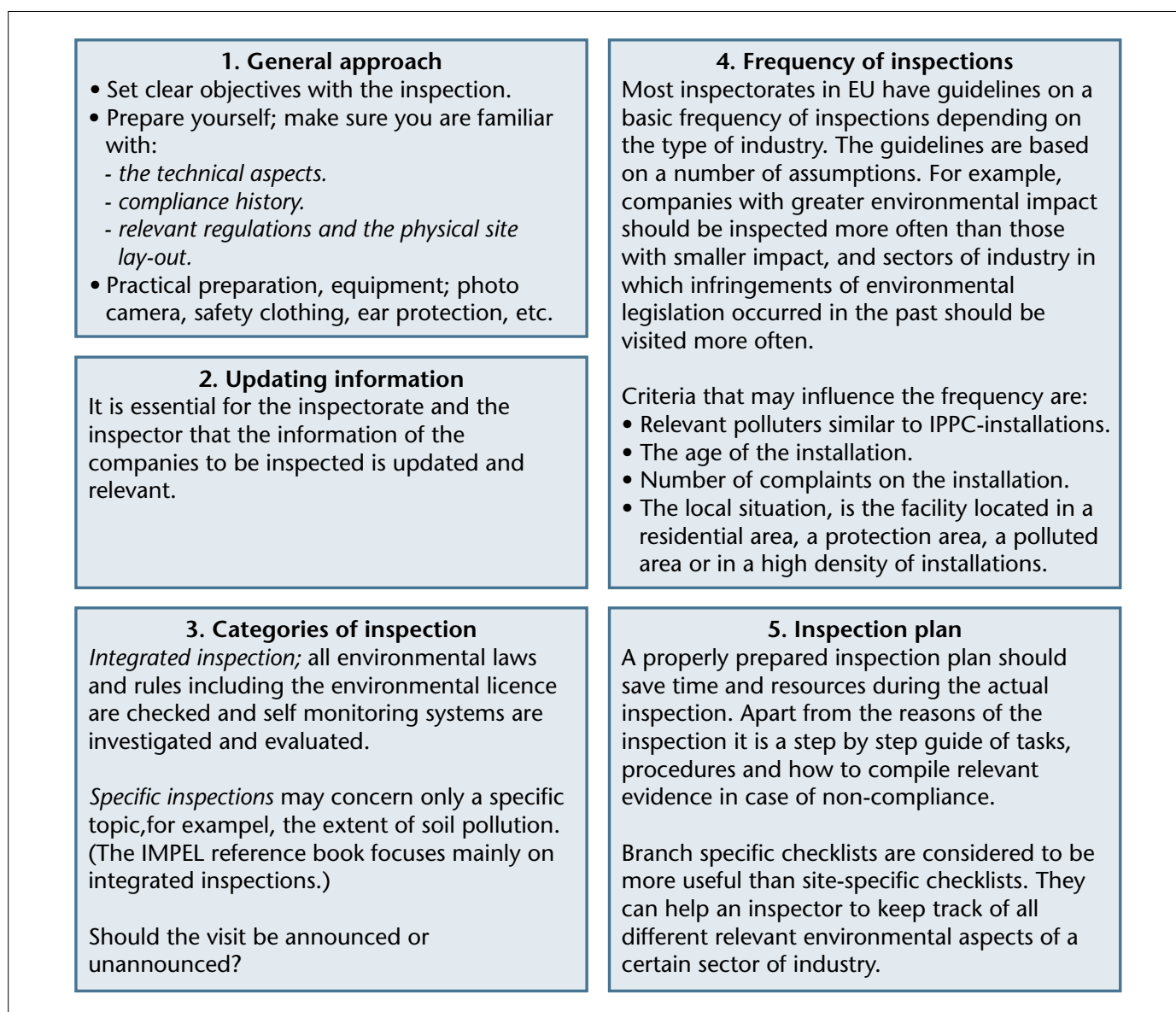


Figure 2.1 Relevant actions of inspection planning for on-site visits.

In addition to the IMPEL publication *Reference Book for Environmental Inspection* the IMPEL publication *Minimum Criteria for Inspections* is available (see Internet Resources).

3. Inspection Planning – Preparation of On-site Visits

Good planning of the inspection is essential and concerns all activities related to the scheduling, organisation, timing, execution and follow-up of inspection work. Figure 2.1 shows some relevant aspects of inspection planning. The degree of preparation for an inspection depends on the type of inspection (integrated or specific), and the size and the complexity of the installation. The purpose must be clear and the information needed must be collected. Studying the dossier, i.e. the collected information at the inspectorate regarding the inspection object, can give much useful information prior to the inspection.

Preparation of a sound inspection plan prior to the inspection serves several purposes and is as important to the total compliance monitoring and enforcement process as the generation of a high quality, well-documented inspection report. A proper inspection plan should save time and resources during the actual inspection: which questions are appropriate to address, guidance for what kinds of evidence should be collected and documented, etc.

The inspection plan should at least include the following parts:

- Objectives/background history of the inspection.
- Scope and assessment topics.
- Inspection activities and field techniques.
- Sampling planning.
- Safety plan.
- Administrative requirements.

The following list may serve as a guide for the inspector to develop an inspection plan:

- Objectives
 - What is the purpose of the inspection?
 - What is to be accomplished?
- Tasks
 - What records, files, licences and regulations will be checked?
 - What co-ordination with laboratories, other state or local authorities is required?
 - What information must be collected?
 - What samples will be taken and/or tests will be conducted?

- Procedures
 - Announced or unannounced inspection?
 - What specific facility processes will be inspected?
 - What procedure will be used?
 - Will the inspection require special procedures?
 - Has a quality assurance plan been developed and understood?
 - What are the responsibilities of each team member?
 - How will the reporting be organised?
- Resources
 - What personnel will be required?
 - What equipment will be needed?
 - Has a safety plan been developed and understood?
- Schedule
 - How much time will be needed for the inspection?
 - What is essential/what is optional?
 - Will there be a follow-up inspection?

More specific details concerning planning and reporting of inspections are presented in the IMPEL publication *Planning and Reporting of Inspections* (see Internet Resources).

Generally during on-site visits, the inspector verifies whether the observations in field are consistent with the material collected during the planning in order to determine compliance with licence conditions. The inspector should be alert, curious and prepared to “get hands dirty”. Self-monitoring and reporting must be scrutinised and evaluated. Finally, impressions like smell, sounds may provide useful information and should also be recorded. At the end of the inspection visit, the inspector should inform the company representatives on the preliminary conclusions of the inspection, and announce if a follow-up of the inspection is relevant.

4. Inspection Reports

The purpose of the inspection report is to give a factual record of an inspection, and to organise and co-ordinate all evidence gathered in a comprehensive and useable manner. It is therefore important that the report be:

- Accurate: all information must be factual and based on sound inspection practices.
- Relevant.
- Comprehensive.
- Co-ordinated, documentary support (photos etc.) should be clearly referenced.
- Objective, no conclusions should be drawn. However, the inspector’s conclusion about the compliance of the facility are the critical factors in the decision as to whether a violation did or did not exist.

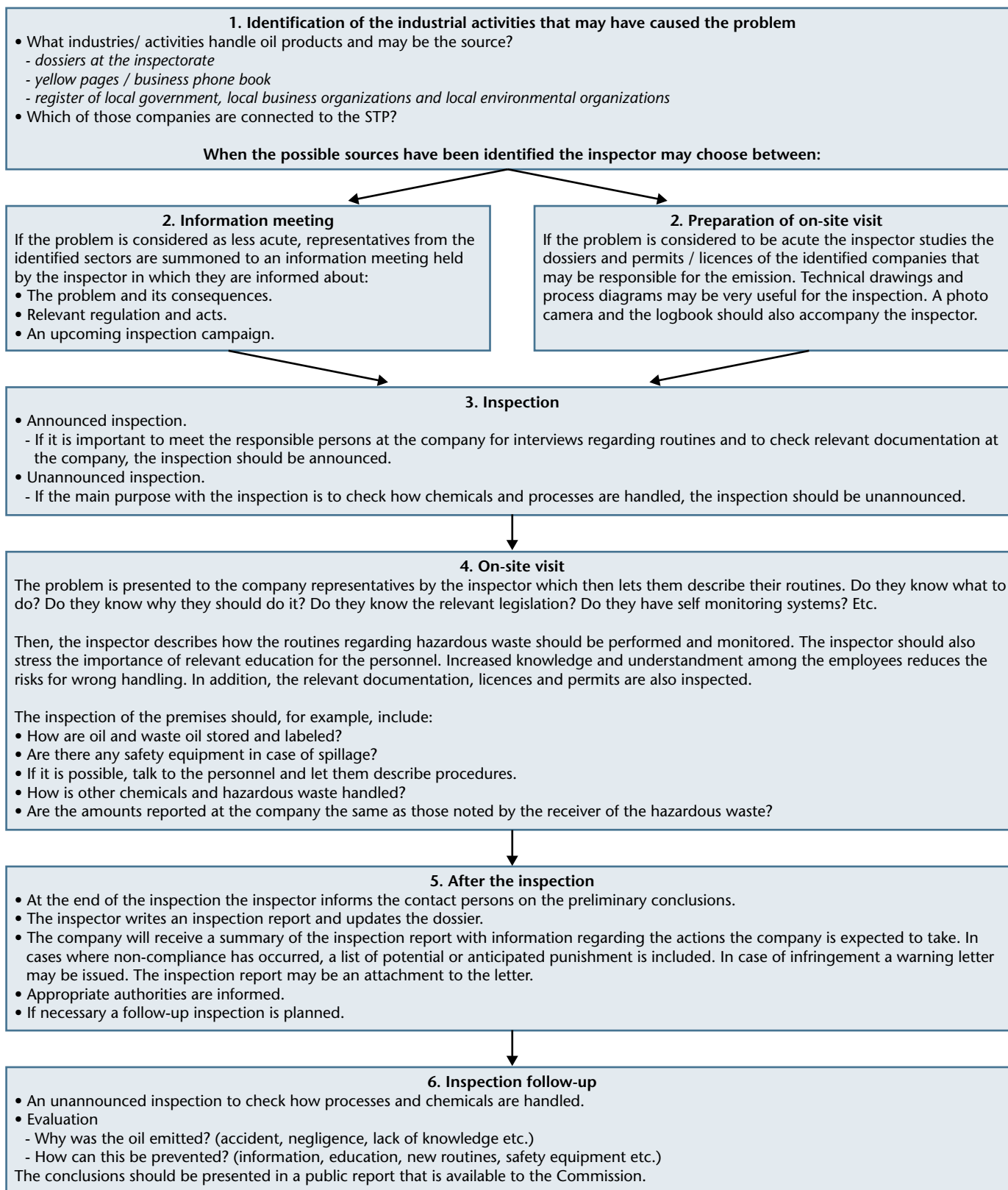


Figure 2.2 Schematic description of how an environmental inspector may work.

- Clear and well organised.
- Neat and legible.

The report should start with an introduction containing general information (purpose, participants, date etc.), a summary of findings and a short history of the facility. Following the introduction is a summary describing the inspection activities such as opening meeting, records, evidence collection, collected samples and closing of the meeting. Analytical results, photographs, copies of documents etc. may be attached to the report. The length and extent of the report is highly dependent on the purpose of the inspection. For example, at an integrated inspection with the purposes to check compliance with all environmental laws and rules, including the environmental licence and to investigate and evaluate the self-monitoring systems of the facility, the inspection report will, of course, be more extensive. An inspection concerning only a specific topic, e.g. emission of a substance to the municipal sewage system, will be short. Layouts examples of inspection reports are included in Chapter 11.3 and in Annex 8 in the IMPEL publication *Reference Book for Environmental Inspection* (see Internet Resources).

5. National Legislation

The objective here is to describe the national legal, administrative and practical prerequisites for an inspection of an indus-

Example – Inspection of a Small Object

The manager at the local sewage treatment plant (STP) informs an inspector at the municipality environmental inspectorate that, during the last three days, there have been elevated levels of petroleum oil in the influent.

The inspector and the manager agree on the importance of quickly finding the source of the incoming oil to minimize the damage in the biological treatment at the STP and to protect the recipients. The first step for the inspector is to identify what industries or activities may be responsible for the elevated levels of oil.

After the source/sources have been identified the inspector may, depending on how acute the problem is, prepare for an information meeting or for on-site visits.

The procedure of how an environmental inspector may handle a case like this is schematically described in Figure 2.2.

trial installation or other kind of inspection object. It should also be noted that environmental inspectors at local levels, i.e. at municipalities, in many European countries focuses mainly on inspection on small facilities since they usually are much more common than large industries. In Sweden for example, inspectorates at the regional level have a main part of the large industries as inspection objects whilst only a few are delegated to the municipal inspectorates.

Regarding the general questions below, all relevant information should be collected, briefly described and discussed. Focus should be on how the information should be used in practical inspection work. To answer the questions, it is useful to have defined a plan for further inspection.

Study Questions

1. What are the necessary elements of an inspection plan? Explain the meaning of these elements for a common industrial plant.
2. Briefly describe how to perform an on-site inspection.
3. What is meant by a licence check connected to an inspection?
4. Discuss the advantages and disadvantages of announced and unannounced inspections.
5. Describe the main contents of an inspection report.
6. Define the word “inspection.” What activities are included?
7. List the minimum criteria for an on-site inspection.
8. Reporting and feedback are important steps in an inspection. What are the purposes of reporting and feedback? Who is it necessary to report and give feedback to?

Seminar Topics

1. Reasons for inspection

- a. Who decides to do an inspection?
- b. Discuss possible reasons for initiating an inspection in general. Why inspect now?

2. Access to plants and properties

- a. Are there any restrictions for access to the inspection object?
- b. What are the possibilities for the inspector to enforce access to the inspection object? Is police enforcement possible/necessary?

3. Access to information

- a. What kind of information is needed in advance?
- b. Are there any restrictions concerning receiving and retrieving the information needed for the inspection?
- c. Is it possible/allowed to take samples from waste water, etc., from the site? Who can take these samples for analysis (e.g. the company, authority, or consultants)?

4. Requirements and enforcement

- a. How can the inspector enforce improvements at a company?
- b. Can hazardous activities be stopped temporarily by the inspector?

5. Sanctions for breaches

- a. Who collects and secures evidence in case of violation against laws and permits?
- b. Describe the procedure for appealing decisions. Who makes the decisions for sanctions in case of an environmental crime?

Part 3

Students Workshops

1. Student Exercise – Preparation of an Inspection

Select a type of inspection object, e.g. an industrial plant producing herbicides, a mine or a mechanical workshop etc. that is possible for the study visit. Discuss the questions below before making the study visits to a local authority and an inspection object. Then make a short inspection plan and collect the information needed.

Seminar Topics

1. Purpose

- What is the purpose of the inspection (periodic compliance visit, complaints or accidents, specific campaigns, etc.)?
- What frequency of inspections is necessary? How often should the installation be checked in order to have sufficient information about environmental performance?
- Will the inspections be scheduled or not? Is it necessary to inform the manager or others at the plant in advance of the visit?
- What aspects will be checked? Single aspects such as waste treatment, chemicals, pollutions to air, etc.? All permits? Is this an IPPC installation? What about the routines for environmental management and internal monitoring? *Note: it is very important to check the function of routines and responsibilities.*

2. Environmental Demands

- What are the demands in the national legislation connected to “your” inspection object?
- What are the demands on the inspection object in licences and permits?

3. Planning

- What kind of information is needed for the inspection plan? Examples are licences and permits to be complied with, reports from previous inspections, knowledge of industrial processes, etc. Collect some of the information in order to plan your inspection.
- Are there any self-monitoring programs or Environmental Management Systems available? Does the

inspector have access to the programs? May these be of use for the inspection process?

- Is technical equipment needed for taking samples?

4. Evaluation and Reporting

- Who makes the evaluation of the collected information from the inspection, including chemical analysis, etc.?
- What kind of information will be included in the report from the inspection?
- What happens with the report? Who will be informed and who will have access to it? How will the implementation process proceed after the inspection?

2. Study Visit to a Local Inspection Authority

The purpose of the study visits is to be familiar with procedures and working conditions at the authority. The teacher organizes a study visit to a local or regional environmental authority. During the visit some of the unresolved questions above should be discussed with inspectors or the manager of the authority. Apart from the very specific questions listed above, a number of other issues can be discussed (listed below). The answers are probably not documented but are very important for the everyday work at the office.

Study Questions

- How does the cooperation with other authorities work (at different levels, in other communities, etc.)? Are there problems?
- Discuss the organization of the authority. Who makes the decisions? What are the financial and personal resources? Is education/further training needed?
- Describe the working climate at the authority. Is there any political or financial pressure on the authority?
- Is the environmental legislation clear? Are interpretations by the local authority or the inspectors possible and/or desirable?
- What environmental issues are the most important? Why? Which are the most common?
- How does the authority plan the work?

7. Does the authority try to prevent environmental problems in any way, by information, campaigns, etc.?
8. What are the most common problems connected with the inspection procedure?
9. How does communication and cooperation with industrial plants work? Does the authority have any guidelines for good communication and social behaviour?
10. Are there any legal or social differences between inspections at small and large companies?
11. How can the authority ensure quality and an equal standard of their inspections?

3. Study Visit to an Inspection Object

The purpose is to get practical experience from an environmental inspection. The participants will visit an inspection object together with the responsible inspector. The object may be chosen according to interest by the participants. The object should not be too large (making it difficult to get the information and knowledge needed), but not too small either (discussions about licences and permits are necessary).

The questions connected to the visit should be defined during the planning process and the visit at the authority. The participants should list issues in advance to discuss and examine during the visit. Examples of important questions are collected below.

Study Questions

1. How does the visit start? Who do you meet, e.g. the manager and employees? Describe the organization of the inspection object. Who makes the environmental decisions – the board, the manager or maybe sometimes even the employees?
2. How to behave during the visit? Who decides what to discuss? Do the authority and the company agree on the environmental conditions?
3. What questions should be discussed, e.g. only legal issues and compliance with laws and permits or other possibilities of environmental improvement as well?
4. How does the company ensure compliance to permits and their environmental quality, e.g. self-monitoring or other internal control measures?
5. How does the inspection end? What will the form of examination be? What will be the main content of the report? How will the process proceed?

4. Concluding Workshop

Study Questions for a Concluding Discussion

1. Is there any conflict between economic interests/job opportunities and environmental efforts? Are there political pressures and priorities?
2. Compare the theoretical purposes with environmental inspections, expressed in IMPEL, with practical inspections. Are there any problems? If so what kind of problems? What are the most important parts of IMPEL?
3. Can authorities contribute to the improvement of environmental efforts in other ways than merely by permits and enforcement? Is it possible to encourage voluntary improvement?
4. Does planning and performing of inspections differ between objects, for instance small and large companies?
5. How does communication work between authorities and inspection objects? Make a short guideline on how to ensure and improve good communication.
6. What are the most common and/or important problems connected to the possibilities to carry out environmental inspections?
7. Define the meaning of “inspection quality.” How does one ensure good quality in environmental inspections?

Internet Resources

IMPEL (Implementation and Enforcement of Environmental Law)

<http://ec.europa.eu/environment/impel/>

IMPEL Best Practices Concerning Training and Qualification for Environmental Inspectors

http://ec.europa.eu/environment/impel/pdf/env_inspectors_finreport.pdf

IMPEL Minimum Criteria for Inspections

<http://ec.europa.eu/environment/impel/pdf/mincrit.pdf>

IMPEL Frequency of Inspections

<http://ec.europa.eu/environment/impel/pdf/freq.pdf>

IMPEL Operator Self-Monitoring

<http://ec.europa.eu/environment/impel/pdf/selfmon.pdf>

IMPEL Planning and Reporting of Inspections

http://ec.europa.eu/environment/impel/pdf/plan_and_report.pdf

IMPEL Reference Book for Environmental Inspection

<http://ec.europa.eu/environment/impel/pdf/refbook.pdf>

IMPEL Best Practice in Compliance Monitoring

<http://ec.europa.eu/environment/impel/pdf/compliance.pdf>

The IPPC Directive

<http://ec.europa.eu/environment/ippc/>

The IPPC Directive – Links

http://ec.europa.eu/environment/ippc/ippc_links.htm

European IPPC Bureau

<http://eippcb.jrc.es/pages/FAbout.htm>

European Union Environmental Legislation

B

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European Union Environmental Legislation

1. INTRODUCTION

1.1 Basis of European Union Legislation

The legislation of the European Union consists of documents on basically four levels. The *Treaty* of the Union functions as a constitution of a state. It is an over-all legal base for all other documents. The *Declarations* are policy documents with indicate a direction but does not have binding status. The *Programmes*, such as the EAPs, are policy documents and not binding. They have, however, considerable influence on the process of legislation since they provide principles and directions.

Finally there are the *Directives* and *Regulations*. A regulation becomes immediately enforceable as law in all member states simultaneously. The directives, the most common type of EU legislation in the field of environment, on the other hand, are implemented nationally. The general clause Art 189 EEC says that

“A directive shall be binding as to the results to be achieved upon each member state to which it is addressed, but shall leave to the national authorities to choice of form and methods.”

Directives are referred to by their official numbers, for instance 70/229/EEC. The first number refers to the year in which the directive was adopted (1970 in this case); the second

Sources for this section

The text in this section is based on the European Union Commission Directorate General for Environment website http://ec.europa.eu/environment/index_sv.htm. A review of the EU activities in the field of environment, including legislation, is found on http://europa.eu/pol/env/index_en.htm. All legally valid document (directives, regulations, etc., and their amendments) are found as pdf documents on <http://eur-lex.europa.eu/en/repert/1510.htm>. The same texts in other EU languages than English are also available on these sites.

number is a serial number. The addition EEC indicates that the directive was legally based on the EEC treaty.

The number of directives related to environmental issues is large and increasing. The European Commission develops directives with considerable input from member states and the European parliament. Once adopted by the Council of Ministers, the member states are solely responsible for the implementation of the requirements of the directive. However, there is some time before the implementation is to be complete.

Directives develop over time. New regulations are added or *amended* to them. The amendments may be published as *Decisions* or *Communications* of the Commission. If many changes were made the Directive may be *codified* by the Commission into a new text, without any policy or legal changes. They then get a new designation – year and number. As new Directives are developed to substitute older legislation, the former texts are *appealed* by the new ones, and thus not any more valid.

1.2 Development of the Directives

The first legislation dealing with an environmental issue was a Euroatom directive from 1959 and the two directives on vehicle emissions and noise from 1970 and 1972. But it was not until after the second Environmental Action Programme in 1977 that a number of directives with more far-going ambitions were adopted. These included legislation on water quality, air quality (directive on limits to SO₂ and particulates, as well as a directive on lead concentration in the air), waste handling, labelling and packaging of dangerous substances, as well as regulating discharge of dangerous substances into surface waters.

These directives were largely a static set of regulations, focusing on setting discharge and concentration limits and the absolute reduction of ambient environmental impact and level of pollution. All these concerns and areas have since been pursued in much more forceful regulations.

The first steps to create more dynamic and pro-active instruments of regulation came with the introduction of the BAT notion in relation to the cleaning of wastewater. BAT is Best Available Technology, later changed to Best Available Techniques. It was at that stage referring to dangerous or hazardous substances in wastewater before being discharged into surface waters and in a separate directive, the same regulation in relation to discharge to ground water. The Best Available (Cleaning) Technology is still used as a reference for the end-of-pipe emission limit values, as a BAT type production equipment and management is required to get an IPPC-licence.

1.3 Framework Directives

Still later even more comprehensive and far-going pieces of legislation took the form of Framework directives (Box 1). A framework directive constitutes a general frame for legislation in an area and requires a set of national decisions to define limits, and rules of adoption etc. The first framework directive was the one on water. This directive is based on a considerable amount of research and was put forward as a set of principles to protect water in the Union. It is not surprising that water protection was the first area to be developed in some detail.

Box 1 Framework Directives

Framework directives or corresponding integrating regulations of whole areas exist in the following areas:

- Integrated Pollution Prevention and Control in Industries, IPPC (Directive 96/61/EC).
- Air Quality Framework Directive (Directive 96/62/EC) on ambient air quality assessment and management.
- Water Framework Directive on integrated river basin management (Directive 2000/60/EC).
- Waste Framework Directive (Directive 2006/12/EC).
- A Regulatory framework (Regulation) for the Registration, Evaluation and Authorisation of Chemicals (REACH) from December 2006.
- A Soil Framework Directive for the protection of soil was proposed (COM(2006) 232) by the Commission in 2006.

Water, after all, flows freely from one country to the next and downstreamers may suffer very badly from sins committed by the upstreamers. International regulation is well justified. To framework directives are added daughter directives or other pieces of legislation, regulating specific issues.

1.4 Strategies and Policies

The Sixth Environment Action Programme represented a step in the direction of integrated environmental policies. One of the initiatives in the EAP was the development of thematic strategies covering seven areas, all of them prepared in 2005 and 2006. The areas are

- Air Pollution (adopted 21/09/2005)
- Prevention and Recycling of Waste (adopted 21/12/2005)
- Protection and Conservation of the Marine Environment (adopted 24/10/2005)
- Sustainable Use of Pesticides (adopted 12/07/2006)
- Soil (adopted 22/09/2006)
- Sustainable Use of Resources (adopted 21/12/2005)
- Urban Environment (adopted 11/01/2006)

The Thematic Strategies represent the next generation of environment policy. As their name suggests, they work with themes rather than with specific pollutants or economic activities, as has been the case in the past. They take a longer-term perspective in setting clear environmental objectives to around 2020 and will thus provide a stable policy framework.

Finally, they focus on identifying the most appropriate instruments to deliver European policy goals in the least burdensome and most cost-effective way possible. Legislation is one such instrument; others are economic support, research, and stakeholder agreements etc.

1.5 Incorporation into National Legislation

The directives need to be incorporated into national legislation to enter into force. This may in some cases be trivial in the sense that a country already practises laws, which conform to the directive or are more advanced than the directive. Then no action is needed. But as EU legislation develops, more and more of the directives need to be translated into national law. This should be done within a given time limit, which is part of the decision of the directive.

From this point of view the European Legislation is not relevant, only the national one. But the European environmental legislation gives a hint on what exists in the national legislation; it is a common minimum requirement. The national environmental legislation, the *Environmental Code* of the country, is what counts, but the European legislation gives a picture of what it includes.

It should be added that the development of EU legislation includes a considerable amount of stakeholder consultation, of questionnaires in which every EU citizen can take part, and of specialists reports from the countries. Legislation should thus be well prepared in Member States and is expected to be acceptable both in content and the conditions for implementation. In most cases they also have been accepted by consensus in the Council of Ministers.

In most cases the environmental directives defines minimum conditions for environmental management in an area. The Member States may use more stringent conditions.

1.6 Legal Follow-up

It is the Commission's responsibility to ensure that Community law is implemented and applied correctly by the 27 Member States of the Union. There are a number of ways in which the Commission monitors this. First of all it undertakes its own studies and assessments. Secondly the Commission investigates complaints from EU citizens, petitions from the European Parliament, and questions from Members of the European Parliament (MEPs). The Commission also scrutinize reports submitted by Member States themselves (there is an obligation to report under the environmental directives), to see if there is a violation of Community environment law.

There are three categories of *breaches* of Community law. Firstly, "non-communication" cases, where a Member State has failed to adopt and communicate to the Commission na-

Box 2 Areas of Policy and Legislation

The acts of policy and legislation are grouped in the following 17 areas listed in alphabetical order:

1. Air
2. Biotechnology
3. Chemicals
4. Civil Protection and Environmental Accidents
5. Climate Change
6. Environmental Economics
7. Enlargement and Neighbouring Countries
8. Health
9. Industry and Technology
10. International Issues
11. Land Use
12. Nature and Biodiversity
13. Noise
14. Soil
15. Sustainable Development
16. Waste
17. Water

tional legislation implementing a directive, after the deadline for implementation has passed. Secondly, there are "non-conformity" cases, where a Member State has failed to implement a directive correctly. The final category is "bad application", where a Member State is failing correctly to apply Community environment law in practice in a particular case.

The infringement procedure consists of several stages defined in Article 226 of the EC Treaty. If the Commission finds that a Member State fails to comply with EU environment law, it will issue a letter of 'formal notice' to the responsible government. The government then has two months to respond with its comments. If this response is considered inadequate the Commission will issue a so-called 'reasoned opinion'. If the Member State then fails to comply within two months, the Commission can refer the case to the European Court of Justice. If the Court finds the Member State guilty of breaching Community law it may impose a fine in the form of a lump sum or penalty payment.

The Commission publishes each year a report on the Implementation and Enforcement of Community Environmental Law, and the European Court of Justice publishes information on the leading cases and judgements of the environmental law.

1.7 Policy Areas

The EU environmental legislation includes in 2007 several hundred legal acts. Most are directed towards a special medium or sector, such as water, air, nature, waste, and chemicals. Others deal with cross-cutting issues, e.g. access to environmental information, and public participation in environmental decision-making (Box 2.)

All relevant areas will be briefly described below and the most important legal texts listed and links given. Texts are based on the EU Commission and DG Environment website. In several areas the legalisation is fairly complex and in these cases a selection has been made. The complete texts can be found in the links provided. In addition information from some integrated areas (e.g. energy) is included.

The original legally valid document (directives and their amendments) are found as pdf documents indicated with links on the website. The review of environmental legislation here is mostly based on the introductory texts available for each of the policy areas.

Link http://ec.europa.eu/environment/index_sv.htm.

1.8 Economic Instruments

As a sharp contrast to the extensive body of European Union common environmental regulations, the EU does not have a common tax policy, with the exception of EU regulations on minimum taxes for fuels. The use of economic instruments

to support the implementation of EU environmental policy is thus left to each Member State individually.

The European Environmental Agency has, in cooperation with the Organisation for Economic Co-operation and Development, OECD, established a considerable database on environmental economic policies and the use of environmental economic instruments within the EU and OECD Member States. The database allows the user to select either one or more sectors of the economy or one or more household expenditure categories. The query will then list all the instruments to which these sectors/categories have been linked.

The information is available in the following areas: Water Pollution, Air Pollution, Climate Change, Land Contamination, Waste Management, Natural Resource Management, Noise, Ozone Layer Protection, Energy Efficiency, Transport, Land Management.

Environmentally Related Taxes, Fees and Charges can be studied e.g. revenues generated, tax rates, tax ceilings and exemptions in environmentally related taxes. There are also data on Tradable Permit Systems, Deposit-Refund Systems and Environmentally Motivated Subsidies.

Link <http://www2.oecd.org/ecoinst/queries/index.htm>

1.9 The European Economic Area

EFTA, the European Free Trade Association, was created by seven, later expanded to nine, European states in 1960. Since then several of these joined the European Union. In 1992 the remaining countries – Iceland, Liechtenstein and Norway – entered into the *European Economic Area* (EEA) Agreement with EU, which entered into force in 1994.

The EEA was maintained because of the wish of the three countries to participate in the Internal Market, while not assuming the full responsibilities of EU membership. The cooperation is very close as all new Community legislation in areas covered by the EEA, which include environmental legislation, is integrated into the Agreement through an EEA Joint Committee decision, and subsequently becomes part of the national legislation of the EEA EFTA States. In addition, the three EEA EFTA States fully participate in the European Environment Agency. The EEA EFTA States are, of all the countries associated with the Union, technically the most closely linked to the EU. Thus, in effect, the EU environmental legislation applies in 30 of the European countries.

Politically, however, the fact that EU membership is not on the current agenda for any of the EEA EFTA countries distinguishes them from other close neighbours, who have EU membership as a declared objective. These include Turkey and the Balkan countries. Switzerland is unique as it stands outside almost all international cooperation.

1.10 European Neighbourhood Policy

The European Neighbourhood Policy (ENP) goes beyond existing relationships with the neighbouring countries to offer substantial technical, political and financial support in several areas including issues such as energy, transport and the environment. It is based on the Commission Communication “Wider Europe” from 2003, a Strategy Paper from 2004, and a report on implementation from 2006. ENP applies to the EU’s immediate neighbours by land or sea.

In the Baltic Sea region ENP includes Belarus and Ukraine. The ENP process is based on country reports and an action plan for each country. The ENP Action Plan for Ukraine was agreed on in early 2005. For Belarus ENP is not yet ‘activated’ since no Cooperation Agreement, which forms the base of the ENP agreement, is in force.

The relations with Russia are not part of ENP but developed through a Strategic Partnership covering four so-called ‘common spaces’. (Common economy; freedom, security and justice; external security; research, education, culture.) Environmental concerns are not included.

Up to 2006, ENP assistance was provided under geographical (TACIS for Central Europe and Russia and MEDA for the Mediterranean area), and thematic programmes such as EIDHR (European Initiative for Democracy and Human Rights). From 2007 these have been replaced by the European Neighbourhood and Partnership Instrument (ENPI), designed to target sustainable development and approximation to EU policies and standards. For 2007-2013 the ENPI budget is approximately 12 billion euros. The ENPI cross-border cooperation (CBC) programme, which supports activities across the EU’s external borders in the East and the South, is funded with 1.18 billion euros for the period 2007-2013.

Link http://ec.europa.eu/world/enp/index_en.htm

1.11 Global Cooperation

Most environmental problems are transboundary, often global, and can only be addressed effectively through international cooperation. For this reason, the EC Treaty establishes that one of the key objectives of Community policy on the environment is to promote measures at international level to deal with regional or worldwide environmental problems. The Union is also part of a number of international bodies in which it plays an import role, as it represents a considerable group of countries. It is in these many of the international conventions and other agreements are worked out. The most important include the United Nations with its institutions such as the Commission on Sustainable Development, and United Nations Environment Programme (UNEP), the Organisation for Economic Cooperation and Development (OECD) and the G8 group.

Box 3 International Environmental Agreements

International environmental agreements to which the EU is a Party or a Signatory listed according to theme

Geneva Convention on Long-range Transboundary Air Pollution, CLRTAP (1979)

Convention on Biological Diversity, CBD (1992) and the Cartagena Biosafety Protocol (2000)
Rotterdam Convention on Prior Informed Consent on hazardous chemicals, PIC (1998)

Stockholm Convention on Persistent Organic Pollutants, POP (2001)
Helsinki Convention on Industrial Accidents (1992)

Barcelona Convention to reduce pollution in the Mediterranean Sea (1976)
Helsinki Convention on the protection of the marine environment of the Baltic Sea (1992)
OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic (1992)
Bonn Agreement on cooperation for combating pollution in the North Sea Area (1983)
Lisbon Agreement on the Protection of the Coasts and the North-East Atlantic against Pollution (1990)

United Nations framework Convention on Climate Change, UNFCCC (1992) and the Kyoto protocol (1997)

Vienna Convention for the Protection of the Ozone Layer (1985) and the Montreal protocol (1987)

Aarhus Convention (1998) on access to environmental information
Espoo Convention on Environmental Impact Assessment (1991)

Alpine Convention (1991)
Bonn Convention on the Conservation of Migratory Species, CMS (1979)
Bern Convention on European Wildlife and Habitats (1979)

Convention on the Conservation of the marine fauna and flora of the Antarctic (1980)

United Nations Convention to Combat Desertification, UNCCD (1994)

Basel Convention on hazardous wastes (1989)

Helsinki Convention on Watercourses and International Lakes (1992)
River basin conventions (Danube (1987), Elbe (1990), Oder (1996), Rhine (1999))

The European Community participate in international environmental agreements, together with its Member States. The 6th EAP of the EU is asking for “swift ratification, effective compliance and enforcement of all international conventions and agreements relating to the environment where the Community is a Party”. The Union has also already ratified many International Environmental Agreements both on a global level (multilateral conventions negotiated under the auspices of the UN), regional level (e.g. in the context of UN/ECE or the Council of Europe), and sub-regional level (for instance for the management of seas or transboundary rivers).

The matters addressed by these agreements are very wide, and include among other the following areas: biodiversity and nature protection, climate change, protection of the ozone layer, desertification, management of chemicals and waste, transboundary water and air pollution, environmental governance (including impact assessments, access to information and public participation), industrial accidents, maritime and river protection, and environmental liability (Box 3).

The Union has an important role in the follow-up of several international conference in the field of environment and sustainable development, including the Rio (UNCED) and Johannesburg (WSSD) conferences. The Johannesburg Plan of Implementation (JPol) and the Political Declaration adopted in Johannesburg, together with the Doha Development Agenda (Trade) and the Monterrey consensus (Financing for Development), have shaped a global partnership for sustainable development. This partnership includes commitments to increased development assistance and market access for developing countries, good governance and a better protection of the environment.

2. AIR

2.1 Clean Air for Europe

Air pollution has been one of Europe’s main political concerns since the late 1970’s. European Union policy included the control of emissions from stationary sources, in particular large power plants and other installations in the energy sector, but also mobile sources, e.g. through requests on fuel quality.

Air quality trends in the Community are overall encouraging. Since the 1970’s the air pollution in Europe has decreased by some 80%. Still the Sixth Environmental Action Programme includes air pollution as one of the issues under Environment and Health, where new efforts are considered necessary. The objective is to “achieve levels of air quality that do not give rise to unacceptable impacts on, and risks to, human health and the environment”.

EU work to reduce air pollution includes EC legislation, international agreements to reduce cross-border pollution, sectors responsible for air pollution, national, regional authorities and NGOs, and research. The focus is implementation of air quality standards and coherency of all air legislation and related policy initiatives. Data on pollutants and their effects on health are provided by the Air Quality Guidelines of the World Health Organisation (WHO) and from the European Environmental Agency.

In order to integrate the work of the Union on combating air pollutions the Commission launched in March 2001 the CAFE Programme (Communication COM(2001)245). CAFE which is short for “Clean Air for Europe” is a programme of technical analysis and policy development underpinning the Thematic Strategy on Air Pollution. CAFE aims to develop long-term, strategic and integrated policy advice to protect against significant negative effects of air pollution on human health and the environment. The implementation of the Thematic Strategy started in September 2005. The Council adopted unanimously the Council Conclusions on the Thematic Strategy in March 2006.

The member states are requested to report on air quality data, as regulated in Council Decision 97/101/EC. It establishes a reciprocal exchange of information and data from networks and individual stations measuring ambient air pollution within the Member States. This *EoI Decision* describes the procedures for the dissemination of air quality monitoring information to the Commission and to the public.

Link <http://ec.europa.eu/environment/air/>

Link <http://ec.europa.eu/environment/air/cafe/index.htm>

2.2 The Convention on Long Range Transboundary Air Pollution

The United Nations Economic Commission for Europe, UNECE, introduced in 1979 the Convention on Long Range Transboundary Air Pollution, to which EU is a partner. To the Convention has been added a total of 8 protocols, in particular a protocol on sulphur in 1985, on nitrogen oxides in 1988, on VOC, Volatile Organic Compounds in 1991, a second sulphur protocol in 1994, and a protocol on heavy metals and one on POPs in 1998. The development of the Convention continues with protocols on integration and multiple effects of pollutants.

The Convention has been successful as far as air pollution in Europe has decreased considerably over the period of its existence. The Convention management includes the EMEP programme for monitoring and evaluation with a Data Centre for systematic reports and studies of the effects. There is also a considerable cooperation with IIASA in these matters.

Link <http://www.unece.org/env/lrtap/>

2.3 The Air Quality Framework Directive and its Daughter Directives

The Council Directive 96/62/EC on ambient air quality assessment and management is commonly referred to as the *Air Quality Framework Directive*. It describes the basic principles as to how air quality should be assessed and managed in the Member States. It lists the pollutants for which air quality standards and objectives have been and will be developed and specified in legislation.

Council Directive 1999/30/EC specifies limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air. The directive is the so-called *First Daughter Directive*. The directive describes the numerical limits and thresholds required to assess and manage air quality for the pollutants mentioned. It addresses both PM₁₀ and PM_{2.5} but only establishes monitoring requirements, no limit values, for fine particles.

Directive 2000/69/EC, the *Second Daughter Directive*, specifies limit values and numerical criteria relating to the assessment and management of benzene and carbon monoxide in ambient air.

Directive 2002/3/EC, the *Third Daughter Directive*, established target values and long term objectives for the concentration of ozone in air. Ozone is a secondary pollutant formed in the atmosphere by the chemical reaction of hydrocarbons and nitrogen oxides in the presence of sunlight. The directive therefore also describes certain monitoring requirements relating to volatile organic compounds and nitrogen oxides in air.

Directive 2004/107/EC, the *Fourth Daughter Directive*, completes the list of pollutants initially described in the Framework Directive, with arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. Target values for all pollutants except mercury are defined for the listed substances. For PAHs, the target is defined in terms of concentration of benzo(a)pyrene, which is used as a marker substance. Monitoring requirements are specified only for mercury.

The Commission adopted a proposal for a directive on ambient air quality at the same time as it adopted the thematic strategy on air pollution. This new proposal includes the following key elements:

- that most of existing legislation, except for the fourth daughter directive, be merged into a single directive with no change to existing air quality objectives
- new air quality objectives and monitoring requirements for PM_{2.5} (fine particles)
- the possibility to discount natural sources of pollution when assessing compliance against limit values
- absolute time extensions of up to five years for compliance with the dates of entry into force of existing limit values.

The directive proposal is subject to the co-decision procedure and will only enter into force once adopted by both the Council of Ministers and the European Parliament.

Link http://ec.europa.eu/environment/air/existing_leg.htm

2.4 Air Quality Standards

The European Union has developed an extensive body of legislation which establishes health based standards and objectives for a number of pollutants in air. These standards and objectives are summarised in a table (see link). They apply over differing periods of time because the observed health impacts associated with the various pollutants occur over different exposure times. A limit value is legally binding. A target value is to be attained as far as possible by the given attainment date and is less strict than a limit value.

The legislation requires that the Member States divide their territory into a number of zones and agglomerations in which they should undertake assessments of air pollution levels using measurements and modelling and other empirical techniques. Where levels are elevated, an air quality plan or programme should be prepared to ensure compliance with the limit value before the date when the limit value formally enters into force. Information on air quality should be disseminated to the public. Link <http://ec.europa.eu/environment/air/quality.htm>

2.5 Emissions from Traffic on Road, Sea and Air

The EU transport system is currently not sustainable, and in many respects moving away from sustainability rather than towards it. The European Environment Agency has highlighted the sector's growing CO₂ emissions that threaten the EU meeting its target under the Kyoto protocol. It also pointed to the large proportion of the population that is exposed to air pollution and other environmental impacts from transport, even if emissions are measurably falling (even though traffic volumes continue to rise). A number of pieces of legislation have been developed to control air pollution from vehicles.

Motor vehicle emissions are regulated by Directive 70/220/EEC (light vehicles) and 88/77/EC (heavy vehicles) with amendments. By the Auto-Oil Programme stricter limit values for carbon monoxide (CO), Volatile Organic Compounds (VOC), nitrogen oxides (NO_x) and particles will be implemented for light (Directive 98/69/EC) and heavy duty (Directive 1999/96/EC) vehicles. By the Auto-Oil Programme the manufacturers are responsible for the emissions from light vehicles during five years or 80,000 km, whichever occurs first. A similar legislation is on its way for heavy-duty vehicles.

In January 2007 the European Commission proposed new standards for transport fuels that will ask suppliers to reduce the greenhouse gas emissions caused by the production, trans-

port and use of their fuels by 10% between 2011 and 2020. This will cut emissions by a cumulative total of 500 million tonnes of carbon dioxide by 2020.

Directive 98/70, as amended by Directive 2003/17/EC, contains the environmental fuel quality specifications for petrol and diesel fuels in the Community with the main focus on sulphur and, for petrol, on lead and aromatics. Since 1 January 2005 the limit on the sulphur content of petrol and diesel is 50 ppm and Member States are required to start phasing in ultra-low sulphur fuel with a maximum 10 ppm sulphur content. Since 1 January 2002 all petrol sold in the EU is unleaded. A new petrol blend will be established allowing higher content of the biofuel ethanol; sulphur levels in diesel and gasoil will be cut to reduce emissions of dangerous dust particles.

Ships are fast becoming the biggest source of air pollution in the EU. In 2000 EU-flagged ships emitted almost 200 million tonnes of carbon dioxide. This is significantly more than emissions from EU aviation. In November 2002, the European Commission adopted a European Union strategy to reduce atmospheric emissions from seagoing ships. The strategy sets out a number of actions to reduce the contribution of shipping to acidification, ground-level ozone, eutrophication, health, climate change and ozone depletion. Air pollutant emissions from ships are also covered by Annex VI of the Marine Pollution Convention, MARPOL 73/78, of the International Maritime Organization with provisions on sulphur and nitrogen oxide emissions standards for ships' engines.

Engines in non-road mobile machinery, such as engines in excavators, bulldozers, front loaders, etc. are regulated by Directive 97/68/EC.

Link <http://ec.europa.eu/environment/air/transport.htm>

2.6 Emissions from Industrial Sources – Large Combustion Power Plants

Control of emissions from large combustion plants – those with a rated thermal input equal to or greater than 50 MW – plays an important role in the Community's efforts to combat acidification, eutrophication and ground-level ozone. Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants, the *LCP Directive*, entered into force in November 2001. It repealed the old Directive on large combustion plants (Directive 88/609/EEC) and tightened the Community requirements for air pollution control from new combustion plants in line with the substantial technical progress in the area.

The LCP Directive encourages the combined generation of heat and power and sets specific emission limit values for the use of biomass as fuel. It also includes gas turbines in its scope in order to regulate NO_x emissions. In particular, the LCP Di-

rective requests that plants licensed after November 2002 will have to comply with the emission limit values for SO₂, NO_x and dust, and that plants licensed after July 1987 and before November 2002, will have to comply with certain of these emission limit values. The LCP Directive also requires significant emission reductions from "existing plants" (licensed before 1 July 1987) to be achieved by January 2008.

A national emission reduction plan, whether used alone or as part of a combined approach, must address all the three pollutants covered by the Directive for all the plants covered by the plan. The plants covered by the LCP Directive are also covered by the Integrated Pollution Prevention and Control (IPPC) Directive. In this respect, the LCP Directive only sets minimum obligations, which are not necessarily sufficient to comply with the IPPC Directive.

Link <http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2001/L/02001L0080-20011127-en.pdf>

3. CHEMICALS

3.1 The Dilemma of Chemicals Control

The need to protect the environment by creating common standards for products, amongst them dangerous chemicals, was recognized early. But the systems introduced have not been sufficient to deal with the problems. There is still no legal instrument to ensure the safe use of the most substances. Today there are more than 100,000 substances used in the Union; most of them have not been tested for toxicity. If there is a suspected damage caused by a chemical the burden of proof is not on the industry, which have used or produced the chemical, but the victim or on the public authorities.

Many pieces of Community legislation have been adopted to handle chemicals. These include Regulations on Pesticides; Worker Protection; Prevention of Chemical Accidents and Reduction of Industrial Emissions e.g. Volatile Organic Compounds and Mercury. In addition, work is progressing in particular on Endocrine Disrupting Chemicals and on Dioxins.

3.2 The REACH Regulation

The Commission proposed a new EU regulatory framework for the *Registration, Evaluation and Authorisation of Chemicals (REACH)* in October 2003. REACH is based on the idea that industry itself is best placed to ensure, that the chemicals it manufactures and puts on the market do not adversely affect human health or the environment. This requires that industry has knowledge of the properties of its substances and manages potential risks. Authorities should focus their resources on ensuring that industry is meeting its obligations and taking action when needed.

REACH will create a single system for both what are currently described as "existing" and "new" substances, and for all of them ensure registration, evaluation and authorisation. *Registration* requires manufacturers and importers to obtain relevant information on their substances and to use that data to manage them safely. To reduce testing on vertebrate animals, *data sharing* is required for studies on such animals. For other tests, data sharing is required on request. Better *information* on hazards and risks and how to manage them will be passed down and up the supply chain. *Downstream users* are brought into the system.

Evaluation is undertaken by the forthcoming European Chemicals Agency to evaluate testing proposals made by industry or to check compliance with the registration requirements. The Agency will also co-ordinate substance evaluation by the authorities to investigate chemicals with perceived risks. Substances will be made subject to *authorisation*. Applicants will have to demonstrate that risks associated with uses of substances are adequately controlled or that the socio-economic benefits of their use outweigh the risks. Applicants must also analyse whether there are safer suitable alternative substances or technologies, and if there are, they must prepare substitution plans, or provide information on research and development activities. The *restrictions* provide a procedure to regulate that the manufacture, placing on the market or use of certain dangerous substances shall be either subject to conditions or prohibited. Thus, restrictions act as a safety net to manage Community wide risks that are otherwise not adequately controlled.

The European Chemicals Agency (ECHA), which will manage the technical, scientific and administrative aspects of the REACH system at the Community level, will create a *classification and labelling inventory* of substances will help promote agreement within industry on their classification.

Link <http://ec.europa.eu/environment/chemicals/index.htm>

3.3 Scope of REACH

The REACH Regulation, was formally adopted on 18 December 2006. It will eventually replace a number of legal documents, such as the Directive on the Classification, Packaging and Labelling of Dangerous Substances, and on the Evaluation and Control of the Risks of Existing Substances; and the Directive on Restrictions, Marketing and Use of certain Dangerous Substances.

REACH covers all substances whether manufactured, imported, used as intermediates or placed on the market, either on their own, in preparations or in articles, unless they are radioactive, subject to customs supervision, or are non-isolated intermediates. Waste is specifically exempted. Food is not subject to REACH as it is not a substance, preparation or article.

Other substances are exempted where other equivalent legislation applies.

There is a general obligation for manufacturers and importers of substances to submit a registration to the Agency for each substance manufactured or imported in quantities of 1 tonne or above per year. Manufacturers and importers of substances will need to obtain information on the substances they manufacture or import, and use this information to assess the risks arising from the uses, and to ensure that the risks which the substances may present are properly managed. Registration requires manufacturers and importers to submit a technical dossier, for substances in quantities of 1 tonne or more, and a chemical safety report for substances in quantities of 10 tonnes or more.

To find out the *properties of the substances* new tests are only required when it is not possible to provide the information in any other permitted way. Where new tests are carried out there are general provisions on the generation of information to ensure the quality of toxicological and eco-toxicological tests and analyses. A defined set of information is asked for persistent, bioaccumulative and toxic (PBT) or very persistent and very bioaccumulative (vPvB) substances or substances that are potentially dangerous to health or the environment. A *chemical safety report* (CSR) is requested for substances manufactured or imported in quantities starting at 10 tonnes. The CSR must include an exposure scenario on the appropriate risk management measures and operational conditions that ensure that the risks from the uses of the substance are adequately controlled. For intermediates, that is substances that are used in the manufacturing process, but are consumed or transformed into another substance, special rules apply.

Link http://ec.europa.eu/environment/chemicals/reach/reach_in_brief04_09_15.pdf

3.4 The Implementation of REACH

REACH entered into force on 1 June 2007. After that, there will be an additional year before the main REACH procedures start to apply in order to allow the new European Chemicals Agency to be established in Helsinki, Finland, to become fully operational. Then the industry will start to submit pre-registration dossiers for existing substances and registration dossiers for new substances.

To facilitate the transition to the REACH system, the registration provisions will be applied in a step-wise fashion. A series of registration deadlines are established for the different tonnage ranges, although certain substances of high environmental concern will need to be registered early. About 30,000 phase-in substances (excluding intermediates) are expected to be registered over the first 11 years after the entry into force of REACH, plus a number of “non-phase-in” substances. For the

registration of substances in articles (e.g. manufactured goods such as cars, textiles, electronic chips), a special regime applies. REACH requires all substances that are intended to be released from articles during normal and reasonably foreseeable conditions of use to be registered according to the normal rules, including tonnage, deadlines and information requirements, if those substances are present in the articles above 1 tonne per year. As a safety net, the Agency can require a registration of a substance in an article at any time when it considers that its release poses a risk to human health or the environment.

To enable a smooth transition from the existing chemicals legislation to REACH, the Commission has developed an interim strategy. The main purpose of this interim strategy is to ensure that all stakeholders, especially industry and public authorities, are adequately prepared for the practical application of the new system by the time REACH enters into force.

Link http://ec.europa.eu/environment/chemicals/reach/reach_in_brief04_09_15.pdf

3.5 The Directives on Existing Substances, EINECS and ELINCS

In the 1960's the national provisions on chemicals differed widely and thus hindered the trade of the European Community. In addition, it was recognised that there was a need to ensure the protection of public health, in particular the health of workers handling dangerous substances. Directive 67/548/EEC in 1967 approximated the national provisions relating to dangerous substances. The Directive introduced common provisions on the classification, packaging and labelling of dangerous substances. Since its adoption in 1967, the Directive has constantly been updated in order to take into account scientific and technical progress to make sure a high level of protection of man and the environment, as well as the correct functioning of the internal market is guaranteed.

The 6th amendment of the Directive in 1979 introduced a notification system for “new” substances. In consequence it required the establishment of the list of “existing” substances, called EINECS. EINECS is the European Inventory of Existing Commercial Chemical Substances and lists all substances that were reported to be on the market on or before 18 September 1981. EINECS is listing about 100,000 existing substances – counting for about 99% of the chemicals' volume on the market. The substances placed on the market for the first time after this target date are considered “new” and are added to ELINCS. ELINCS is European List of Notified Chemical Substances. New substances are required to be tested and notified before marketing in volumes above 10 kg.

The core of the EU's 'Existing Substances Program' is to ensure better management of risks of existing substances to

man and the environment. Hence, risk assessment reports and risk reduction strategies create the necessary basis for the implementation of risk reduction measures. The 7th amendment of the Directive in 1992 required a risk assessment for “new” substances. It further introduced the “sole representative” in the notification system, and added the Safety Data Sheet as a hazard communication facility for the professional user.

The notification system of ‘new substances’ will be substituted by REACH. The classification and labelling system of the Directive 67/548/EEC will be substituted by the implementation of the *Globally Harmonised System* (GHS), the global measure corresponding to REACH.

Links http://ec.europa.eu/environment/dansub/home_en.htm
http://ec.europa.eu/environment/chemicals/exist_subst/index.htm

3.6 Plant Protection Products and Biocides

Pesticides are chemical products that are used to destroy or otherwise control pests and other harmful organisms. There are significant economic and other benefits related to the use of pesticides, but they also cause concern for human health and the environment.

Pesticides contain one or more biologically active substances that have the controlling effect on the unwanted organisms. Unfortunately, these substances are often also harmful to non-target organisms. Therefore, in many countries, pesticides have been subject to strict control for long time already. Specific assessment and approval schemes have been established to prevent unacceptable effects on human health and the environment and to ensure that products are effective and suitable for their purpose.

In Community legislation, pesticides have been divided into two major groups, plant protection products and biocidal products. Products belonging to these groups need to be assessed and authorised before they can be placed on the market. In addition, certain pesticides are subject to prohibitions or restrictions and regulations concerning control of international trade. As many pesticides are deliberately released to the environment, they are also a source of surface and ground water pollution. Therefore they are subjects of water legislation as well. All in all, the sustainable use of pesticides is an issue recognised to be of major importance in the Sixth Environment Action Program.

Links <http://ecb.jrc.it/biocides/>

<http://ec.europa.eu/environment/chemicals/preparing/interim.htm>

3.7 POPs – Persistent Organic Pollutants

Persistent organic pollutants (POPs) are chemical substances that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment. This group of priority pollut-

ants consists of pesticides (such as DDT), industrial chemicals (such as polychlorinated biphenyls, PCBs) and unintentional by-products of industrial processes (such as dioxins and furans). Persistent Organic Pollutants are transported across international boundaries far from their sources, even to regions where they have never been used or produced. Consequently, persistent organic pollutants pose a threat to the environment and to human health all over the globe.

Two international legally binding instruments control POPs. The Protocol on POPs to the UNECE Convention on Long-Range Transboundary Air Pollution (CLRTAP), which entered into force in 2003, and the global Stockholm Convention on POPs, which entered into force in 2004. These instruments establish strict international regimes for 16 POPs in the UNECE Protocol and 12 POPs in the Stockholm Convention. Both instruments also contain provisions for including additional chemicals into these lists.

The European Community has signed both international instruments on POPs, together with the then 15 Member States, and they are now included in Regulation (EC) No 850/2004 on persistent organic pollutants. They lay down the following control measures: Prohibition or severe restriction of the production and use of intentionally produced POPs. Restrictions on export and import of the intentionally produced POPs (Stockholm Convention). Provisions on the safe handling of stockpiles (Stockholm Convention). Provisions on the environmentally sound disposal of wastes containing POPs. Provisions on the reduction of emissions of unintentionally produced POPs (e.g. dioxins and furans).

The new Regulation complements the earlier Community legislation on POPs and aligns it with the provisions of the international agreements on POPs. The European Community Implementation Plan to the Stockholm Convention, which complements the national plans of the EU Member States, was adopted on 9 March 2007.

Link http://ec.europa.eu/environment/pops/index_en.htm

3.8 Directives on Chemical Accidents (Seveso II)

The “Seveso” accident happened in 1976 at a chemical plant in Seveso, Italy, manufacturing pesticides and herbicides. A dense vapour cloud containing tetrachlorodibenzoparadioxin (TCDD), commonly known as dioxin, was released from a reactor, used for the production of trichlorofenol. Although no immediate fatalities were reported, kilogramme quantities of the substance lethal to man even in microgramme doses were widely dispersed which resulted in an immediate contamination of some ten square miles of land and vegetation. More than 600 people had to be evacuated from their homes and as many as 2000 were treated for dioxin poisoning.

In 1982, *Council Directive 82/501/EEC on the major-accident hazards of certain industrial activities* – so-called Seveso Directive – was adopted. In the light of severe accidents at the Union Carbide factory at Bhopal, India in 1984 where a leak of methyl isocyanate caused more than 2,500 deaths and at the Sandoz warehouse in Basel, Switzerland in 1986 where fire-fighting water contaminated with mercury, organophosphate pesticides and other chemicals caused massive pollution of the Rhine and the death of half a million fish, the Seveso Directive was amended twice, in 1987 by *Directive 87/216/EEC* and in 1988 by *Directive 88/610/EE*. Both amendments aimed at broadening the scope of the Directive, in particular to include the storage of dangerous substances.

In 1996, *Council Directive 96/82/EC on the control of major-accident hazards* – so-called Seveso II Directive – was adopted. The Seveso II Directive has fully replaced its predecessor, the original Seveso Directive. Important changes include a revision and extension of the scope, the introduction of new requirements relating to safety management systems, emergency planning and land-use planning and a reinforcement of the provisions on inspections to be carried out by Member States.

In the light of recent industrial accidents (Toulouse, Baia Mare and Enschede) and studies on carcinogens and substances dangerous for the environment, the Seveso II Directive 96/82/EC was extended by the Directive 2003/105/EC. The most important extensions of the scope of that Directive are to cover risks arising from storage and processing activities in mining, from pyrotechnic and explosive substances and from the storage of ammonium nitrate and ammonium nitrate based fertilizers.

Link <http://ec.europa.eu/environment/seveso/index.htm>

3.9 Large Oil Spills at Sea

Europe is the world's largest market in crude oil imports, representing about one third of the world total. Ninety percent of oil and refined products are transported to and from Europe by sea. Accidents resulting in massive spill, such as "Prestige" or "Erika", provide gripping illustrations of the problem of vessel pollution. Large oil spills at sea constitute a threat to the environment, placing enormous demands on the national authorities responsible for response and clean-up operations.

Besides accidental pollution, caused by ships in distress, there are three types of routine ship operations, which pollute the sea: ballast water, tank washings and engine room effluent discharges. Due to these operations large amounts of oil are pumped deliberately from ships every day, along almost the entire coastline of Europe. This is the greatest source of marine pollution by ships, and the one that poses an insidious long-term threat to the marine and coastal environment.

At present, the legal basis of Community action is found in Decision 2850 of 20/12/2000 on a framework for cooperation in the field of accidental or deliberate marine pollution with the aim to support and supplement Member States' efforts. Council Decision of 23 October 2001, which established a mechanism for reinforced cooperation in civil protection assistance interventions covering both civil protection and marine pollution, has had a significant impact. At the same time the European Maritime Safety Agency (EMSA) has increased its role. In December 2006 the Commission issued a Communication (2006/0863) on the current preparedness and response of Community to marine pollution, indicating how to continue and promote this field from 2007 and on.

Link http://ec.europa.eu/environment/civil/marin/mp02_en_legislation.htm

4. ENERGY

4.1 Energy and Environment

All energy production and consumption has environmental impacts. Energy related emissions contribute to pollution of air, water and soil while also posing risks to human health, nature and biodiversity. EU sustainable energy policies aim to reduce these threats, while ensuring the security of supply and the competitiveness of the EU industries.

The EU has made a commitment to integrate environmental concerns into all relevant policy areas, including energy. This work is an ongoing process requiring efforts in a number of areas including setting ambitious targets for increasing *energy efficiency* and share of *renewable energies* in overall energy mix and for alternative fuels, as well as ensuring the internal energy market by separating energy production from distribution.

Comparison of the energy related effects on environment and human health from different energy sources is often not straightforward and energy modelling is thus needed to guide the policy decisions in selection of the relevant policy measures and the choice between different energy sources.

Climate change is currently the most serious threat to the natural environment and human health with potentially devastating economic costs to the societies worldwide. Since 80% of the greenhouse gases originate from heat and power production as well as from transport, one of the main energy-related policy drivers in the EU is the reduction of greenhouse gases (GHG) at their sources. This is pursued in the *European Climate Change Programme* (ECCP), the greenhouse gas trading *Emissions Trading Scheme* (ETS), limiting air pollution through *National Emission Ceilings* (NEC) directive, and developing common rules for *Carbon Capture and Storage* (CCS).

The 2007 Spring European Council adopted an energy policy for Europe, aiming at saving energy and promoting climate-friendly energy sources. EU leaders set a firm target of cutting 20% of the EU's greenhouse gas emissions by 2020 – the EU will be willing to put this goal up to 30% if the US, China and India make similar commitments. EU leaders also set a binding overall goal of 20% for renewable energy sources by 2020, compared to the present 6,5%. A binding minimum target of 10% for the share of biofuels in overall transport petrol and diesel consumption by 2020 was also set.

With the exception of carbon dioxide trading, legislation in this area is rather weak and development is rather promoted through policy actions and support programmes. Below existing and planned legislation will be described in the context of the European energy policy.

4.2 Energy Efficiency

The European Community, together with its Member States, is working intensively to improve energy efficiency in all sectors whilst at the same time increasing the use of renewable energies. This can be a key issue to solve environmental, self-sufficiency and cost problems and adequately provide for increasing energy demand without major upheavals. Improved energy efficiency will play a key role in meeting the EU Kyoto target in an economic way.

The Green Paper on Energy Efficiency points to the fact that the EU could save at least 20% of its present energy consumption in a cost-effective manner, equivalent to 60 billion euros per year, or the present combined energy consumption of Germany and Finland. Energy saving is without doubt the quickest, most effective and most cost-effective manner for reducing greenhouse gas emissions, as well as improving air quality, in particular in densely populated areas.

In order to support better integration of energy efficiency measures into national legislation the European Commission has proposed several directives, which have been adopted and are now in force. These concern broad areas where there is significant potential for energy savings. They are:

- End-use Efficiency & Energy Services
- Energy Efficiency in Buildings
- Eco-design of Energy-Using Products
- Energy Labelling of Domestic Appliances
- Combined Heat and Power

A number of voluntary instruments were also adopted to foster better cooperation with industry. The European Parliament and the Council has proposed a Directive to promote energy end-use efficiency and energy services. The directive will establish targets, incentives and the institutional, financial

and legal frameworks needed to eliminate barriers and imperfections in markets for energy services and for providing energy-saving programmes. The proposed directive includes an annual target to save 1% of the quantity of energy supplied and/or sold to the end customers.

The proposal is related to Council Directive 93/76/EEC on limiting carbon dioxide emissions by improving energy efficiency (SAVE). The Communication from the Commission – Energy efficiency in the European Community – Towards a strategy for the rational use of energy is of interest.
Link <http://europa.eu/scadplus/leg/en/s14000.htm>

4.3 Energy Performance of Buildings

Energy consumption for buildings-related services accounts for approximately one third of total EU energy consumption. The *Directive 2002/91/EC on the energy performance of buildings* is a follow-up to the measures on boilers (92/42/EEC), construction products (89/106/EEC) and SAVE programme provisions on buildings. The earlier directive on the energy certification of buildings (Directive 93/76/EEC repealed by Directive 2006/23/32/EC) does not have the same objectives as Directive 2002/91/EC, which propose actions to fill any existing gaps.

Directive 2002/91/EC concerns the residential sector and the tertiary sector (offices, public buildings, etc.). It covers all aspects of energy efficiency in buildings in an attempt to establish a truly integrated approach, while the scope of the provisions on certification does not include some buildings, such as historic buildings, industrial sites, etc.

The four main aspects of the proposed general framework are:

1. a common methodology for calculating the integrated energy performance of buildings;
2. minimum standards on the energy performance of new buildings and existing buildings that are subject to major renovation;
3. systems for the energy certification of new and existing buildings and, for public buildings, prominent display of this certification and other relevant information. Certificates must be less than five years old;
4. regular inspection of boilers and central air-conditioning systems in buildings and in addition an assessment of heating installations in which the boilers are more than 15 years old.

The Member States are responsible for drawing up the minimum standards. They will also ensure that the certification and inspection of buildings are carried out by qualified and independent personnel.

Related regulations are Directive 2006/32/EC on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC, Directive 2005/32/EC establishing a framework for the setting of eco-design requirements for energy-using products and amending Council Directive 92/42/EEC, and Directives 96/57/EC and 2000/55/EC.

Link http://ec.europa.eu/energy/demand/legislation/buildings_en.htm

4.4 Cogeneration

Cogeneration is a technique allowing the production of heat and electricity in a single process. There is considerable unexploited potential for cogeneration in the Member States. Moreover cogeneration reduces losses on the electrical grid because cogeneration installations are usually closer to the consumption point.

Electricity/heat cogeneration installations can achieve energy efficiency levels of around 90%. Electricity production from cogeneration accounted for 11% of total electricity production in the EU in 1998. With an increase to 18%, the energy savings could be 3-4% of total gross consumption in the EU. The development of cogeneration could avoid the emission of 127 million tonnes of CO₂ in the EU in 2010 and 258 million tonnes in 2020.

Directive 2004/8/EC on the promotion of cogeneration is based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC. The purpose of the Directive is to facilitate the installation and operation of electrical cogeneration plants. A forthcoming legislative framework on cogeneration should overcome the major obstacles of inadequate control of longstanding monopolies, inadequate support from regional and local authorities, incomplete liberalisation, regulatory obstacles having a negative effect, and lack of European standards for network connection.

There are already examples of regulatory developments in some Member States, such as Belgium (green certificates and cogeneration quotas), Spain (new decree on the sale of cogeneration electricity) or Germany (new law on cogeneration).

Related regulations are Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market and Directive 92/42/EEC on efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels.

Link http://ec.europa.eu/energy/demand/legislation/heat_power_en.htm

5. CLIMATE CHANGE

5.1 EC and the United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC), approved by the Union as Council Decision 94/69/EC, has the long-term objective to prevent dangerous anthropogenic interference with the climate system. Its Kyoto Protocol, signed in New York on 29 April 1998, requires the EC (consisting of the 15 Member States of before May 2004) to reduce greenhouse gas (GHG) emissions by 8% below 1990 levels by 2008-2012. Most of the 10 new Member States have the same target. The target for Hungary and Poland is -6% while Cyprus and Malta are no Annex-I Parties to the UNFCCC and thus have no targets.

The convention commits the Community and its Member States to develop, periodically update, publish and report to the Conference of the Parties national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol on ozone-depleting substances. Therefore, it is appropriate for the European Commission to provide for effective cooperation and coordination in relation to the preparation of reports, as well as review and compliance procedures obligations under the Kyoto Protocol, as agreed at the seventh Conference of the Parties to the UNFCCC in Marrakech (the Marrakech Accords). The European Environment Agency assists the Commission with monitoring activities, especially in the scope of the Community inventory system, and in the analysis by the Commission of progress towards the fulfilment of the commitments.

Link <http://ec.europa.eu/environment/climat/gge.htm>

5.2 European Climate Change Programme (ECCP)

Action by both Member States and the European Community needs to be reinforced if the EU is to succeed in cutting its greenhouse gas emissions to 8% below 1990 levels by 2008-2012, as required by the Kyoto protocol.

For this reason the Commission launched in June 2000 the European Climate Change Programme (ECCP). The goal of the ECCP is to identify and develop all the necessary elements of an EU strategy to implement the Kyoto Protocol. The development of the first ECCP involved all the relevant groups of stakeholders working together, including representatives from the Commission's different departments (DGs), the Member States, industry and environmental groups. The second European Climate Change Programme (ECCP II) was launched in October 2005.

Energy and transport play a large part in climate change since they are the leading sources of greenhouse gas emis-

sions; this is why energy policy is particularly important in the European Union's sustainable development strategy. The EU is increasingly dependent on energy imported from third countries, creating economic, social, political and other risks for the Union. The EU therefore wishes to reduce its dependence and improve its security of supply by promoting other energy sources and cutting demand for energy. Consequently, it is putting the accent, above all, on improving energy efficiency and promoting renewable energy sources.

The ECCP I showed many differences of implementation in the Member States. It also indicated that the existing database is, as yet, not detailed enough to fully assess the impacts of individual policies and measures on greenhouse gas emissions in a thorough quantitative manner. The Commission is therefore planning some further methodological work to start in 2007. It further began in June 2006 a study which focuses on the sectoral emission reduction potentials and economic costs for climate change. The main objective is to identify the least-cost contribution of different sectors and gases for meeting post-2012 EU-25 quantitative reduction objectives for all greenhouse gases, and to determine a package of cost-effective policies and measures for all sectors and gases towards meeting these objectives. This study will serve as the basis for evaluation of new policies and measures especially to meet post-2012 targets.

Link <http://ec.europa.eu/environment/climat/eccp.htm>

5.3 EU Emissions Trading Scheme (ETS)

In January 2005 the European Union Greenhouse Gas Emission Trading Scheme (EU ETS) commenced operation as the largest multi-country, multi-sector Greenhouse Gas emission trading scheme world-wide. The scheme is based on Directive 2003/87/EC, which entered into force on 25 October 2003.

Allowances traded in the EU ETS will not be printed but held in accounts in electronic registries set up by Member States. All of these registries will be overseen by a Central Administrator at EU level who, through the Community independent transaction log, will check each transaction for any irregularities. In this way, the registries system keep track of the ownership of allowances in the same way as a banking system keeps track of the ownership of money.

For the second trading period, running from 2008 to 2012, the Commission adopts the Decision on the national allocation plans during 2007.

On 20th December 2006, the Commission adopted a proposal for legislation to include aviation in the Emissions Trading Scheme. The proposal provides for aviation to be brought into the EU ETS in two steps. From the start of 2011, emissions from all domestic and international flights between EU

airports will be covered. One year later the scope will be expanded to cover emissions from all international flights that arrive at or depart from an EU airport. The intention is for the EU ETS to serve as a model for other countries considering similar national or regional schemes, and to link these to the EU scheme over time. Therefore, the EU ETS can form the basis for wider, global action.

Link <http://ec.europa.eu/environment/climat/emission.htm>

5.4 The Community Strategy to Reduce CO₂ from Light Vehicles (Cars and Vans)

On 7 February 2007, the Commission adopted the Communication (COM(2007)19) outlining a comprehensive new strategy to reduce carbon dioxide emissions from new cars and vans sold in the European Union. The new strategy, should be seen together with the revision of EU fuel quality standards proposed on 31 January 2007 and the long-established objective of limiting average CO₂ emissions from new cars to 120 grams per km by 2012, a reduction of around 25% from current levels. To encourage the car industry to compete on the basis of fuel efficiency instead of size and power, the Commission is also inviting manufacturers to sign an EU code of good practice on car marketing and advertising.

Link http://ec.europa.eu/environment/co2/co2_home.htm

5.5 European Community Action to Reduce Ozone-Depleting Substances

The Union and its member states commitment under the Montreal Protocol, to phase out ozone-depleting substances, in particular, chlorofluorocarbons (CFCs), also contributes to limit climate change, since CFCs are potent green house gases.

The Regulation (EC) No 2037/2000 is the European Union's legislative instrument to phase out Ozone Depleting Substances (ODS). ODS covered by the Regulation are identified as controlled substances in line with the definitions of the Montreal Protocol. The Regulation includes controls on production, importation, exportation, supply, use leakage and recovery of controlled substances. It also establishes a licensing procedure for all imports of ODS. Since its adoption a long list of amendments have been added. Many of these concern specific chemical substances, while others are of more procedural character. A consolidated version of Regulation (EC) No 2037/2000, that includes all amendments until November 2006, is available.

Link <http://ec.europa.eu/environment/ozone/index.htm>

6. INDUSTRY AND TECHNOLOGY

6.1 The EU Industrial Environmental Regulations and Policies

The European Union has developed a considerable set of policy and legal instruments to promote the environmental improvement of European industry, the “greening of industrial production”. When issuing a license or permit for an industrial production, a list of environmental regulations have to be considered. These are all integrated in a so-called *integrated permit*, formulated according to the Integrated Pollution Prevention and Control, IPPC, Directive, which has the aim to ascertain that an industrial production, is using the best technique, and that the emissions are not moved between different media – air, water and soil – but cleaned, or eliminated at the source, when possible.

A number of “semi-legal” measures have been introduced to support the environmental improvement of industries. These include the introduction of Environmental Management Systems through the EMAS scheme, which is a Directive but with the unusual addition that it is not compulsory (obligatory). Secondly a system for the use of environmental labelling has been developed, the EU Flower. This green labelling is available but is not compulsory to use. Similarly the development of standardisations is also used as a means to introduce environmental improvements in many areas. Thus the wide use of standards is contributing to environmental protection. Another important part is the greening of the public use of products as the Greening of Public Procurement, GPP.

There are also a series of policy actions, which have a very large importance for the development of improvements in industrial productions. These include e.g. a considerable EU support to the development of technological improvements through research and development. These actions are coordinated within the EU Environmental Technologies Action Plan, ETAP. The Integrated Product Policy, IPP, is another very forceful policy development. The tools promoted under IPP are most importantly eco-design of products, support to Life Cycle Assessment LCA, recycling and improved materials management.

Below several of these policies will be shortly described and proper links provided.

6.2 The IPPC Directive

The EU common rules for permitting and controlling industrial installations, the IPPC Directive, *Directive 96/61/EC concerning integrated pollution prevention and control*, aims to minimise pollution from various industrial sources. Operators of industrial installations covered by Annex I of the IPPC Di-

rective are required to obtain an authorisation, an integrated permit. About 50,000 installations are presently covered by the IPPC Directive in the EU. New installations, and existing installations which are subject to “substantial changes”, have been required to meet the requirements of the IPPC Directive since 1999. Other existing installations must be brought into compliance by 30 October 2007. This is the key deadline for the full implementation of the Directive.

The IPPC Directive is based on the principles of (1) an integrated approach, (2) best available techniques, (3) flexibility and (4) public participation.

The *integrated approach* means that the permits must take into account the whole environmental performance of the plant, covering e.g. emissions to air, water and land, generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and restoration of the site upon closure. The purpose of the Directive is to ensure a high level of protection of the environment taken as a whole.

The permit conditions, including emission limit values (ELVs), must be based on *Best Available Techniques* (BAT), as defined in the IPPC Directive. To assist the licensing authorities and companies to determine BAT, the European IPPC Bureau organises an exchange of information between experts from the EU Member States, industry and environmental organisations. The produced BAT Reference Documents (BREFs), which serves to guide the introduction of BAT in the integrated permit, are adopted and published by the Commission.

The IPPC Directive contains elements of *flexibility* by allowing the licensing authorities, in determining permit conditions, to take into account the technical characteristics of the installation, its geographical location, and the local environmental conditions.

The Directive ensures that the *public has a right to participate* in the decision making process, and to be informed of its consequences, by having access to permit applications in order to give opinions. The European Pollutant Emission Register (EPER), which contains emission data reported by Member States, are made accessible in a public register, which is intended to provide environmental information on major industrial activities. EPER will be replaced by the European Pollutant Release and Transfer Register (E-PRTR) from 2007 reporting period onwards.

Link <http://ec.europa.eu/environment/ippc/index.htm>

6.3 Development of the IPPC Directive

The original IPPC directive has been amended twice since it entered in force. The first amendment reinforced public participation in line with the Aarhus Convention. The second amendment clarified the relationship between the permit con-

ditions established in accordance with the IPPC Directive and the EU greenhouse gas emission trading scheme.

The Member States have chosen various approaches to implement the IPPC Directive, such as case-by-case permitting or use of general binding rules for industry sectors.

The Commission has adopted in November 2005 its first IPPC Report. It includes an IPPC Implementation Action Plan set up to support the Member States and monitor the progress made towards meeting the deadline of 30 October 2007 for the full implementation of the Directive.

Link <http://ec.europa.eu/environment/ippc/index.htm>

6.4 Eco-Management and Audit Scheme (EMAS)

The Eco-Management and Audit Scheme (EMAS) is the EU voluntary instrument, which acknowledges organisations that improve their environmental performance on a continuous basis. EMAS registered organisations are legally compliant, run an environment management system and report on their environmental performance through the publication of an independently verified environmental statement.

The scheme has been available since 1995 (Council Regulation (EEC) No 1836/93). It 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). In addition, EMAS was strengthened by the integration of EN/ISO 14001 as the environmental management system required by EMAS, and by adopting an attractive EMAS logo to signal EMAS registration to the outside world.

Link http://ec.europa.eu/environment/emas/index_en.htm

6.5 Integrated Product Policy (IPP)

All products cause environmental degradation in some way, whether from their manufacturing, use or disposal. The *Integrated Product Policy* (IPP) seeks to minimise these by looking at all phases of a products' life cycle and taking action where it is most effective.

The life cycle of a product is often long and complicated. It covers all the areas from the extraction of natural resources, through their design, manufacture, assembly, marketing, distribution, sale and use to their eventual disposal as waste. At the same time it also involves many different actors such as designers, industry, marketing people, retailers and consumers.

With so many different products and actors there cannot be one simple policy measure for everything. Instead there are a whole variety of tools – both voluntary and mandatory – that can be used to achieve this objective. These include measures such as economic instruments, substance bans, volun-

tary agreements, environmental labelling and product design guidelines.

The Integrated Product Policy (COM(2003) 302 final) is not a regulation, but a set of support measures. It will seek to identify and stimulate action on products with the greatest potential for environmental improvement in three phases: First research to identify products with the greatest environmental impact, secondly by identifying measures to reduce their environmental impacts throughout their life cycles. Research in phase one and two is led by the Institute for Prospective Technological Studies (IPTS) in Seville. In the third phase the European Commission will seek to address policy measures for the products that are identified having the greatest potential for environmental improvement at least socio-economic cost.

Link <http://ec.europa.eu/environment/ipp/home.htm>

6.6 Implementing the Integrated Product Policy

The EIPRO, Environmental Impact of PROducts (phase 1) study, completed in May 2006, shows that products from only three areas of consumption – *food and drink, private transportation, and housing* – together are responsible for 70-80% of environmental impacts of private consumption. These products also account for some 60% of consumption expenditure altogether. All other areas of consumption together account for no more than 20-30% of most environmental impacts.

For the Second phase the Commission concluded that Life Cycle Assessments provide the best framework for assessing the potential environmental impacts of products currently available, but also that there is a need for more consistent data and consensus on LCA methodologies. The *European Platform of Life Cycle Assessment* includes a series of studies and workshops with the aim of producing a handbook on best practice, based on the best possible consensus. The objective is to promote life cycle thinking in business and in policy making focusing on underlying data and methodological needs. The project started in mid-2005 and is initially planned to run until mid-2008. It is a joint project between DG Environment and the Commission's Directorate-General Joint Research Centre (JRC-IES).

A series of policy tools to address the need for improved environmental profiles of products, *eco-design initiatives*, already exists and are now assembled under the IPP programme. The Directive 2005/32/EC on the *Eco-design of Energy-using Products* (EuP), such as electrical and electronic devices or heating equipment, provides coherent EU-wide rules for eco-design and ensure that disparities among national regulations do not become obstacles to intra-EU trade. The Directive does not introduce directly binding requirements for specific products, but does define conditions and criteria for setting requirements regarding environmentally relevant product char-

acteristics (such as energy consumption) and allows them to be improved quickly and efficiently. The labelling of green products, the *European eco-label* is one more tool for promoting environmentally good design of products. Public procurement accounts for around 16% of the EU's GDP. The *Greening of Public Procurements* (see below) is a powerful tool for promoting environmentally beneficial markets. Standards for almost any product, service or process are powerful tools for influencing the market. *Integration of environmental aspects in standardisation* (see below) is becoming another part of the IPP toolbox.

Link <http://ec.europa.eu/environment/ipp/home.htm>

6.7 The European Union Eco-label Scheme

EU eco-label scheme is a voluntary scheme designed to encourage businesses to market environmentally friendly products and services for European consumers, both public and private purchasers, by more easily identifying them. Eco-labelled (non-food) products are marked with the EU Flower, found throughout the European Union as well as in Norway, Liechtenstein and Iceland. The EU eco-label scheme is based on Regulation 1980/2000/EC and run by the European Union Eco-labelling Board (EUEB).

The eco-label is a rapidly growing brand, covering today both services and products in close to 30 product categories. An individual product must comply with all criteria (key, best practice and performance) in order to be awarded the EU Eco-label. Ecological criteria for a product group are normally established for a period of three years. This allows for technical improvements and changes in the market to be reflected when criteria are revised.

Link http://ec.europa.eu/environment/ecolabel/index_en.htm

6.8 Greening Standardisation

European and international standards are gaining increasing importance as a tool to support European policies and legislation, based upon the model of technical harmonisation introduced in EU in 1987. Within this approach, legislation sets the legal performance-oriented framework and objectives, whereas the detailed technical specifications for implementation are addressed in standards. Compliance with the standards remains voluntary.

European standardisation offers great potential to advance the protection of our environment (COM (2004) 674). It supports the energy efficiency of electrical products, the recyclability of products and the environmental impacts of buildings. One example is the European Committee for Electrotechnical Standardization, CENELEC, which since December 2006 offers an environmental database online. The database assists in

environmental issues, and serve as a knowledge base for standards writers and stakeholders to systematically identify areas for improvement of the environmental profile of standards.

Link http://ec.europa.eu/environment/standardisation/index_en.htm

6.9 Green Public Procurement

Green public procurement means that public purchasers take account of environmental factors when buying products, services or works. Public procurement accounts for around 16% of the EU's GDP. As such it represents a potentially powerful economic driver to further the uptake of environmental technologies.

Two directives clarify, simplify and modernise existing European legislation on public procurement. Directive 2004/18 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts and Directive 2004/17 on the coordination of procurement procedures of entities operating in the water, energy, transport and postal services sector. The Directives explain a broad range of issues connected to Green Public Procurement.

Performance clauses of a public procurement contract may include environmental considerations. The Public Procurement Directives explicitly state that performance or functional requirements can be taken from specifications of European, international and national eco-labels. The purchasing authority can decide to recognise an eco-label as proof of compliance, but it also has to accept other means of proof of compliance with the specifications. In certain contracts, the authority may even ask for EMS certification or a comparable scheme. A purchasing officer can choose the bid offering the lowest price or 'the economically most advantageous offer, which may refer to environmental sub-criteria.

The green procurement conditions are relevant to the private sector as provider to the public sector. In the private sector corresponding issues are included in *supply chain management*. Here there are wide possibilities to select providers. However the request that a supplier has been certified according to an environmental management system is becoming very common, not the least due to customers pressure.

Link http://ec.europa.eu/environment/gpp/index_en.htm

6.10 Environmental Technologies Action Plan, ETAP

Environmental Technologies Action Plan, ETAP, is the Unions programme to support environmental technology development. Since 2004 ETAP covers a spectrum of actions to promote eco-innovation and encourage industry to develop and take up environmental technologies.

The *European Forum on Eco-Innovation* mobilises relevant players from business, finance, and technology development,

and provides a platform to move the innovation process and take inventions out of laboratories and onto the market.

Technology platforms are public/private partnerships on specific topics bring together all the interested stakeholders to build long-term visions to promote a specific technology or solve a particular issue. Areas addressed include Hydrogen and Fuel Cells, Photovoltaics, Steel, and Water supply and sanitation.

Networks of testing centres (Eurodemo, Promote, Testnet, Airtv) establish a mechanism to validate objectively the performance of new products and develop common or co-ordinated protocols and practices, a service especially important for SMEs.

Setting Performance targets that are long-term and visionary is important to encourage industry to take up environmental technologies. EU-activities related to Performance Targets include the Integrated Product Policy, the EuP Directive, the IPPC Directive, the EU Eco-Label, Environmental Products Declaration and national experiences in the field of eco-design, and EMAS, many to be described below.

The *financial instruments* to support investments in environmental technologies range from classical loans through guarantee mechanisms to venture capital, in addition to the Framework-Programme on Research and Development and the demonstration and investment programmes, such as LIFE-Environment, and the Structural Funds.

A new *Competitiveness and Innovation Programme* (CIP) will address eco-innovation, by stimulating the wider use of eco-efficient technologies, and by helping to bridge market gaps in SME finance.

ETAP promotes *Awareness Raising and Training* activities in conjunction with the development and take-up of environmentally friendly technologies.

Link http://ec.europa.eu/environment/etap/index_en.htm

7. LAND USE, NATURE PROTECTION, AND SOIL

7.1 Land Use and Spatial Planning

Land use policy covers a series of environmentally important issues such as infrastructure development including roads, railways, bridges, etc.; rural development with forestry and agriculture; urban development including building and traffic planning; coastal zone development and management.

The most important legal instrument in this sector is the *Environmental Impact Assessment*, EIA, with the intention to assure that environmental consequences of a development are carefully scrutinised before it starts. It is especially important that alternative development options, including the zero option – no development – is included in the assessment. More

recently the Strategic Environmental Assessment, SEA, has been introduced to broaden the number of projects which will be assessed and also broaden the aspects considered, especially to social and economic aspects. EIA or SEA is legally required in most development projects in the Union.

Land use requires a *land use development plan*, normally legally established by the local authority. The plan defines which kind of activity can be allowed on different parts of the land and is the background for municipal decision on permits for the development of industry, residential areas, etc.

The development of land use is also addressed by the European Spatial Development Perspective (ESDP) document from 1999. This document was introduced to create a common framework for spatial planning in the Union. Its scope, wider than just environmental concerns, includes economic, social and cultural issues, as the basis for spatial management.

7.2 Environmental Impact Assessment

Environmental assessment is a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made. The process involves an analysis of the likely effects on the environment, recording those effects in a report, undertaking a public consultation exercise on the report, taking into account the comments and the report when making the final decision and informing the public about that decision afterwards.

In principle, environmental assessment can be undertaken for individual projects such as a dam, motorway, airport or a factory ('Environmental Impact Assessment') or for plans, programmes and policies ('Strategic Environmental Assessment').

The *EIA Directive* on Environmental Impact Assessment of the effects of projects on the environment was introduced in 1985 (Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment) and was amended in 1997 (Council Directive 97/11/EC). The EIA Directive outlines which project categories shall be made subject to an EIA, which procedure shall be followed and the content of the assessment.

Following the signature of the Aarhus Convention by the Community in June 1998, the Community adopted in May 2003 Directive 2003/35/EC amending amongst others the EIA Directive. This Directive aligns the provisions on public participation in accordance with the Aarhus Convention on public participation in decision-making and access to justice in environmental matters.

Other pieces of EU-legislation are related to the EIA Directive. This includes the IPPC Directive on the licensing of industrial sites, the SEVESO Directive on preventing chemical accidents and the EMAS Regulation on environmental man-

agement. An IMPEL report shows the interrelation between EIA, IPPC, SEVESO Directives and the EMAS Regulation
Link <http://ec.europa.eu/environment/eia/eia-legalcontext.htm>

7.3 Strategic Environmental Assessment

SEA Directive (Directive 2001/42/EC), effective from July 2004, assures that a wide range of plans and programmes begun after July 2004 now require an environmental assessment.

The purpose of the SEA Directive is to ensure that environmental consequences of certain plans and programmes are identified and assessed during their preparation and before their adoption. The public and environmental authorities can give their opinion and all results are integrated and taken into account in the course of the planning procedure. After the adoption of the plan or programme the public is informed about the decision and the way in which it was made. In the case of likely transboundary significant effects the affected Member State and its public are informed and have the possibility to make comments which are also integrated into the national decision-making process.

Link <http://ec.europa.eu/environment/eia/sea-legalcontext.htm>

7.4 Nature Protection and Biodiversity

Two EU Directives deal with the conservation of European wildlife, focusing on the protection of sites as well as species.

Council Directive 79/409/EEC on the conservation of wild birds, the *Birds Directive*, identified 193 endangered species and sub-species for which the Member States are required to designate Special Protection Areas (SPAs). Over 4,000 SPAs have been designated to date, covering 8% of EU territory. As a result of this action, some severely threatened species are now beginning to recover.

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, the *Habitats Directive*, aims to protect other wildlife species and habitats. Each Member State is required to identify sites of European importance and to put in place a special management plan to protect them, combining long-term conservation with economic and social activities, as part of a sustainable development strategy.

These sites, together with those of the Birds Directive, make up the Natura 2000 network – the cornerstone of EU nature protection policy. The Natura 2000 network, implemented during 2004-2006, already comprises more than 18,000 sites, covering over 17% of EU territory, was completed for EU 15. The *Natura 2000 Networking Programme* will create a series of training events, workshops and practical tools to promote Natura 2000, good practice in site management and the benefits of networking, across Europe.

Link <http://ec.europa.eu/environment/nature/home.htm>

7.5 Proposal for a Framework Directive on Soil

In response to concerns about the degradation of soils in the EU the Commission published in April 2002 a Communication "Towards a Thematic Strategy for Soil Protection". This was the first occasion on which the Commission has addressed soil protection for its own sake. It outlined the first steps to the development of a Thematic Strategy to protect soils in the European Union. It consists of a Communication from the Commission (COM(2006) 231), a proposal for a framework Directive, and an Impact Assessment.

The Communication gives the background for a high level of soil protection, and the Strategy and explains what kind of measures must be taken in a ten-year work program. The proposed framework Directive (COM(2006) 232) sets out common principles for protecting soils. The Impact Assessment (SEC (2006) 1165 and SEC(2006) 620) contains an analysis of the economic, social and environmental impacts of the different options that were considered in the preparatory phase of the strategy and of the measures finally retained by the Commission.

Link http://ec.europa.eu/environment/soil/index_en.htm

8. NOISE

8.1 The Directive on Environmental Noise

Noise is an environmental problem in all EU Member States. This includes industrial noise, aircraft noise, road traffic noise, railway noise, and related emission data. Directive 2002/49/EC, the *Directive on Environmental Noise* of June 2002, has as the main aim to provide a common basis for tackling the noise problem across the EU. The underlying principles are similar to those for other overarching environment policy directives:

Monitoring the environmental problem; by requiring competent authorities in Member States to draw up "strategic noise maps" for major roads, railways, airports and agglomerations, using harmonised noise indicators. These maps will be used to assess the number of people annoyed and sleep-disturbed respectively throughout Europe.

Informing and consulting the public about noise exposure, its effects, and the measures considered to address noise, in line with the principles of the Aarhus Convention.

Addressing *local noise issues* by requiring competent authorities to draw up action plans to reduce noise where necessary and maintain environmental noise quality where it is good.

The directive does not set any limit value, nor does it prescribe the measures to be used in the action plans, which remain at the discretion of the competent authorities. These are partly specified in a series of detailed regulations (see below).

The European Environment Agency is preparing an electronic reporting mechanism aimed at helping Member States report their data in compliance with Directive 2002/49/EC.

The Commission is developing a *long-term EU strategy*, which includes objectives to reduce the number of people affected by noise in the longer term, and provides a framework for developing existing Community policy on noise reduction from source. With this respect, the Commission has made a declaration concerning the provisions with regard to the preparation of legislation relating to sources of noise.

Link <http://ec.europa.eu/environment/noise/directive.htm>

8.2 Existing Directives Relating to Noise Sources

There are a number of directives and other pieces of legislation regarding noise from cars, aircrafts, boats, industrial production and so on.

Road traffic noise is addressed in Council Directive 70/157/EEC “on the approximation of the laws of the Member States relating to the permissible sound level and the exhaust system of motor vehicles”.

Railway noise and the Interoperability of the Trans-European high-speed rail system are addressed in several regulations. The 1996 regulation (96/48/EC) is general. Technical specification for interoperability (TSI) relating to high-speed rolling stock was regulated in the Commission Decision 2002/735/EC and the Technical specification for interoperability (TSI) relating to high-speed railway infrastructures is addressed by the Commission Decision 2002/732/EC. There are several amendments to these regulations.

There are a number of regulations addressing Noise from Equipment for Use Outdoors (2000/14/EC) and for Miscellaneous Recreational Craft Noise (2003/44/EC). The Commission has adopted in August 2003 guidelines on the revised interim computation methods for industrial noise, aircraft noise, road traffic noise and railway noise, and related emission data.

Link <http://ec.europa.eu/environment/noise/sources.htm>

9. WASTE

9.1 Strategies and Framework Directives on Waste

Waste is a main environmental concern within the European Union. The amount of waste produced is still increasing, although substantial efforts to increase recycling have been made. The reasons for concern are two-fold: first the environmental and health impacts of waste, secondly the fact that wastization is poor resource management.

As part of the 6th Environmental Action Plan the European Commission proposed in December 2005 a new *strategy on the prevention and recycling of waste*. This strategy is one of

the seven key environmental thematic strategies of the Union. It aims to help Europe become a recycling society that seeks to avoid waste and use waste as a resource. It will draw on the knowledge that the *thematic strategy on resource* adopted at the same time.

The first EEC *Waste Directive* was adopted in 1975. A new *codified Waste Framework Directive* (Directive 2006/12/EC) has now replaced the 1975 version, as a legal text that replaces all the previous versions and their amendments without any legal or political changes. In parallel the Commission has published a proposal for substantive revision of the Directive to merge, streamline and clarify the waste legislation and contribute to a better regulation (Waste COM(2005) 667 final). The European Parliament gave its first reading opinion on the revision in February 2007. The Commission has, as part of the process, encouraged the EU Member States to set recycling standards and develop national waste prevention programmes.

Waste central legislation include – in addition to the Framework Directive (2006/12/EC) – Directive 91/689/EEC on hazardous waste, Decision 2000/532/EC on establishing a list of waste, and Council Regulation (EEC) N° 259/93 on the supervision and control of shipments of waste within, into and out of the European Community. The Union has also adopted in a Council Decision 93/98/EEC the Convention on the control of transboundary movements of hazardous wastes and their disposal (Basel Convention).

Along series of special Directives and their secondary legislation regulates waste management within a long list of sectors. Below follow short descriptions and proper links to most of these regulations.

Link <http://ec.europa.eu/environment/waste/strategy.htm>

Link <http://ec.europa.eu/environment/waste/legislation/a.htm>

9.2 The Landfill Directive

The Landfill Directive (Council Directive 99/31/EC on the landfill of waste) aims to prevent or reduce as far as possible negative effects on the environment from the land-filling of waste in particular on surface water, groundwater, soil, air and human health. The directive is unusually detailed and introduces stringent technical requirements for waste and landfills. In this way it plays the role of defining the BAT for landfills (There is no BREF for landfills).

The directive applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land, and includes all waste categories. Landfills are divided into three classes: landfills for hazardous waste, for non-hazardous waste, and for inert waste.

The acceptance of waste at each landfill class is described in Annex II of the directive. Waste must be treated before being

landfilled and hazardous waste must be assigned to a hazardous waste landfill. Municipal waste should be sent to landfills for non-hazardous waste, and inert waste to an inert waste landfill. Liquid waste, flammable waste, explosive or oxidising waste, hospital and other clinical waste which is infectious is not accepted in a landfill at all. Nor are used tyres, with certain exceptions.

A number of large-scale operations are *not* included in the Directive. This includes the spreading of sludge, including sewage sludge, on soil, inert waste for redevelopment or restoration work, the deposit of unpolluted soil or of non-hazardous inert waste from prospecting and extraction, mineral resources from operation of quarries; non-hazardous dredging sludge alongside small waterways, and of non-hazardous sludge in surface water.

The Directive requests an operating permit for landfill sites. Applications for permits must contain information on types and total quantity of waste, capacity, site description, methods for pollution prevention and abatement, operation, monitoring and control plan, and a plan for closure and aftercare procedures. An impact assessment study is also required.

In addition a landfill above a certain size requires an IPPC permit to operate.

Landfills serving islands have less stringent regulations if they only accept non-hazardous or inert wastes from that island, and has a total capacity not exceeding 15 000 tonnes or with an annual intake not exceeding 1 000 tonnes.

Link http://ec.europa.eu/environment/waste/landfill_index.htm

9.3 Biodegradable Waste

The main environmental threat from *biowaste* is the production of methane in landfills. This accounted for some 3% of total greenhouse gas emissions in the EU-15 in 1995. The Landfill Directive 1999/31/EC obliges Member States to reduce the amount of biodegradable waste that they landfill to 35% of 1995 levels by 2016, which will significantly reduce the problem.

There are several alternative *treatment methods* for biodegradable waste. The Commission will provide criteria, in the form of a guidance document, to help identify the environmentally best option for the management of biowaste. Member States will be required to report their treatment choices in their national waste management plans (draft Waste Framework Directive). The environmentally sound management of biowaste will be addressed in the Thematic Strategy on waste prevention and recycling in 2010.

Quality standards for *compost* are planned in the revised Waste Framework Directive. The intention is to develop a market for compost, and overcome one of the biggest obstacles to composting policies, the lack of user confidence and market acceptance. Environmental standards for facilities in which

biological treatment takes place will be addressed in a review of the IPPC Directive for licensing major industrial and agricultural installations based on the Best Available Techniques (BAT). The Thematic Strategy on Soil will address the wider subject of carbon depletion in soil, which includes the use of compost as a means to increase the carbon content of soil.

The Commission is preparing guidelines on the application of life cycle thinking to biowaste management policies. Updated information can be found at the JRC website devoted to the *European life cycle thinking guidelines for the management of municipal biodegradable waste*. The final document will be the first guidance document developed at European level on applying life cycle thinking to waste management policies.

Link <http://ec.europa.eu/environment/waste/compost/index.htm>

9.4 Mining Waste

The pollution of Danube river caused by a cyanide spill following a damburst of a tailings pond in Baia Mare, Romania in 2000 and the 1998 accident in Aznalcóllar, Spain where a damburst poisoned the environment of the Coto Doñana National Park, have increased public awareness of the environmental and safety hazards of mining activities. These accidents, like other similar ones, have illustrated the significant environmental and health risks associated with the management of mining waste.

In October 2000, the Commission adopted a Communication asking for an amendment of the Seveso II Directive to include mineral processing of ores, tailings ponds or dams used in mineral processing of ores. It is also preparing a BREF document of waste management to reduce everyday pollution and to prevent or mitigate accidents in the mining sector.

Finally a directive on the management of mining waste was adopted. Directive 2006/21/EC on the management of waste from the extractive industries stipulates measures, procedures and guidance to prevent or reduce as far as possible any adverse effects on the environment, in particular water, air, soil, fauna and flora and landscape, and any resultant risks to human health, brought about as a result of the management of waste from the extractive industries. It requests Member States to ensure that the operator draws up a waste management plan for the minimisation, treatment, recovery and disposal of extractive waste.

Link <http://ec.europa.eu/environment/waste/mining/index.htm>

9.5 Waste Incineration Directive

Directive 2000/76/EC on the incineration of waste, the *WI Directive*, aims to prevent or to reduce as far as possible negative effects on the environment caused by the incineration and co-incineration of waste. It replaces the former directives on the incineration of hazardous waste (Directive 94/67/EC) and non-

hazardous waste (Directives 89/369/EEC and 89/429/EEC). It asks for the reduction of pollution caused by emissions into the air, soil, surface water and groundwater through the application of operational conditions, technical requirements, and emission limit values for waste incineration and co-incineration plants. The Directive does not include some plants, e.g. those treating only biomass, such as non-treated agriculture and forestry residues.

The WI Directive makes a clear distinction between incineration plants (which are dedicated to the thermal treatment of waste and may or may not recover heat generated by combustion) and co-incineration plants (such as cement kilns, steel or power plants whose main purpose is energy generation or the production of material products).

The WI Directive sets controls on releases to water, and emissions to air for NO_x, SO₂, HCl, heavy metals, particles, and dioxins and furans. It provides for public consultation, access to information and participation in the permitting procedure.

Other EU regulations and Commission documents that are relevant to the waste incineration sector include

- IPPC Directive, as many of the plants covered by the WI Directive are also covered by this directive. In these cases, the WI Directive only sets minimum obligations, which are not necessarily sufficient to comply with the IPPC Directive.
- LCP Directive (Directive 2001/80/EC on large combustion plants), which regulates the emissions of acidifying pollutants, particles, and ozone precursors from large (above 50 MW) combustion plants. The LCP Directive encourages the combined generation of heat and power and sets specific emission limit values for the use of biomass as fuel.
- VOC Solvents Directive (Directive 1999/13/EC), which regulates industrial emissions of volatile organic compounds (VOCs). The VOC Solvents Directive establishes emission limit values for VOCs in waste gases.
- Directive 1999/32/EC regulating the combustion of certain types of sulphur containing liquid fuels to reduce the emissions of sulphur dioxide.

Details of emissions from waste incineration plants and other industrial sources can be accessed via the European Pollutant Emission Register (EPER)

Link <http://ec.europa.eu/environment/air/stationary.htm>

9.6 Disposal of Waste Oils

The EU consumed in 2003 roughly 4.4 million tonnes a year of lubricant oils, such as lubricant oils for vehicles, turbines, gearboxes and engines, hydraulic oils, etc. Some 50% of this

became waste oils (the rest is lost during use, or through leakages, etc.), which leaves us with approximately 2.5 million tonnes of waste oil to manage every year. Waste oils are hazardous waste. Waste oils leaking into rivers, lakes and streams threaten aquatic life, and severe soil contamination can result from waste oils being left on the ground.

According 2003 data almost 2 million tonnes of waste oils in EU were collected, giving a collection rate of 81%. Out of this amount, 44% was regenerated while 46% was combusted. That is, 20% of this oil is still illegally dumped or burnt.

The Waste Oil Directive 75/439/EEC, as last amended by Directive 2000/76/EC, was designed to create a harmonised system for the collection, storage, recovery and disposal of waste oils and protect the environment against the harmful effects of illegal dumping and of treatment operations. The Directive applies to any mineral-based lubrication or industrial oils which have become unfit for their original use. It requires that waste oils are collected and disposed of by processing, destruction, storage or tipping above or under ground. The processing of waste oils by regeneration, i.e. by refining, should be given priority.

Any undertaking, which collects waste oils, must be subject to registration and national supervision, including possibly a system of permits. The mixing of waste oils with polychlorinated biphenyls or terphenyls (PCBs and PCTs) or with toxic and dangerous wastes is not allowed.

Link http://ec.europa.eu/environment/waste/oil_index.htm

9.7 The Disposal of PCBs and PCTs

Polychlorinated biphenyls and polychlorinated terphenyls (PCBs/PCTs) are persistent and toxic man-made chemicals. PCBs were commercially produced world-wide on a large scale between the 1930's and 1980's. Given their extraordinary chemical stability and heat resistance, they were extensively employed as components in electrical and hydraulic equipment, such as transformers, capacitors, heat transfer and hydraulic systems; and in open applications: as pesticide extenders, sealant, carbonless copy paper, industrial oils, paints, adhesives, plastics, flame retardants and to control dust on roads.

In the 1970's, when their human toxicity, suspected carcinogenicity, and environmental persistence, and a wide spectrum of adverse effects in animals and humans became known, several countries limited the use of PCBs. Finally in 1985, the use and marketing of PCBs in the European Community were very heavily restricted.

The very stable PCBs still exists in large amounts in the infrastructure of our society and for this reason is a main concern especially when managing building and industrial/equipment waste. Directive 96/59/EC on the disposal of PCBs and

PCTs aims at disposing completely of PCBs and equipment containing PCBs as soon as possible, and for big equipment before the end of 2010.

The directive sets the requirements for an environmentally sound disposal of PCBs. Member States have to make an inventory of big equipment containing PCBs, have to adopt a plan for disposal of inventoried equipment, and outlines for collection and disposal of non inventoried equipment (small electrical equipment very often present in household appliances manufactured before the ban on marketing of PCBs).

Furthermore, the Commission has adopted a Community Strategy on Dioxins, Furans and PCBs aimed at reducing as far as possible the release of these substances in the environment and their introduction in the food chains. As regulation No 850/2004/EC on persistent organic pollutants also covers PCB, the Commission has carried out a study to facilitate the implementation of the waste related provisions of this regulation.

Link <http://ec.europa.eu/environment/waste/pcbs/index.htm>

9.8 Disposal of End-of-Life Vehicles

Every year, end of life vehicles generate between 8 and 9 million tonnes of waste in the Union. In 1997, the Commission proposed a Directive which aims at making vehicle dismantling and recycling more environmentally friendly, sets clear quantified targets for reuse, recycling and recovery of vehicles and their components and pushes producers to manufacture new vehicles also with a view to their recyclability. This legislation was officially adopted in September 2000 as Directive 2000/53/EC – *the ELV Directive*. Based on an Impact Assessment the Commission adopted in 2007 a report on the targets (“2015 targets”) of the ELV Directive.

The Commission have developed a Guidance Document on the legislative acquis which, even though it is not legally binding, aims at facilitating the implementation of the ELV Directive and its secondary legislation at national level.

The ELV Directive was amended with a series of detailed instructions. The Council Decision 2005/673/EC amended the Annex II; Commission Decisions 2005/437/EC and 2005/438/EC regulate the management of vehicles spare parts. The Netherlands’ waste disposal system for car wrecks is adopted in Commission Decision 2002/204/EC. Directive 2005/64/EC regulates the type-approval of motor vehicles with regard to their reusability, recyclability and recoverability and amends Council Directive 70/156/EEC.

Link http://ec.europa.eu/environment/waste/elv_index.htm

9.9 Packaging and Packaging Waste

Packaging waste in the EU is a large and increasing concern. The 2002 average EU-15 amount of waste was 172 kg/capita

and year. Between 1997 and 2002 the growth in packaging waste generation in the EU-15 almost followed the growth in GDP: waste increased by 10% and GDP by 12.6%. There are large variations ranging from 87 kg/capita in Finland to 217 kg/capita in Ireland (2002), partly explained by differing definitions of packaging. Only the UK, Denmark and Austria reduced their per capita generation of packaging waste since 1997.

The first introduced directive on the management of packaging waste (Directive 85/339/EEC) regarding liquid beverage containers was too vague to achieve effective market harmonisation. A new *Directive on Packaging and Packaging Waste* (Directive 94/62/EC) was adopted in 1994. It aims to harmonise national measures in order to prevent or reduce the impact of packaging and packaging waste on the environment and to ensure the functioning of the Internal Market. It contains provisions on the prevention of packaging waste, on the re-use of packaging and on the recovery and recycling of packaging waste. The directive was amended by a series of secondary packaging legislation regulating the identification of packaging materials, reports of the directives, the database system, and the conditions for derogation of plastic crates, plastic pallets, and glass packaging.

The (prolonged) implementation of the directive in the new Member States is regulated by Directive 2005/20/EC.

Link <http://ec.europa.eu/environment/waste/packaging/events.htm>

9.10 Waste Electrical and Electronic Equipment, WEEE Directive

A fast increasing waste stream of electrical and electronic equipment, reflects the increased amounts of TV sets, computers, sound equipments and the like used in our societies. Directives 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment and Directive 2002/96/EC on waste electrical and electronic equipment are designed to tackle the fast increasing waste stream of electrical and electronic equipment and complements measures on landfill and incineration of waste. Together they constitute the *waste electrical and electronic equipment (WEEE) Directive*.

Increased recycling will limit the total quantity of waste going to final disposal. Therefore, through the directives, producers are responsible for taking back and recycling electrical and electronic equipment. This provides incentives to design electrical and electronic equipment in an environmentally more efficient way, which takes waste management aspects fully into account. Consumers will be able to return their equipment free of charge.

In order to prevent the generation of hazardous waste, Directive 2002/95/EC requires the substitution of various heavy

metals (lead, mercury, cadmium, and hexavalent chromium) and brominated flame retardants (polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE)) in new electrical and electronic equipment put on the market from 1 July 2006.

Directive 2003/108/EC amends Directive 2002/96/EC. A number of additional legislation has been developed to detail the restriction on the use of certain hazardous substances in electrical and electronic equipment.

Link http://ec.europa.eu/environment/waste/weee/index_en.htm

9.11 Disposal of Batteries and Accumulators

Directive 91/157/EEC on batteries and accumulators containing dangerous substances regulates the waste of batteries containing mercury, lead and cadmium. Directive 2006/66/EC, (now under implementation for all batteries and accumulators) aims at minimising the negative impacts of batteries and accumulators on the environment and also harmonising requirements for the smooth functioning of the internal market. It prohibits the marketing of some batteries containing hazardous substances and contains measures for a high level of collection and recycling of batteries with quantified collection and recycling targets.

The Directive sets out minimum rules for producer responsibility and provisions with regard to labelling of batteries and their removability from equipment. Producers must arrange financing for the collection, treatment, recycling and sound disposal of all types of collected spent batteries with a view to recycling their raw materials for use in the manufacture of new products. The cost of collecting portable batteries may be shared among producers and national, regional and local authorities. All batteries and accumulators must bear the symbol indicating separate collection (a crossed-out wheeled bin as depicted in Annex II to the proposal).

Link <http://ec.europa.eu/environment/waste/batteries/index.htm>

9.12 Waste Management Planning

Waste management planning is the cornerstone of any national, regional or local policy on waste management. The establishment of a plan allows the operator to take stock of the existing situation, to define the objectives that need to be met in the future, to formulate appropriate strategies, and identify the necessary implementation means.

The drawing up of waste management plans is required by Directive 2006/12/EC, which sets out the general requirement. Specific provisions for hazardous waste are found in Article 6 of Directive 91/689/EEC and for packaging and packaging waste in Article 6 of Directive 94/62/EC.

To assist national, regional and local competent authorities when preparing waste management plans, the Commission has published a methodological guidance. It should promote

more coherent and appropriate planning practices in the Member States in compliance with the requirements of relevant EU legislation.

Link <http://ec.europa.eu/environment/waste/plans/index.htm>

9.13 Waste Shipments

Economic growth and globalization have led to a worldwide increase of waste transports across borders, whether on the road, by railway or ship. These waste movements or *shipments* sometimes involve hazardous wastes and can create risks for human health and the environment. In other cases wastes are traded to replace natural resources in industrial facilities with high environmental standards.

In order to control waste shipments, certain procedures and requirements have been introduced in international and EU law. These include Regulation (EC) 1013/2006 on shipments of waste and shipments of “green-listed” non-hazardous wastes to non-OECD countries; and Regulation (EC) 1420/1999 establishing common rules and procedures for shipments to certain non-OECD countries of certain types of waste. Special provisions for waste shipments apply to several of the new Member States, including Latvia, Poland and Slovakia.

Decision 93/98/EEC introduces in the EU the Convention on the control of transboundary movements of hazardous wastes and their disposal (Basel Convention); and Commission Decision 94/774/EC amends Council Regulation (EEC) No 259/93 on the supervision and control of shipments of waste within, into and out of the European Community.

Some types of waste shipments are covered by specific legal regimes; in particular Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues, and Directive 2006/117/EURATOM on the supervision and control of shipments of radioactive waste and spent fuel.

Link <http://ec.europa.eu/environment/waste/shipments/index.htm>

10. WATER

10.1 The Water Framework Directive

Cleaner rivers and lakes, groundwater and coastal beaches are of high priority in European Environmental policy. Early European water legislation led in the 1980's up to binding quality targets for drinking water and quality objectives for fish and shellfish waters, bathing waters and groundwater. A second phase of water legislation culminated in 1991 with the adoption of the Urban Waste Water Treatment Directive, and the Nitrates Directive, which addressed water pollution by nitrates from cities and agriculture. A fundamental rethink of Community water policy, asking for a more integrated approach, culminated in mid-1995. A new European water policy and

framework legislation to reach “good status” of surface waters and groundwater developed on a river basins approach. A Directive to introduce *integrated river basin management* for Europe, Directive 2000/60/EC, the *EU Water Framework Directive* (WFD) was finally adopted in 2000.

The framework directive approach rationalises the Unions water legislation by replacing seven of the “first wave” directives on surface water, measurement methods, the fish and shellfish water, groundwater; and dangerous substances discharges. Still a number of *specific regulations* are left to tackle particular pollution problems. Key examples are the Urban Waste Water Treatment Directive and the Nitrates Directive, which together tackle the problem of eutrophication; and the IPPC Directive, which deals with chemical pollution from industries. The Groundwater Directive corresponds to Article 17 of WFD, and Decision 2455/2001/EC to the list of priority substances asked for in Article 16 of the WFD. The objectives of “good ecological status” is addressed by an intercalibration process comparing national classifications, and Decision 2005/646/EC sets out a network of intercalibration sites. The results of this process are expected to be published in late 2007.

Historically, there has been a dichotomy of water pollution control: *source control* and *quality standards*. Source controls alone can allow a cumulative pollution load, where there is a concentration of pollution sources, while quality standards can underestimate the effect of a particular substance on the ecosystem. For this reason, a consensus has developed that both are needed in practice. The Water Framework Directive formalises this. On the source side, it requires that all existing technology-driven source-based controls must be implemented as a first step. But it also includes the development of a list of priority substances for action at EU level, and the design of the most cost-effective set of measures to achieve load reduction of those substances.

On March 2007, the Commission organised a conference where more than 400 participants reviewed the first WFD implementation report and launched a Water Information System for Europe (WISE).

Link http://ec.europa.eu/environment/water/water-framework/index_en.html

10.2 River Basin Management

The Water Framework directive requires management by river basin – the natural geographical and hydrological unit – instead of according to administrative or political boundaries. For each river basin district, some of which will traverse national frontiers, a *river basin management plan* is requested, and a *River Basin Authority* needs to be established. The key

objectives are protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. *Good ecological status* and *good chemical status* are asked for but without absolute standards, only referring to *minimal anthropogenic impact*. The effect on each body of water of full implementation of all existing legislation is considered. If the existing legislation solves the problem the objective of the framework Directive is attained.

The role of citizens and citizens’ groups will be crucial. To arrive at decisions to achieve the objectives in the river basin management plan will involve balancing the interests of various groups. The economic analysis requirement is intended to provide a rational basis for this, but it is essential that the process and the implementation of the legislation are open to those living in the basin. The Water Framework Directive requires information and public consultation alongside when river basin management plans are established.

Flood protection and essential drinking water supply is dealt with by providing derogations from the requirement to achieve good status for these cases. Less clear-cut cases are navigation and power generation, where the activity is open to alternative approaches.

As to pollution the precautionary principle provides the basis. A few chemical quality standards have been established for particular substances (nitrates, pesticides and biocides), and these must always be adhered to. Groundwater should not be polluted at all. Quantity is also a major issue for groundwater. For good management, the Directive limits abstraction only to that portion of the overall recharge, which is not needed by the ecology.

The first river basin management plans should be ready by 2009 and then revised each six years.

Link http://ec.europa.eu/environment/water/index_en.htm

10.3 Drinking Water Directive

Directive 98/83/EC, the Drinking Water Directive (DWD), concerns the quality of water intended for human consumption. The objective of the Drinking Water Directive is to protect the health of the consumers in the European Union and to make sure the water is wholesome and clean. Member States have to monitor the quality of the drinking water supplied to their citizens at the tap and of the water used in the food production industry, and report the results every three years.

The Drinking Water Directive sets standards for the most common substances that can be found in drinking water. A total of 48 microbiological and chemical parameters must be monitored and tested regularly. In principle WHO guidelines for drinking water are used as a basis for the standards.

In order to adapt the Directive to progress in science and technology and to address the changed context met after the enlargement of the Union, the Commission is currently (2007) preparing a revision of the Directive addressing bacteriological contamination, chemical substances including construction products in contact with drinking water, small water supplies and risk assessment and risk management.

The concept of risk assessment and risk management during the production and distribution of drinking water was introduced by WHO in the 2004 Guidelines for Drinking Water Quality. This concept was introduced in the context the European Water Safety Plans.

Link http://ec.europa.eu/environment/water/water-drink/index_en.html

10.4 Urban Waste Water Treatment, UWWT Directive

Directive 91/271/EEC concerning urban wastewater treatment aims to protect the water environment from the adverse effects of discharges of urban wastewater and from certain industrial discharges, and secure an environmentally sound reuse or disposal of sewage sludge. Directive 98/15/EC was amended to UWWT Directive to clarify the requirements on discharges from urban wastewater treatment plants to sensitive areas which are subject to eutrophication.

Secondary (biological) treatment is the basic level, which should be provided everywhere. All discharges from agglomerations with more than 10,000 person equivalents (p.e.) within the catchments of sensitive water bodies shall, however, have sewage collecting systems and wastewater treatment plants more stringent than secondary treatment. For discharges in coastal waters treatment may be less stringent (primary treatment) under certain conditions and subject to the agreement of the European Commission.

Member States should establish systems or authorisation for all discharges of urban wastewater, and industrial wastewater into urban sewage collecting systems, to ensure that no adverse effect on the environment (including receiving waters) will occur; and ensure the safe disposal of sewage sludge. For food processing industries and agglomerations with more than 2,000 p.e. the directive requires that collecting system and appropriate treatments are introduced. Member States should also protect receiving waters from pollution of storm water overflows via collecting systems under unusual situations, such as heavy rain.

Adequate co-operation and information exchange with other Member States has to be developed where discharges of wastewater have a transboundary effect on water quality of shared waters.

Link http://ec.europa.eu/environment/water/water-urban-waste/index_en.html

10.5 Sewage Sludge

Sludge originates from the treatment of wastewater. Due to the physical-chemical processes, the sludge tends to concentrate heavy metals and poorly biodegradable trace organic compounds as well as potentially pathogenic organisms (viruses, bacteria etc) present in the wastewaters. Sludge is, however, rich in nutrients, such as nitrogen and phosphorous, and contains valuable organic matter that is useful when soils are depleted or subject to erosion.

The implementation of the Urban Waste Water Treatment Directive has increased the quantities of sewage sludge. From an annual production of some 5.5 million tonnes of dry matter in 1992, the Community will have an estimated 9 million tonnes by the end of 2005 in the EU-15, as the number of households connected to sewers and the level of treatment increases. Landfilling and incineration are the most widely used methods, despite their environmental drawbacks. The reuse of sludge accounts for about 40% of the whole.

The Sewage Sludge Directive (Directive 86/278/EEC) seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and man. It prohibits the use of untreated sludge on agricultural land unless it is injected or incorporated into the soil. Treated sludge is defined as having undergone “biological, chemical or heat treatment, long-term storage or any other appropriate process so as significantly to reduce its fermentability and the health hazards resulting from its use”. Sludge must not be applied to soil in which fruit and vegetable crops are growing or grown, or less than ten months before fruit and vegetable crops are to be harvested. Grazing animals must not be allowed access to grassland or forage land less than three weeks after the application of sludge. Spreading of sludge on surface waters is prohibited (WFD).

The Directive lays down limit values for concentrations of heavy metals in the soil and in sludge and the maximum annual quantities of heavy metals, which may be introduced into the soil. Several Member States have set concentration limits at levels below those in the Directive, and average concentrations of heavy metals in sludge used in agriculture are significantly lower than those specified in the Directive. Seven Member States reported using at least 50% of the sludge they generate in agriculture.

Link <http://ec.europa.eu/environment/waste/sludge/index.htm>

10.6 The Nitrates Directive

The EU has been taking measures to limit nitrogen pollution in waters for over twenty years. While the initial directives concerned themselves mainly with water for human consumption,

more recently legislation (e.g. the UWWT Directive) attempts more to limit eutrophication. Directive 91/676/EEC on nitrates from agricultural sources, called the *Nitrate Directive*, aims to reduce eutrophication caused by agriculture.

The directive requests that agricultural land, which significantly contribute to nitrogen pollution – so-called “vulnerable zones” (NVZs) – are identified and that Action Programs to reduce N pollution are established. The main types of actions that the Nitrates directive promotes include crop rotations; use of soil winter cover, that is catch crops in order to limit leaching during the wet seasons; use of fertilisers and manure, with a balance between crop needs; N inputs and soil supply, frequent manure and soil analysis, mandatory fertilisation plans and limitations per crop for both mineral and organic N fertilisation.

Good nitrate management is requested in this directive. It includes appropriate N spreading, sufficient manure storage and good spreading practices (less than 170 kg organic nitrogen/hectare/year), the use of buffer strips (grass strips and hedges) along watercourses and ditches, and the restriction of cultivation on steeply sloping soils and of irrigation.

Link http://ec.europa.eu/environment/water/water-nitrates/index_en.html

10.7 Priority Substances Under the Water Framework Directive

In July 2006, the Commission adopted a Directive setting environmental quality standards for priority substances, which Member States must achieve by 2015, to ensure “good chemical surface water status”.

Article 16 of the Water Framework Directive (2000/60/EC) sets out a “Strategy against pollution of water”. The first step of the strategy was the establishment of a list of priority hazardous substances to become Annex 10 of the Directive, adopted as final Decision (2455/2001/EC) in 2001. The list identifies 33 substances or group of substances, which have been shown to be of major concern for European Waters. 11 substances have been identified as priority hazardous substances, which will be subject to phasing out of discharges, emissions and losses within an appropriate timetable that shall not exceed 20 years. A further 14 substances were identified as being subject to review for identification as possible “priority hazardous substances”.

Hazardous substances were also listed in Directive 76/464/EEC, later codified as 2006/11/EC, on pollution caused by certain dangerous substances discharged into the aquatic environment. The Directive introduced the concept of list I and list II substances. List I includes substances to be eliminated. It lists 132 pollutants selected on the basis of their persistence,

toxicity and bioaccumulation. So far, 18 individual substances of the “candidate list I” have been regulated in five specific ‘daughter’ Directives. The 18 list I substances are given emission limit values in the IPPC directive as minimum requirements for large industrial installations.

List II includes substances, which should be reduced. It lists groups and families of substances that have a deleterious effect on the aquatic environment. It also contains all individual list I substances that have not been regulated, that is the other 114 substances of the ‘candidate list I’. For the relevant pollutants of list II, Member States must establish pollution reduction programmes including water quality objectives according to Article 7 of the Directive 76/464/EEC. Progress in properly implementing list II substances that are regulated under Article 7 of the Directive has proved to be very slow, and the Commission has started a legal procedure.

Link http://ec.europa.eu/environment/water/water-danger-sub/76_464.htm

Link http://ec.europa.eu/environment/water/water-dangersub/pri_substances.htm

10.8 Groundwater Directive

The new Groundwater Directive (2006/118/EC) establishes a regime, which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The directive establishes quality criteria that takes account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge. The directive responds to the requirements of the Water Framework Directive (WFD). It requests assessments on chemical status of groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations.

The groundwater directive requires groundwater quality standards to be established by the end of 2008. Pollution trends should be studied using so-called “baseline level” data obtained in 2007-2008, and prevent or limit inputs of pollutants into groundwater to allow environmental objectives – compliance with good chemical status criteria – to be achieved by 2015. As in the WFD the reviews of technical provisions of the directive should be carried out in 2013 and every six years thereafter.

Link http://ec.europa.eu/environment/water/water-framework/groundwater/policy/current_framework/new_directive_en.htm

Case Studies

C



Environmental Performance and Conditions of Permits for a Waste Treatment Company

1. Introduction

The Company

Oil & Sludge Treatment Inc. is a company whose main business consists of dealing with the reception, intermediate storage and treatment of different types of refuse and toxic waste. It is situated close to the city of Umeå in North Sweden with facilities at the harbour at the Baltic Sea coast.

The company is a typical entrepreneurial company that started on a small scale, with a small number of sludge trucks emptying oil separators, fat separators etc and depositing the waste at treatment facilities and dumps. The number of cars and the amount of transported waste has since grown steadily over the years. The GD and founder of the company deemed that there were sufficient grounds to treat the waste locally, thus lowering the total amount of material transported to treatment facilities in the south of Sweden. The facility by the docks received a licence for the treatment of sludge oil and polluted sludge/gravel and was thus established.

The Managing Director also noted possibilities to treat other types of waste, such as fat waste. Such treatment, however, requires a permit if exceeding 50 tonnes per year. Estimated volumes were approximately 3,000 tonnes per year. Awaiting a licence for this section of the operation, treatment of less than 50 tonnes per year was reported, followed by a report of interim storage of 1,000 tonnes per year. When a licence has been granted, a full scale treatment of fat waste products will be possible. Problems with the water purification facility led

to the need for an interim storage of oil-polluted water for a period of time. This too could be handled as a report. A report on the pressing of floating sludge, with the purpose of optimizing the purification of polluted water from oil separators, has also been treated by the supervising authority. At present, the company is preparing to, firstly, initiate the interim storage of hazardous waste (i.e. other than waste oil that the company has a licence to treat) and, secondly, start energy production through burning treated waste fat.

Description of Operations

The company is subject to a permit requirement at the highest level, an integrated permit. Licence evaluation therefore takes place in the environmental court. The County Administrative Board is responsible for the supervision of such operations. In this case, the municipality of Umeå has exercised its right to assume responsibility for the environmental supervision.

The company's working hours are Monday through Friday between 7 am and 4 pm, with the exception of summer closedowns and national holidays. The facilities are located at an oil port. Closest neighbours are oil companies and similar operations. Closest populated areas are located approximately one kilometre from the facilities. The operation generates quite a lot of local transportation work, but on the whole the transportation work is decreasing since a substantial amount of waste used to be transported to the south of Sweden. A description of the kind of waste that is handled

and treated at the facility, as well as the processes used, are as follows.

Sludge oil is a by-product from the oil used as fuel by ships. Sludge oil is classified as hazardous waste. It has a high water content (approximately 50%) and high viscosity. At the treatment facility the water phase can be separated, reducing the amount of fluid transported for conversion and recycling by half. The sludge oil is pumped through to the receptor tank (2,000 m³) where water and oil are separated at a temperature of 50°C. The extracted water is transported to an oil separator (30 m³) where further separation takes place at a temperature of approximately 70°C. The water phase is then sent on to a third oil separator (12 m³) with four chambers. Extracted oil from the three stages is removed from the surface by suction and then emptied to an oil tank (50 m³). It is handled as hazardous waste and transported to a destruction facility.

The water phase passes through a pipe filter, where larger particles are extracted, before it is led into a collector tank (10 m³). From here, the water passes on to the ultra filter where the fluid is circulated in a closed system via membrane filters and a processing tank. The resulting concentrate is led to a rest tank and treated as hazardous waste. The purified water phase passes through a time-controlled automatic tester. A continuous turbidity control monitors the outgoing water and stops the process if the turbidity is too high. Outgoing water is carried to the recipient. The treatment is done batch-wise.

The ultra filtering technology has been tried before, and today it is used at other facilities in Sweden, where it has proven to work well as a single stage purification process.

Oil-rich Sludge

Oil-rich sludge and gravel from oil separators, washing channels and similar facilities are all classified as hazardous waste. The sludge is treated in a sludge groove, into which the sludge trucks from the delivering companies deposit the material. The floating oil-rich sludge emerging on the surface of the sludge groove is collected and compressed in a chamber filter compressor. Compressor water is led to the purification facility. The filter bar is sent for further treatment at another facility.

After a detention period, the fluid phase is pumped onto an oil separator (12 m³) where oil and water are separated. The water phase is then transported to additional oil separators (30 m³) for further separation. After this, the water phase continues through the pipe filter and the inspection tank (10 m³) before it reaches the ultra filter.

Most of the dehydrated sludge and gravel from the sludge groove is transferred to the compost facility. Oil pollutions cleaned of gravel and sand are treated at the purification facility.

Composting

Parts of the dehydrated sludge and gravel are mixed with horse manure and bark and placed in rows on a covered treatment plate for composting. Any drainage from the compost is redirected into the purification process. No such drainage has yet occurred, however.

Composting is not yet carried out on a full scale. When fully operational, the intention is that all dehydrated sludge and gravel should be composted at the facility. The field of application for the compost material is determined from case to case after consulting with the supervisory authority.

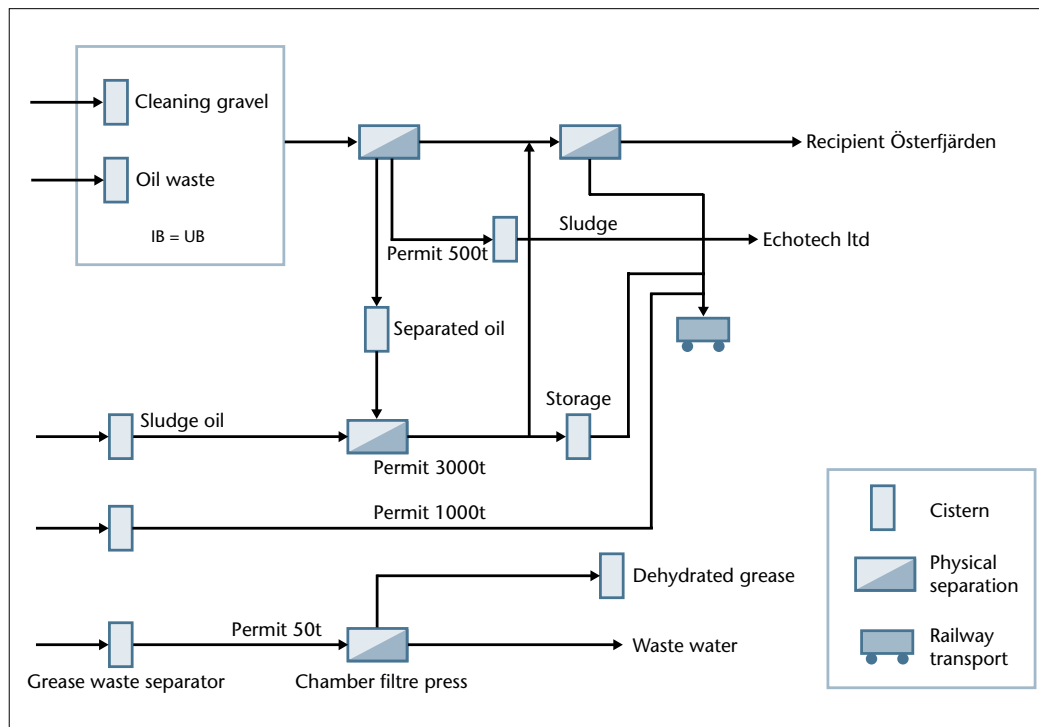


Figure 1.1 Schematic diagram of the flows and processes of the facility. (IB = In balance, OB = Out balance, UF = Ultra filter)

Interim Storage of Waste Oil

The interim storage of waste oil uses a sealed detached tank (1,000 m³). The material is stored until there is a sufficient amount to warrant transport by rail.

Sludge from Fat Separation

Fat and fatty emulsions from fat separators at, for instance, industrial kitchens are classed as waste. The water content is about 80-90%. Collected waste fat is transferred from the company's own sludge trucks to designated storage tanks. A polymer is added to further solidify the fat. The waste is pumped into a chamber filter press, where the water is extracted. The extracted water is not considered to differ much from normal household wastewater and it is therefore diverted into the spill-water network. The dehydrated waste fat is sent to approved facilities to be burned. Energy production using treated waste fat is planned by the company for the future.

2. Environmental Issues

Water

All process water from the facility is purified at a purification facility with ultra filters. Approximately 2,500 m³ of purified process water a year is released directly to the recipient. Purified water contains oxygen-demanding substances (COD) and oil as well as low concentrations of heavy metals. The total of oxygen-demanding matters amounts to three tonnes a year; oil makes up about ten kilograms a year and cadmium, copper and lead add up to a few g/year. The company is actively working to reduce the amount of oxygen-demanding matters in the spill water.

Process water from pressing the waste fat is redirected to a sewage-treatment plant for further purification. Storm water from the facility is redirected to the harbour's coordinated purification facility for oil-polluted water to be purified before its release to the recipient.

Air

Primary air outlets include the oil burner that heats the premises, transports to and from the facilities, evaporation of volatile hydrocarbons from waste materials, as well as discharged volatile hydrocarbons from the composting process. The discharge of volatile hydrocarbons, VHCs, is judged insignificant enough as not to affect the quality of the air in any determined way. Problems with odour may, however, occur periodically between interim storage and treatment of waste fat. The company is currently investigating if adding lime might have a positive effect on problems with bad odours. If this is not sufficient, installing a carbon filter to purify the air is a possible course of action.



Figure 1.2 Chamber filter press for dehydration of fat from the fat separator.

Spill from the company's transports as well as spill from the oil burner nevertheless combine to lower the quality of air locally through the release of carbon dioxide, nitrogen dioxide and particles. On the broader scale, however, transportation is effectively reduced through the company's operations, since less waste material has to be transported to destruction facilities in the south of Sweden. Consequently, the company's operations contribute to improve the air around us. The company also uses so-called clean vehicles (green cars) to further reduce the local effects on the air quality. To minimize disturbance caused by exhaust fumes and noise in residential areas, transportation is also directed along special routes predetermined by the supervising authorities.

Noise

Noise from the planned operations comes from pumps, loading and off-loading, as well as transports to and from the facilities. The risk of this causing any disturbance is, however, negligible as the facilities are located far from any residential areas.

Risks

The largest threat caused by the handled waste materials is accidental spillage reaching soil and water. Large tanks containing liquid waste are therefore surrounded with ditches of soil. Spillage from these tanks is collected in the ditches and can be handled through pumping the liquid through to another tank or tanker. The tank containing sludge oil is only surrounded with a ditch of soil. Sludge oil is not in liquid form at temperatures below 30°C, and is similar to tar in its cold state. Should there be a leakage of sludge oil, the oil collects in a congealing mass inside the ditch. Chemicals are stored indoors, in a space without a drain. As it contains flammable components, handling

waste oil is always associated with fire hazard. Nevertheless, should a fire occur, it will be contained to the tank of waste oil. The tank's size, as well as the distance to other tanks and nearby oil depots, is all substantial enough for the risk of fire to be regarded as minimal. In case of fire in nearby depots where large quantities of pure petrol are handled, there is a risk that the thermal radiation will cause the waste tanks to combust. As a preventative measure, the company is therefore a

member of the coordination group for risk management in the oil port, organized by the dockland companies. The company also participates in the oil port's fire drills.

Energy Consumption

Approximately 350 MWh of electric power along with 20 m³ of heating oil and 90 m³ of fuel is consumed at the facility. In order to minimize the consumption of fuel, the company has

Box 1.1 Permit – Separate Judgement, given on August 5, 2000

The environmental court gives Oil & Sludge Treatment (the company) permission to, in accordance with the Environmental Code (1998:808), at the property *Hamnen* in the municipality of Umeå, build and operate a facility for the interim storage of 1,000 tonnes of waste oil, as well as the treatment of, in part, 3,000 tonnes of sludge oil per year from ships, including waste from the engine room, and, in part, a total of 500 tonnes of oil polluted waste a year, in the form of sludge and gravel from the sludge separators, oil separators, gutters, pump holes and similar.

The operation shall be running no later than four (4) years from the date of the judgement, in reference to the interim storage of waste oil, and no later than two (2) years from the same day with regards to the rest of the operations. If not, the permit expires.

For the permit, the following conditions are in force:

1. If not otherwise stated in this judgement, the operation must include measures to reduce the pollution of water and air, as well as other disturbances to the surroundings, in accordance with what the company has stated or assumed responsibility for in the case.
2. Ditches corresponding to available tank space must be organized. The arrangements must be designed in cooperation with the supervising authority.
3. Noise from the operations must be limited, so that outside and in residential areas noise levels do not exceed the equivalent of 50 dB(A) on weekdays between 7 am and 6 pm, 45 dB(A) on Saturdays, Sundays and national holidays, 40 dB(A) at night between 10 pm and 7 am and 45 dB(A) at all other hours. At night, momentary noises outside may not exceed 55 dB(A).
4. In the control programme, it shall be clearly shown in what way the company's readiness in case of emergencies is coordinated with the emergency planning work within the larger dock area.
5. Suggestions for an after treatment plan shall be established and submitted to the supervising authority in good time before a possible closure of the operations.

Trial period

The following investigations shall be carried out by the company, after consultation with the county administra-

tive board, and must be presented to the environmental court no later than December 31, 2001, together with the demands that the investigations may cause in the way of measures and final conditions:

1. Investigation relating to the treated process waste water released by the facility regarding, firstly, the total volume and, secondly, the content of pollutions.
2. Investigation relating to composting with regards to, firstly, what results achieved by treatments, secondly, the presence and risk of odours and, lastly, how the end product can be used.

Until otherwise stipulated, the following provisional regulations are in effect:

1. Process water separated in the facility shall be purified in an ultra filter.
2. Process water released from the facility must not exceed the guiding values and monthly mean values for the following pollution levels:

Suspended	10	mg/1
COD Cr	1,000	mg/1
Zink	0.5	mg/1
Copper	0.2	mg/1
Chromium	0.2	mg/1
Lead	0.1	mg/1
Nickel	0.2	mg/1
Cadmium	0.02	mg/1
Oil	5	mg/1

3. The compost facility shall be operated in such a way that it does not cause any odour disturbances to the surrounding area.
4. The treated process water from the facility shall be redirected to Österfjärden.

The licence is only valid if the company can put up a collateral of SEK one million (SEK 1,000,000) for incurring costs. The collateral must be comprised of a deposit or surety, including a bank guarantee, and kept by the county administrative board of Västerbotten.

established rules against idle running of vehicles and works continuously to optimize transportation through examining logistical systems. In the future, the company intends to use waste fat as fuel in its own burner, where the waste will replace a good quantity of heating oil.

Use of Chemicals

The most common chemical used at the facility is a polymer supplement designed to thicken the waste fat, which amounts to approximately 18 m³ a year. A variety of chemical cleansers, totalling around 100 litres a year, are also used for cleaning the facilities. The company works actively according to the exchange principle, which means that if there are less hazardous alternatives these should be favoured to other chemicals.

3. Permit Authorisation

Background

Since the operation is classified as subject to a permit requirement, the operations have been tried by the environmental court.

The authorisation process began with a consultation with the authorities and the concerned parties. In this the company gives a brief account of the nature and extent of the operations as well as the expected effects on the environment. At the consultation, both authorities and concerned parties can make suggestions as to which aspects of the operation should be looked at more closely.

Environmental Impact Assessment

The company then starts the process of preparing an Environmental Impact Assessment (EIA). Should the county administrative board deem it necessary, in the light of the estimated environmental effects of the operation or other pertinent issues, the consultation group can be further extended to also include environmental interest groups and certain national agencies (e.g. the Swedish Environmental Protection Agency, the Swedish Board of Fisheries and the Swedish Rescue Services Agency). Suggestions from the previous consultation are included in the statement and the permit application.

The Environmental Court Proceedings

The application, including the EIA, is then submitted to the licensing authorities. When the licensing authority, as in this particular case, is the environmental court, the authorisation process is settled in oral court proceedings. At the proceedings, the company's claims, suggestions for conditions as well as the application and the EIA are treated by the court, the authorities and the company.

After the proceedings, the court will give its judgement with the permit and conditions for the operation. In this particular case, two issues were not sufficiently investigated, and for these issues only a provisional set of conditions were given. This means that the company was given a set amount of time to investigate the issues while in operation. Below is the separate judgement of the environmental court regarding the per-

Box 1.2 Judgement with Final Conditions of the Licence, stated on December 2, 2004

For the licence to build and operate a facility for the treatment and interim storage of oil waste etc., on the premises *Hamnen* in Umeå, that the environmental court in Umeå submitted a separate judgement on May 8, 2000, the following final conditions shall be applicable, in addition to the conditions established in the separate judgement.

1. Process water released from the facility must not exceed the guiding values (monthly mean) for the following pollution levels:

Suspended particles	10	mg/1
COD Cr until 2005 12 31	1,500	mg/1
COD Cr from 2006 01 01	1,000	mg/1
Zinc	0.1	mg/1
Copper	0.1	mg/1
Chromium	0.01	mg/1
Lead	0.01	mg/1
Nickel	0.1	mg/1
Cadmium	0.001	mg/1
Oil	5.0	mg/1

2. Dilution of the process waste water with the purpose of lowering the pollution levels is not permitted.
3. In case of bothersome odours or other inconveniences caused by composting, appropriate measures to deal with the disturbances must be taken. Measures must be taken after consultation with the supervising authorities.
4. Treatment of polluted, dehydrated sludge must take place indoors, on a dense surface with the possibility of collecting drainage water. Collected drainage water must be purified in the ultra filter.

Supported by the 22 chapt. 25 § 3 st in the Environmental Code, the environmental court leaves it to the supervising authority to prescribe the outstanding conditions that may be required regarding the design and operation of the composting facility.

mit of the company in question. Please note that the company must offer financial collateral covering the costs of liquidation in case of bankruptcy for the permit to be valid.

Trial Period Investigation

After the close of the trial period, the company will show an investigation from the trial period. If the court and authorities deem the investigation to be sufficient, a new negotiation meeting is often called to finally settle questions which have been deferred.

At the negotiation, the company's investigation was treated along with any new information. In this case, the investigation showed that the spillage levels of heavy metals was significantly lower than the provisional conditions, spillage of oil and suspended substances were on par with the provisional conditions, while the COD spillage exceeded the allowance in the provisional conditions. However, at the negotiation the company stated that they had very recently found the cause of the elevated COD levels and intended to adjust the facility to lower the levels. The court therefore decided to lower the guiding values for heavy metals, maintain the guiding values for oil and suspended substances and, for a period of time, increase the guiding values for COD to give the company the chance to deal with the problems of COD. Regarding the composting of sludge, the court established conditions for odour problems and treatment of drainage water. Other issues relating to the composting were delegated to the supervising authority. Below is the final judgment for the deferred issues.

Operator's Self-monitoring

In accordance with the Environmental Code, all environmentally harmful operations must exercise operator's self-monitoring control of the operation and its affect on the environment. The contents and extent of the operator's self-monitoring control for operations that requires a permit is regulated in a special statute. Violating this statute is punishable by law. The



Figure 1.3 View of the plant.

company has established an operator's self-monitoring control programme, which has been presented to the supervising authority. In case of changes to the operation, the control programme must also be revised. The most important parts of the programme are presented below.

Sampling

Tests of outgoing water from the ultra filter are made every second week, in the form of day samples. These are analysed separately and the monthly mean values are calculated. The sample is taken with an automatic tester. Analyses are carried out for suspended substances, COD, zinc, copper, chromium, lead, nickel, cadmium and oil index. The analyses are carried out by an accredited laboratory.

During the operation of the fat filter press, the company will continue to carry out tests and analyse reject water from the fat filter facility. Testing of reject water will take place every second press. The parameters being analysed are as follows: BOD, COD, suspended substances, TOC, fat, tensides and oil index. The analyses are made by an accredited laboratory.

Results from the analyses are presented both as level and quantity values. Should significant deviations from normal values be detected in the values, the supervising authorities will be notified.

Controls of Preventive Environmental Measures and Equipment

The following are monitored regularly:

- That the chemicals and hazardous waste are stored and protected from leakage to the surroundings.
- The ditches at the premises.
- That there is an absorption agent.
- That the facilities hold satisfactory standards, thereby avoiding leaks.

The monitoring of the functioning of the purification equipment is carried out according to practice collected in a binder labelled "Ultrafilter Operation". The facility is checked daily according to the practice in the quality management system and the environmental management system.

Monitoring of Practices in Case of Incidents, Interruptions and Accidents

In case major, serious interruptions (e.g. spills, leakage, fire) the following are contacted:

Rescue services	112
Umeå Harbour	090-16 32 80 (switchboard)
Supervising authority	090-10 70 00 (switchboard)

There are fire extinguishers in pump houses, by reception containers and by ultra filters. The sludge tank has a powder/foam extinguisher. The facility has routines for the handling of leakage, spillage, stoppage and fire posted. The rescue services have updated lists of contacts for all operations within the dock area. The regulations for the operation are followed, as well as the general emergency plan that has been established for Umeå oil port.

Periodical Inspection by an Impartial Inspector

Periodical inspections of the operations shall be carried out on the company's own initiative every other year, starting from 2003. The purpose of the periodical inspection is to:

- Examine the performance and technical quality of the operator's self-monitoring system.
- Give a basis for the judgement of whether the facilities are operated and maintained in a technically optimal way.
- Give a basis for the judgement of whether the conditions and monitoring programme have been followed.

The inspection shall be carried out by an impartial inspector with expertise in the field. Before the inspection is carried out, an application must be submitted to the supervising authority on when the inspection will take place and who will perform it. The extent of the inspection is to be settled after consultation with the supervising authority.

Environmental Report

Environmentally dangerous operations subjected to a permit requirement must submit an annual environmental report. This

is due no later than March 31, the business year described in this report. The report also states the volume of the year's production, changes made and the volume of spills. The report is a very important supervisory tool for the authorities. The information contained is also used for regional and national summaries on the state of the environment. Not submitting the report, or submitting it too late is punishable by law. The most important section of the report is the company's description and comments on how the conditions of the licence have been met. Table 1.1 contains extracts from this section of the report.

4. Other Authority Decisions

Environmental Sanction Fees

Despite a reminder from the supervising authority, the company's environmental report for 2004 was submitted late. Some breaches of the regulations stated in the Environmental Code and regulations with support in the Code, in which delayed submission of the environmental report is included, entail a penalty in the form of an environmental sanction fee. The value of the penalty is dependent on the nature of the breach. The penalty for a delayed environmental report amounts to SEK 2,000 (Euro 220). The authority was therefore authorised to decide on an environmental fee for this delay.

The decision was formulated as follows:

The Environmental and Health Board has come to the decision, based on ch § 30 of the Environmental Code, that the Company shall pay an environmental sanction fee of SEK 2,000 for a breach of the § 6 of the regulations of the Swedish Environmental Protection Agency regarding the en-

Table 1.1 Conditions and regulations with comments on how conditions have been met during 2004.

Condition, active decision	Comment on how conditions have been met
The licence comprises the building and running of a facility for interim storage of 1,000 tonnes of waste oil and treatment of, firstly, 3,000 tonnes of sludge oil from ships per year, including machine room waste and, secondly, a total of 500 tonnes a year of oil-polluted waste in the form of sludge and gravel from sludge separators, oil separators, gutter wells, pump holes and similar.	During 2004, a total of 249 tonnes of waste oil has been received and transported to Reci Halmstad. 3,048 tonnes of sludge oil has been received, of which 1,564 tonnes have been treated. 1,624 tonnes of oil-polluted sludge has been received, generating 188 tonnes of oil-polluted sludge. The conditions stipulated in the licence have been met.
Process water released from the facility must not exceed the guiding values and monthly mean values for the following pollution levels (see licence, final judgement).	A total of 2,573 m ³ of process water has been released to the recipient. COD has been exceeded twice, suspended substances have been exceeded four times and chromium has been exceeded three times. A continuous optimization of the operation is expected to prevent any future breaches.
Banking corresponding to available tank volumes must be provided. The banking arrangements must be designed in cooperation with the supervising authority.	Banking has been designed in cooperation with the supervising authority. During 2004, no leakage has occurred.
No dilution of the process water, with the purpose of lowering the pollution levels must occur.	No pollution has occurred during 2004.

vironmental report for environmentally hazardous operations subject to a permit requirement.

Notification of Minor Changes to the Operation

A change or addition for an operation subjected to a permit requirement can be carried out after a notification to the supervising authority, in cases when the change is not subject to a permit requirement. The notification must contain, among other things, a description of the change, estimated consequences to the environment following the change, and a revised operator's self-monitoring control programme.

The company submitted such a notification of change to the interim storage of waste from fat separators. As the company had not yet been granted a licence for a full-scale treatment

of such waste, the company was obliged to store the waste temporarily awaiting the licence. The change was deemed notifiable, i.e. have a legal obligation to submit a report and the supervising authority subsequently gave an order on precautions for the notified interim storage.

The Authority's Comments

The company is undergoing constant development to be able to handle new wastes, new methods and new procedures. So far they have kept within the pale of the law – apart from late submission of the environmental report – but there have nevertheless been a few close calls. Supervising the company has involved great efforts from the supervising authority, where in some cases the authority has been able to allow certain changes, while in others it has not.

The company's main operations have always had the nature of improving environmental protection – such as, for instance, reduced transports. In the beginning, however, the company had limited knowledge of the laws and regulations in the area of environmental protection. Through close cooperation with the supervising and licensing authorities, however, the company has now achieved a high level of knowledge, both about the effects of their own operation and consequences for the environment, and in the field of environmental legislation.

The authority predicts a substantial amount of work in the future to revise the operation, as a consequence of the scheduled changes. Following this, supervision of the operation will mainly involve inspection of and cooperation with the company, for the development of the operator's self-monitoring programme.

Box 1.3 Decision Regarding the Notified Changes

The Environmental and Health Board, in accordance with the Environmental Code and with reference to 27 § on the provision on environmentally hazardous operations and health protection, charges the Company with the following, regarding the notified changes:

This decision refers to a maximum of 1,000 tonnes of coincident interim storage of waste from fat separators. The decision is in effect until such time that a possible licence, according to the Environmental Code for expansion of the operation, including interim storage of waste from fat separators prior to treatment, has become legally valid.

- If not otherwise stated in this order, the Company shall follow the duties and tasks stated by the company in the notification.
- Transports to and from the facilities must be routed through the road E12, except in those cases where it is inadvisable from an environmental point of view.
- The company's operator's self-monitoring control must be updated to include the notified change. Special note must be taken to controlling the detection of odour problems from the interim storage. A report of the updated operator's self-monitoring control must reach the supervising authority no later than 01-08-2005.
- Any odour problems occurring during interim storage and other handling of the fat waste must be reported to the supervising authority. Should any odour problems occur, necessary precautions, such as carbon filtering of outgoing air or similar, must be taken.

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A Court Case on Permits to use Pesticides in a Plant Nursery

1. Introduction

The Company

Swedish Forest Plants Ltd is a company, that produces plants, mainly of pine, for the purpose of reforestation of clear-cut areas in northern Sweden. Production started in the area in 1950 and has been established since then. The plant nursery is located on a gravel and sand ridge, as such soil was needed for the particular kind of growth form (bare root) that was commonly used at the time. Approximately 3 km downstream from the ridge formation is a large water supply for Umeå city of about 110,000 inhabitants. The area around the water catchment is protected to prevent the pollution of the water source. The protected area also includes the plant nursery.

Use of Pesticides

Pesticides are used to protect the plants from insect attacks. In particular some species of beetles are a serious threat to plant growth. Early on DDT was used. This was discontinued in 1970, when a general ban on the use of DDT was introduced. Later on other insecticides were used. Also protection of the plants against fungal growth became important and a number of fungicides are used regularly.

2. Licensing

Licensing

The Swedish environmental legislation did not until recently include a general demand for a permit for plant nurseries. This company thus did not have to apply for a permit, but of course as any activity, needs to abide by the environmental legislation of the country.

However, in 1977 the Swedish Environmental Protection Agency, EPA, issued regulations for the use of pesticides. Therefore, the plant nursery needed a permit to use pesticides within the protected area. The municipal office for environmental health was in this case the supervisory authority and responsible for approving or rejecting permit applications.

Application for a Permit in 1998 – Analysis of Pesticides in Water

The company applied for such a permit in 1998. In connection with the application, the supervisory authority required that the company take samples from the ground water for analysis of specified chemical agents.

The analysis showed that a number of chemicals were prevalent both within the area, and downstream in the gravel

ridge. The kind of chemicals found were compounds that had been used historically since the start of the operation. Further studies of the ground water and soil were carried out and showed high levels of pesticides in the surface soil. Residues from pesticide use were also found 1-2 km downstream from the nursery.

From 1998, there was a gradual winding-up of the use of pesticides in the plant nursery. This process was carried out according to a termination plan designed by the plant nursery in cooperation with the supervisory authority.

Application for a New Licence in 2001

Before the growing season of 2001, the plant nursery applied for a permit to use four compounds (fungicides). However, the supervisory authority – the environmental health office at the municipality – deemed two of these compounds questionable from a risk point of view and did not allow their use. For the risk evaluation of pesticide use within a protected



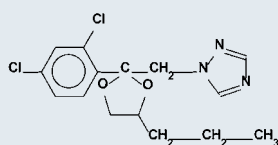
Figure 2.1 A growing pine cone. (Photo © Sveaskog)

water supply, great importance is given to the mobility of the compounds in the soil and ground water.

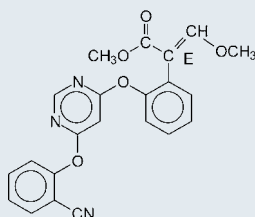
Of the compounds listed (Box 1) in the applications Propiconazole and Iprodion were approved while Azoxystrobin and Tolyfluanid were not approved by the authority:

Box 1 Pesticides

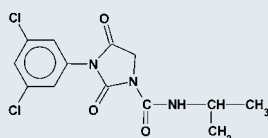
1. Propiconazole
(Swedish trade name:
Tilt gel)
Antimoulding agent



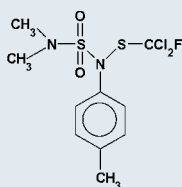
2. Iprodion
(Swedish trade name:
Rovral flo)
Antimoulding agent



3. Azoxystrobin
(Swedish trade name:
Amistar)
Antimoulding agent



4. Tolyfluanid
(Swedish trade name:
Euparen)
Antimoulding agent



The Assessment of Fungicide Use

For Azoxystrobin there was no information about mobility. However, the Danish Environmental Protection Agency had studied the compound and was of the opinion that the use of compounds such as Azoxystrobin should generally be forbidden outdoors due to the risk of contamination of the ground water. Tolyfluanid breaks down into DMST (N-methyl, N'-(4-methylphenyl)-sulfamide), a substance that can potentially contaminate the groundwater. The original substance, however, shows medium to low mobility in soil and ground water. The remaining two compounds, Propiconazole and Iprodion, both show low mobility in the soil.

It should be pointed out that Azoxystrobin and Propiconazole are both used against grey mould and Tolyfluanid and Iprodion are used against the same types of fungus infestations. The supervisory authority was therefore of the opinion that the plant nursery should be able to make do with the use of one compound for each type of mould. The compounds considered to cause the least risk for water pollution were Propiconazole and Iprodion. These compounds would not pose an immediate risk to the water supply. The other two were excluded on the ground that their use would cause a significant risk to the groundwater in the long-term. The denial was thus a long-term preventative measure.

The supervisory authority therefore allowed the use of Propiconazole and Iprodion during the growing season of 2001. The permit was issued with the condition that the com-

pany should account for its use of pesticides during the year to the supervisory authority. The company was informed of the decision.

3. Inspection and Court Case

Inspection on the 2001 Permit – Charge for Criminal Activity

During the revision of the 2001 report to the authority it was noted that the company, apart from the approved compounds, had also used Azoxystrobin and Tolyfluanid, which were not approved in the permit. The amount used was 2.5 kg of active compounds.

Violating the permit is considered an environmental crime according to the Swedish environmental legislation. Any person responsible for such illegal environmental activities is liable to be fined or imprisoned for a maximum of one year. The supervisory authority is obliged to report suspected violations of the environmental legislation, according to the Environmental Code. The case was therefore remitted to the environmental prosecutor who started a preliminary investigation. The preliminary investigation resulted in a legal action against the responsible director of the plant nursery.

It should be noted that if the company had severe objections against the conditions in the permit, they had the opportunity to appeal. But the possibility of appeal to a higher court had not been used by the company.

The Procedure in the District Court – Appeal to the Higher Court

The district court rejected the suit due to the fact that the risk of damage was considered negligible. The environmental prosecutor, however, appealed the case to the court of appeal who, again, denied the complaint, commenting that the risk was small and the action insignificant.

An appeal of the decision from the court of appeal can only be made by the Chief Public Prosecutor and shall only be allowed if it can be considered a matter of a principal that the case is settled in a higher court.

In this case the Chief Public Prosecutor appealed the decision from of the court of appeal to the highest authority, the Supreme Court. The Supreme Court announced its verdict during spring 2006. This decision is not open to appeal.

The Supreme Court Decision

The Supreme Court established that when a permit violation has occurred, the risk of damage does not pose a basis for whether the violation should be considered minor. If a person that has applied for a permit and acts in violation of this

permit, only in exceptional cases can the act be considered insignificant. The Supreme Court also established that a violation against the permit for the use of pesticides must not lead to imprisonment, even though imprisonment is included in the range of punishment for environmental crimes. The reason for this is that the rules regarding the use of pesticides are only directions from the EPA and are not regulated by law or provisions.

Should an administrative authority, such as the EPA, fill out the punishment decree form for environmental crimes in such a way that the crime the responsible person has been charged is fully stated in these regulations, the charged person can not be sentenced to prison. The principle is that the government or Parliament must decide regulations, which may lead to a prison sentence, that is, they must be laws or provisions.

The Supreme Court therefore convicted the responsible person of conducting illegal environmental activities, sen-



Figure 2.2 North Swedish pine forest. (Photo @ Södra)

tencing him to pay a fine according to Section 29, § 4 in the Environmental Code.

4. Comments

Reflections from the Supervisory Authority

The plant nursery's violation against the conditions of the permit did not pose an immediate risk to the water supply, but the purpose of excluding certain compounds was that the use of these compounds causes a significant risk to the ground water in the long term. The opinion of the authority and the decision to exclude the use of certain compounds was thus a long-term preventative measure.

Irrespective of the acute risk of pollution, it is extremely unfortunate from the authority's perspective if an operator, regardless of whether this is done intentionally or by accident, does not comply with the decisions taken. The position of and confidence in the authority can be severely undermined when an operation that violates the authority's decision does not receive any kind of sanction.

It is therefore the authority's opinion that the fines issued for the violation of the permit was a positive thing. This is positive, firstly, because the Supreme Court shares the opinion of the authority regarding the specific case and the importance of adhering to the decisions and conditions of the authority, and secondly, because the legally valid punishment for environmental crimes show other operations that it is expensive not to follow the environmental laws and authority's decisions. The verdict thus has a general preventive effect.

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Internet Resources

<http://apps.kemi.se/bkmregoff/Bkmblad/Propikon.pdf>
<http://apps.kemi.se/bkmregoff/Bkmblad/Iprodion.pdf>
<http://apps.kemi.se/bkmregoff/Bkmblad/Azoxystyr.pdf>
<http://apps.kemi.se/bkmregoff/Bkmblad/Toly1.pdf>



An Integrated Permit for a Landfill according to IPPC

1. The Landfill in Waste Management

Landfills

In all countries dumps, garbage heaps or – in modern wording – landfills have been the most common type of waste disposal. There are thousands of landfills in our countries, many of them small and unplanned. Too often they are found in places where they leak to groundwater and constitute an environmental threat. In recent times regulations on waste management have become much more strict. The traditional landfills thus have become illegal. Modern landfills are operations opened, run and closed by an authority, most often a municipality, which has the responsibility for waste management.

In European Union policy waste management is a very important area. The amounts of solid waste in Europe have been increasing enormously during the last few decades; other options have had to be developed. In these reuse, recycling of material and, finally, incineration are prioritised. Land-filling is the least favoured alternative.

Legal Requirements

A landfill is today an operation controlled by a number of measures to guarantee that it is not destroying its environment, especially not the groundwater, or is a nuisance to the neighbourhood, for example from bad smells. The use of landfill is today subject to considerable taxation and regulations. In particular land-filling of organic waste is being reduced continuously and becoming outlawed.

Below, the procedure for the establishment of a landfill in a small Polish town will be described. The story of the landfill is a little more complicated than it would have been in a western country, as it happened when Poland was joining the European Union and thus adjusting its environmental code to the so-called *acquis communautaire*, the body of EU legislation.

The case also illustrates how often new investments and environmental operations in the new EU countries involve international cooperation, and how less reputable operators try to make money by evading environmental law.

How to Construct a Landfill

A landfill is a threat to the environment mostly because it leaches contaminated water to the ground and groundwater and emits gases, mostly methane, to the air, and creates noise. In the EU the construction of a landfill should be designed according to the Landfill Directive, which is very detailed; all the technical information needed is found in the Directive.

A typical landfill consists of

- a liner, the system that seals the landfill from the underlying soil
- a leachate collection and management system, to allow treatment of wastewater
- the drainage system for the water
- a system for collection of methane, caused by the decomposition of organic material

- a monitoring system for methane and leachate water
- a road infrastructure for allowing trucks to deliver waste etc

When the allowed amount of waste has been added to the landfill, it has to be covered with a so-called landfill cap. In this way it is secured for the future. In best cases the landfill area can be used for some activities, for example a golf course or the like. If organic waste was dumped in the landfill, such new uses cannot be arranged earlier than after 30 years of its closure.

2. Opening a New Landfill

Establishing a Waste Management Company

The old landfill in the town of Tomaszow had almost been filled up to the legally allowed level in 1997. The city needed a new landfill, mostly for its household solid waste. The city established contact with a Belgian waste management company and the two formed a new waste company on a 50:50 ownership basis. While the Belgian partner made some investments, the city contributed with the property needed for the new site.

The new company was formed and established by early 1999. The Belgian partners also had experience and competence, and especially experience of the EU Landfill Directive from 1999 [Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste]. The Landfill Directive outlines how a landfill may be constructed and how the surroundings should be protected.

Application for Localization

A new industrial or industrial-like activity, like a landfill, needs to have a permit to be built and become operational on a given property. The new company thus had to provide an application

for localization. The authority responsible for this permit is the municipality. The chosen localization was close to the site of the old landfill and from this point of view not controversial.

The decision on localization was taken by the municipality as an administrative decision, signed by the Mayor. Acceptance requires that the planned localisation agrees with the spatial plan and detailed plan for the area. The plan for land-use development is decided on by the city council and regarded as a local regulation. In this case the site for the landfill was located in the municipality of Lubochnia. The site belonged however to the National Forest, and was the property of the National Forest company, but was leased by Tomaszów municipality from October 1999. In the municipal spatial plan of Lubochnia the area was indicated as not to be used for agriculture or forestry.

The company also had to provide an Environmental Impact Assessment, EIA, which according to EU legislation is required if a landfill handles more than 10 tons of waste per day, or more than a total of 25,000 tons of waste at the site. This is of course the case. Ten tons is what comes on a single truck, and there would be much more than that.

The Environmental Impact Assessment has to be made publicly available. Those who wish may protest against the

Box 1 Regulations Involved

Part 1 Starting and building the landfill

- EU Landfill Directive from 1999
- National regulations for Environmental Impact Assessment
- Town and country planning
- Law on Building permits

Part 2 Running the landfill after EU accession

- IPPC Directive
- Water framework Directive
- Air Framework Directive
- Noise Regulation



Figure 3.1 Localisation of the new landfill (light blue) in relation to old landfill (dark blue), urban centres and the highway.



Figure 3.2 Transporting waste to the new landfill.

localization within a certain time, often 3 weeks. In this case the localization was not controversial. As mentioned, it was neighbouring on the old landfill, and located in the forest surrounding the town, close to the highway from Warszawa to Katowice. Possible noise would not be problematic. It was not close to residential areas or other industries.

The localisation was accepted by the municipality (not surprisingly considering it was a partly municipally owned company), and no one used the right to protest against the localization. The requested permit was granted the new company after the legally stipulated time of 30 days.

Application for a Building Permit

With a permit for localization the company now had to apply for a building permit for the landfill. A detailed drawing had to be provided, as well as a description of the operations, and the EIA. In particular the description had to show how the ground water would be protected and give details on noise, smell etc.

The authority responsible for a building permit of a landfill of this size is the Powiat. A “powiat” in Poland is a regional authority (most often translated into County), larger than a municipality but smaller than a voivodship (most often translated into Province, in Polish województwo). In case of very large installations it is the voivodship, that grants the permit. For medium-size activities it is the Powiat.

If documentation is complete the Powiat has only 30 days to decide. Also here the application has to be made publicly available and anyone may protest against the building.

A building permit is provided as an administrative decision, signed by the Director (Governor) of the Powiat. The application of the waste company was granted after the 30 days. [Building permit No 294/99/T from 28.12.1999] The activity could start.

Box 2 Activities requiring an Integrated (IPPC) Permit

Annex I of the IPPC Directive lists installations for which an integrated permit is required. They are

1. Energy industries
2. Production and processing of metals
3. Mineral industry
4. Chemical industry
5. Waste management
6. Other activities

Each of them are described in detail. For category 5:

1. Installations for the disposal or recovery of hazardous waste
2. Installations for the incineration of municipal waste
3. Installations for the disposal of non-hazardous waste, with a capacity exceeding 50 tonnes per day.
4. Landfills receiving more than 10 tonnes per day or with a total capacity exceeding 25,000 tonnes, excluding landfills of inert waste.

The landfill of Tomaszow is included in category 5.4.

3. The IPPC Permit

IPPC is introduced in Poland

The new landfill was built in 2001 and started its operations in late 2001. The permit to start to operate dated October 4, 2001. Waste was collected from the municipalities of Tomaszow and neighbouring Lubochnia.

During this time Poland was negotiating its EU membership. In late 2003 it became clear that Poland was going to introduce the Integrated Prevention and Pollution Control, IPPC, Directive. This directive, introduced in the EU-15 in 2000, would be part of the new acquis as Poland would join the Union on May 1st 2004. In Poland the Integrated Permit were requested slightly earlier, already from January 1st 2004. From the Annex II of the directive it is clear that landfills would need an integrated permit.

At this point the Danish government had stated a project to assist Poland to introduce the EU environmental legislation. Three voivodships became project areas for practical work. Lodz Voivodeship, where Tomaszow is located, was one of them.



Figure 3.3 Tanks for leachate from landfill, composting plate for greek waste, and slope of old landfill.

The Procedure for Obtaining an IPPC Permit

The procedure leading to an integrated permit may be seen as four phases as follows:

1. Preparatory phase including the environmental audit
 - identification of environmental aspects
2. Introductory phase
3. Assessment phase
4. Decision phase

The two first phases are the responsibility of the applicant, the owner of the installation. The last two phases are the responsibility of the competent authority. However it is best if the two have contacts during the entire process. In the third phase a negotiation between the applicant and the authority is conducted.

Preparatory and Introductory Phases

It was first necessary to check if the landfill needed an integrated permit. This is the case if it receives more than 10 tonnes per day or has a total capacity exceeding 25,000 tons. Landfills of inert waste are excluded. In the case of the Tomaszów landfill, due to commencement of the operation of the company during the past year of 2003, the company foresaw the following output:

- waste, which is harmless on the landfill, about 120,000 m³/year. As the density of communal waste is about 250 kg/m³, it will be about 30,000 tons annually. That is, about 85 tons of waste can be stored per day
- temporary storage of recyclable materials and hazardous waste, about 3,000 tons/annually
- composting of green waste – about 500-700 tons/annually

These data confirmed that the landfill required an IPPC (integrated) permit, and specified the conditions to be negotiated with the authorities.

The next step was the preparation of the application for an integrated permit. This is the responsibility of the owner of the company. Very often the owner recruits a consultancy to prepare the application in the cooperation with the owner.

When the application is turned in, the applicant has to pay a fee. It varies with the size of the operation. The maximum charge for an IPPC permit was 3,000 euros. In the case of this landfill, which was a comparatively small operation, the company had to pay 750 euros.

How the Permit is Prepared.

According to Polish Law the authorities are responsible for preparing the integrated permit for the installation. Here the owner of landfill should be prepared to negotiate with the authorities regarding the operational conditions. Also in this step the possibility of public participation is required.

During the permit preparation it is necessary to take into account not only the landfill directive but also other directives and regulations. These could be:

- Emissions to air (collection of landfill gas)
- Emissions to water and ground (possible leakage to water)
- Noise (working machines, traffic to and from the landfill)

The IPPC Bureau in Seville has decided not to prepare the BREF for landfills because the landfill directive is so technical that it can be regarded as defining the BAT requirements with this directive.

After the negotiations the permit was granted to the company.

Changing Ownership

In 2004 the owner and the board of the company were changed. The new owner made a lot of money by taking waste from Warsaw and used all space available. To these provocations was added the fact that landfill tax was not paid, and the company went bankrupt. The new owner thus violated both environmental and criminal law, and was removed.

In 2005 the landfill company again changed owners as it was taken over by SITA, a well-known French waste management company. The situation was also influenced in 2005 as Polish environmental law was adjusting to EU law. For the landfill company the change in the Waste Law meant that waste may only be accepted from the closest places. The landfill thus could only be used by the city of Tomaszow as originally intended.

Box 3 The Contents of an Application for an Integrated Permit

I. Formal part

General information and statements of the applicant

II. Information and descriptive part

General information on the subject of the application

Description of installations used

Description of environmental impact

Description of the neighbourhood

Description of the quality of environment in the impact area of the company

Environmental emission impact

III. Operational part

III.1. Fulfilment of BAT requirements by the company

Methods of protecting the water environment

Methods of air protection

Methods of protection against noise and vibration

Methods for limiting noxiousness of waste management

Methods of protection against electromagnetic radiation

Technical and organizational methods for protecting the environment as a whole

Environmentally safe termination of equipment and installation operation

Necessary scope of monitoring

Readjustment program (optional)

III.2 Applied limit values for emissions and other parameters

Additional parameters of the quality of the environment

Suggested limit emission values

III.3 Applied for limit value and types of produced waste and neutralization

Monitoring of the quantity of collected water

Scope of monitoring of emission

Scope of technological process monitoring

Scope of environmental quality monitoring

Suggested principles of collecting and transferring the results of monitoring

Other scope of monitoring

Suggested criteria of identification of substantial impact and principles of defining monitoring requirements

III.4 Conditions of verification and changes in the content of the permit, suggested period of validity of permit

Suggested frequency of monitoring of permit conditions

Criteria for defining substantial change in the economic activity performed

Criteria for defining "substantial deterioration of the state of environment"

A New Integrated Permit

SITA applied for a continued integrated permit in March 2005. Now, however, the authorities did not grant the permit, since the lease of the site where the landfill was located had expired on June 18, 2005, and the site thus was not owned by the operator. Rather the Voivodeship Inspectorate of Environmental Protection forced the landfill to a halt its operations on October 30, 2005. Thereafter it took 1.5 year for the municipality to agree with the National Forest on a prolongation of the land lease. In the meantime SITA could not use the landfill.

In 2006 SITA applied once again for an integrated permit with slightly altered conditions, mostly regarding an expansion of the operation. At the beginning of 2007 SITA was granted this new integrated permit. With the new conditions it would be possible to increase the landfill height to some 5 meters and further expand its area.

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ISO 14001 Surveillance Audit as Compliance Inspection

1. The Cement Factory

History

The Krasnoselsk Cement factory is situated close to the town of Vaukavysk in the Grodno region in Belarus, 50 km from the Polish border, on the bank of the River Ros, which flows to the River Neman and on to the Baltic Sea.

The plant is the largest of three cement plants which are found in Belarus. It produces high quality cement, lime, and fine-granulated chalk.

The history of the company dates back to 1914, when the first two cement production lines started, and the railway track to Ros railway station with two wooden bridges was constructed and apartment houses built. The company in historical times provided cement to several international large projects such as the TV tower “Ostankino” in Moscow, the Asuan Dam in Egypt, and others.

The now active plant in Vaukavysk is newly built. It opened only in 2001, close to the previous, now closed, plant. It was built mainly with equipment delivered from Germany and Belgium.

Production

Krasnoselsk Cement factory operates a wet cement production process. Its main energy source is natural gas. The main raw materials are limestone, clay, and sand, which are mined in nearby quarries using Russian-model excavators. The raw materials are delivered to the production lines by trucks using

a 5 km connecting road. It is then milled in two self-crushing mills and two re-crushing mills to obtain a finer material.

Cement, or Portland cement, is made when limestone, clay (or sand) and fuel is burnt in a sloping rotating oven, a so-called rotary kiln. The factory has four production lines, two with rotating kilns of 4x150m, and two with kilns of 5x150m. During the process the material forms a gravel-like hard burned brick, called clinker. The clinker is milled in the milling shop with 8 mills 3.2x15m together with small amounts of other material, to form the cement. The production capacity of the plant is over 1,000,000 tons of cement annually.

In 2003, the company produced 1,140,000 tons of cement. The cement is delivered by truck or by railway. 17% of the cement was packed and delivered to customers in paper bags of 25 or 50 kg.

Environmental Concerns and Improvements

The cement production influences the environment in the neighboring region. In particular for many years cement dust was a problem, as was emission to the air of SO_x and NO_x.

By the mid 1960s, the dust problem decreased as electrostatic precipitators were added to the rotating kilns. In 2006 the reported emissions of dust to the air was 4,000 tons.

The factory has invested in several improvements during recent years. This became part of the work for receiving an ISO 14001 EMS certificate. In this process all kinds of aspects and impacts were looked at. Environmental improvements



Figure 4.1 The landfill of the factory, which at the inspection received the mark “non-conformance” since it was not managed according to existing legal specifications.

were made, especially in the area of emissions to the air. There were also efforts to reduce natural gas consumption. A new burner was installed in 2005. In 2006 electrostatic filters were installed at a cost of 300,000 euro.

As part of this process the company is updating the production lines, improving the quality and competitiveness of the products, decreasing the costs of fuel and energy utilization, as well as improving the environmental situation in the plant itself, and in the village.

2. Permits and Certificates

Permit of Operation

A plant of the size of the Krasnoselsk Cement requires a permit to operate from the Ministry of Building, Construction and Architecture of Belarus. The Ministry itself is thus the competent authority for this permit.

Permit for Emissions

The company needs a permit for its emissions to the air and its production and management of solid waste. Such a permit is issued by the Ministry of Environment regional office, in this case in the Grodno region, one out of seven such offices in the country. The permit is valid for one year and a new application has to be delivered each year, including an estimation of the expected emission the coming year.

The Ministry in Minsk does itself issue certain permits, which are thus not in the hands of the regional offices. It includes the extraction of water from groundwater wells and surface water, and the use of ozone depleting substances, in particular freon, for refrigeration. This was not needed for the cement factory.

The company had to pay a fee (tax) for the emission registered by the environmental authorities, in this case SO_x , NO_x , CO, VOCs both from the kilns and from the vehicles. Secondly there is tax to be paid for landfill of waste. In 2006 the company paid a total of 2,000,000 Belarusian rubles (about 700,000 euros) for the totality of its emissions and other environmental impacts.

Permit for Water Management

The plant receives all its water from the municipality of Krasnoselsk and thus only needs an agreement with the municipality for its incoming water.

It emits all its wastewater to the municipal wastewater treatment plant. In this case it requires a permit from the municipality for the amounts and character of the wastewater discharged. A permit for the discharge to municipal wastewater was issued to the plant by the municipality of Vaukavysk. This permit is also annual and has to be renewed each calendar year.

ISO 9001 and 14001 Certificates

Since the new factory opened, the plant had worked to get a certificate according to the ISO system. In 2003, the company was certified according to the ISO 9001/2000 quality management standard. The focus in this management system is customer satisfaction, which it also became for the cement factory.

All the products of the company are certified within the Belarusian national certification system by the national certification body.

The company also worked to receive an environmental management system certification according to the ISO14001/2004 standard. This was successful in July 2005. The certificate is

valid for three years, to July 2008. It will require external surveillance audits every year.

3. Inspection and Environmental Auditing

Objectives and Scope of Inspection (Surveillance) Audit

The factory was audited according to conditions in its 14001 certificate in October 2006. The auditor looked at two main issues:

1. Does the plant operate in compliance with its legal permits.
2. Does the plant fulfill in its ISO 14001 standard requirements?

The main impact to the environment from production lines and units and a description of natural resources involved in processes, had to be checked. It was possible to inspect the production itself, the mining and transport of material from the quarries, and the management of solid waste. The auditor had, however, no possibility of monitoring emissions to the air. But as a rule the auditor checks relevant documents, such as permits, schedule of inspection of filtering installation, records (protocols) of analyses, etc.

The situation at the quarries was not so good, and in particular the road from the quarries to the factory was in bad conditions. The surroundings were covered with white clay dust. In Belarus it is, for obvious reasons, not possible to interview workers regarding the working conditions, but it is clear that they were not always satisfactory.

Waste Management

It turned out that the landfill used by the company did not have a valid permit and it was thus formally illegal. It was in addition not managed in a satisfactory way. Waste coming to the landfill from the plant was not registered. It was mixed with solid waste received from other sources, which was not documented or weighed either. The landfill included eg old tires, which is not allowed on landfills, and e.g. glass, wood, and paper, which, according to Belarusian waste management legislation, should go to recycling. There was no system for methane collection, but that is not required and does not exist in Belarus.

A more serious criticism of the landfill was that leachate water was not taken care of. A ditch surrounding the landfill had been built to collect leachate water but did not work in practice. The water instead seemed to penetrate to and pollute the groundwater. There were no arrangements for monitoring ground water in the area.

Finally the landfill was not organized in a proper way, that is, the garbage was not stored in a systematic way, and the

cover was only partly done. It was not fenced, and no lightning on the road to the landfill. This landfill was thus run in conflict with current technical specifications.

Operations with Hazardous Material, Oil and Chemicals

Another unacceptable practice was disclosed in the vicinity of the plant itself. In a building, which was part of the old factory on the bank of the river, a storage place for barrels with waste oil was found.

The conditions for these barrels were not acceptable. The place, formally closed for five years, was highly polluted by oil products. They were not protected against rain and would in the long term start leaking. This again did not have a permit.

Figure 4.2 The Law violation act, issued by the local environmental inspectorate concerning non-satisfactory waste management at the Krasnoselsk Cement plant.

Non-conformances, Conclusions and Notification

The auditor could conclude that the company did not operate in compliance with the existing permits from authorities and several of the practices were not acceptable from an environmental point of view.

The non-conformance records called for several major or minor correction. In this case two bad practices of waste management and hazardous material management was given the note “minor non-conformances”. The company were given conditions for a renewed audit in one month’s time.

The company was then required to

- arrange a satisfactory storage for waste oil containers
- organize the regular monitoring of the ground water in the area of the landfill
- build a fence around the landfill
- regularly document weight and category of waste to the landfill

Re-audit

The recurring audit was carried out later in 2006.

Hazardous material or oil products had been moved to storage in another place and in a correct way, with a cement floor and a fire protection system.

For the landfill a process to improve the situation had started. The documentation of waste added to the landfill had improved, including weighing and characterization.

A fence had been built around the landfill

An agreement with a chemical laboratory had been reached regarding continuous monitoring of the ground water around the landfill.

The company would keep its EMS ISO 14001 certificate, until next surveillance audit in the summer of 2007.

Inspection Permits by the Authorities

The authorities in most case only conduct desk inspection, that is, check documents provided by the companies. If they request improvements is largely dependent on the assessment if the company is economically strong enough to improve.

Occasionally the regional office of the Ministry of Environment does make visits. These may include monitoring air emissions and in general check if the company is in compliance with permits. This has not been the case with the Krasnoselsk Cement.

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Implementing REACH, the New European Union Chemicals Regulation

1. REACH – A New and Controversial EU-Legislation on Chemical Substances

The background

After a more than seven years of intensive struggle and heavy lobbying to develop a coherent European chemicals policy, the REACH (Registration, Evaluation, Authorisation of Chemicals) Regulation (1907/2006/EC) was finally published in the EC Journal on 30th December 2006. The regulation became effective in June 2007. The REACH system is a single regulatory framework, which replaces the old dual system for assessing the risks of existing “old” (put on the market before 1981) and “new” substances.

Worldwide about 400 million tonnes of chemicals are produced annually. Chemicals are found in almost all products we use every day. For example, during tests, 100 to 300 artificial substances could be identified in the human body. Among the chemicals in use, there are many substances, which are considered to be dangerous for human health and which threaten the natural environment. However, there is a general lack of knowledge about the properties of chemical substances and their impacts on humans and the environment. The main reason for this gap in knowledge is an inefficient legislative system for chemicals. Therefore, the main motivations for the review of the European chemicals policy and, consequently, the development of REACH were to close this gap in knowledge and to reduce the risks, which result from the use of danger-

ous substances. REACH, therefore, aims at granting approval (authorisation) only to those chemicals, for which the risks are shown to be adequately handled based on valid information. Or, in other words, No data – no market.

For obvious reasons, the chemicals industry and its downstream users (such as car manufacturing) are deeply affected by REACH. These sectors play a very important role in the global economy. The EU is the largest chemicals producer in the world with about 31% of the world’s chemicals production (US 28%). The European chemical industry, which generates a turnover of about 316 billion euros and provides some 4.7 million jobs, is among the largest manufacturing industries in Europe.

The main objectives of the new European chemicals legislation include:

- to develop a new integrated and coherent chemicals policy reflecting the precautionary principle and the principle of sustainability.
- to modernize the regulatory framework to encourage and stimulate innovation, competitiveness and the efficient working of the internal market.
- to increase the safety of humans and the environment in the handling of chemicals and at the same time improve the competitiveness of the chemicals industry in Europe.
- to reverse the burden of proof from authorities to industry for testing and risk assessment of chemicals.

- to establish a European Chemicals Agency to manage the registration database and participate in the evaluation and authorisation process.

Motivation for REACH

So far, the EU has distinguished between so called “old“ or “phase-in” chemicals entering the market before 1981 (approx. 102,000 chemical substances), listed in the so-called EINECS catalogue and “new“ or “non-phase-in” chemicals (more than 3,200) entering the market after 1981. The problem consists of a general lack of knowledge of those chemicals which entered the market before 1981, because until then no formal authorisation was required. Hence, the vast majority of the chemical substances, their properties and impacts for human health and the natural environment are not, or still insufficiently, known. So far, only about 9,000 or 8% of the existing chemicals are sufficiently investigated and evaluated.

It has been, however, very difficult to assess the risks related to chemical substances used in every-day processes. Since 1993, there is an evaluation mechanism in use to reduce this gap in knowledge based on the consideration of specific characteristics of chemicals, but it is not efficient. While the responsibility lies with the public authorities, it is the industry that can provide the required knowledge.

Additionally, there has been a patchwork of too many and often not consistent regulations and legal requirements both on the

EU and on the member state level. As a conclusion, the former system for regulating the production and of monitoring the use of chemicals in the European Union turned out to be inefficient.

The Political Process Toward REACH

Table 5.1 displays the time schedule of the REACH policy development from the publishing of the so-called “White Paper” (1998) until the adoption of the REACH regulation on 18th December 2007. All relevant legislative steps within the European Parliament and Commission are displayed.

2. How REACH Works

General Lay-out

One of the key elements of the REACH system is the shift in responsibility from EU and national authorities to industry and other stakeholders. This means that the burden of proof for testing and risk assessment now lies with the industry. Under the premise “no data, no market” it will only be allowed to place substances on the market for which sufficient data is available. The newly created central REACH agency, which is located in Helsinki, Finland, has the task to implement and control compliance with the new policy.

The REACH policy regulates the registration, evaluation and authorisation of new and existing chemical substances which are produced, used or imported in quantities over 1 tonne per year. This means that until the year 2018 approximately 30,000 substances will fall under the REACH legislation. The implementation of REACH is divided into the pre-registration, the registration, the evaluation and the authorisation (or restriction) phase with strictly determined periods of time (Table 5.2). For an overview of the implementation of REACH in companies see Figure 5.1

Pre-registration Phase

The REACH policy requires the pre-registration of all phase-in substance between June 2008 and December 2008. Producers, importers and (down-stream) users of chemical substances have to send data about these substances to the central agency in Helsinki, which include the name and identification number of the substances (CAS number). The data on type of substance and the annual production volume will be pre-registered together with the name and address of the person representing the company to the agency and serving as the communication link.

One month after the end of the pre-registration phase, the agency will publish a list of the pre-registered substances. The idea of the pre-registration is to enable producers and importers of identical substances to share specific data and to avoid double work on dossier research as well as costly tests and to reduce

Box 1 REACH and EINECS

REACH

Regulation 1907/2006/EC of the European Parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation 793/93/EEC and Commission Regulation 1488/94/EC as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

EINECS

European Inventory of Existing Commercial Chemical Substances. The EINECS contains a list and definitions of chemical substances that were placed on the market in the European Economic Area between 1 January 1971 and 18 September 1981. The listed substances (more than 100 000) are exempt from pre-marketing notification requirements.

the number of animal tests. This is supposed to take place in the Substance Information Exchange Forum (SIEF), which is created for the phase-in substances. Phase-in substances, which have not been registered by December 2008, will not be allowed to be produced anymore.

Registration

The registration of chemicals in a central database of the agency is generally required for all substances produced in quantities larger than 1 tonne per year (t/a). Information required for the registration includes a technical dossier and a safety data sheet.

The REACH legislation has laid down interim periods based on volumes per year for the registration process to overcome unacceptable barriers and assumed negative consequences for the European chemicals industry with respect to its competition

and international market relevance. All existing (“phase-in”, EINECS) and newly produced (“non phase-in”) substances, which are produced or imported in quantities more than 1,000 t/a, more than 100 t/a for environmental hazardous substances and more than 1 t/y for CMR (carcinogenic, mutagenic or toxic to reproduction) substances, have to be registered until November 2010. The registration phase for substances produced in volumes larger than 100 t/a will last until May 2013. By May 2018, all substances, which are produced or imported in quantities of more than 1 t/a, have to be registered.

The REACH legislation does not apply for substances which are

- only used for scientific research,
- polymers,
- radioactive substances,

Table 5.1 REACH development

April 1998	The EU Environment Council asks the Commission to review the set of existing chemicals legislation.
February 2001	The Commission presents its White Paper on “Strategy for a Future Chemicals Policy”.
May 2003	The Commission publishes parts of its draft legislation on the internet for public consultation. It receives many reactions and as a result, the Commission bows to industry pressure and weakens its draft legislation, taking out safety information for more than 20,000 chemicals.
October 2003	The Commission adopts its proposal for Regulation on Registration, Evaluation and Authorisation of Chemicals (REACH). The proposal aims to get safety data for 30,000 chemicals of the 100,000 that are available on the EU market.
January 2004	An Ad Hoc Working Group on chemical (national experts) starts the detailed analysis of the proposal.
March 2004	The Commission, Cefic and UNICE sign a Memorandum of Understanding, which provides for the undertaking of further work on the impact assessment of REACH by means of a multi-stakeholder project. NGO’s cannot endorse this study due to major deficiencies in both the methodology and transparency of the process.
July 2004	The Commission approves Cefic’s proposal for Strategic Partnership on REACH Testing (SPORT), a pilot project to test the workability of the REACH proposal. The project is jointly managed by the Commission, the Member States and industry. NGOs, Trade Unions, the Network of the European Chemical Regions and the OECD are observers in the Steering Group meetings.
January 2005	Joint public hearings are held in the EU Parliament: over 1,000 delegates from industry and non-governmental organisations attend.
March 2005	The final report is published on the further work on business impact as provided by the Memorandum of Understanding between the Commission, Cefic and UNICE. The study finds REACH will not lead to withdrawal of important chemicals from the market due to cost of registration and concludes that REACH is not bad for business.
mid 2005	The final report of SPORT is published
November 2005	First vote in the EU Parliament. Parliament votes to phase out the most hazardous chemicals but allows huge knowledge gaps on safety for thousands of chemicals.
December 2005	The Council adopts a political agreement.
November 2006	Second Vote in the EU Parliament.
December 2006	The European Parliament and the Council reach a compromise and adopt the REACH Regulation. It is published in the official journal of the EU.
1 June 2007	REACH Regulation enters into force in all 27 EU member state.

- substances in drugs or used as nutritive additives,
- substances which are listed in the REACH appendix IV (e.g. water, natural oils) and V (e.g. minerals, coal) as well as already registered or re-imported substances.

Hence, a registration for these substances is not required.

The amount of information required for registration will be proportional to the chemical's health risks and production volumes. The legislation requires the provision of a technical dossier including for example the identity of the producer or importer, the identity of the substance, information on the manufacture and uses of the substance, the classification and labelling of the substance, guidance on safe use of the substance, summaries of studies of tests which have been carried out.

For substances which are produced in volumes of more than 10 tonnes per year, the following information is required:

- a chemical safety report which includes information about measures of risk management undertaken,
- data on the properties of the substance
- an evaluation concerning the possible danger to human health and the environment.

Especially for chemicals produced in high quantities and for dangerous substances, the amount of data required for the registration is enormous. Therefore, the Commission has accepted a British-Hungarian initiative, the so-called OSOR strategy (One Substance, One Registration). This is proposed particularly to SMEs to reduce their efforts by sharing the duties linked to the REACH implementation by forming consortia to apply jointly for registration. The OSOR strategy, however, bears some problems particularly related to data sharing (see below).

Evaluation

Evaluation of chemicals and substances can be based on either dossiers or substance testing including animal tests. This step

within REACH is designed to close the lack of knowledge and information of chemicals impacts on human health and the natural environment and to provide all relevant information and data for the registration application. Evaluation, naturally, is the most time consuming and costly working step within the REACH process and was, therefore, heavily disputed by the chemical industry. The above-mentioned OSOR initiative and the joint consortia application are options to reduce both costs and workloads.

Authorisation/Restriction/Rejection

Authorisation of substances will be required for highly problematic substances, such as CMRs, PBTs (persistent, bioaccumulative and toxic), vPvBs (very persistent and very bioaccumulative) and other substances with serious and irreversible effects on humans and the environment.

The applicant has to “ensure risks from substances of very high concern are properly controlled or that they are substituted”. This means that the authorisation will only be granted to these substances if risks can be adequately controlled or on valid socio-economic grounds (that means if the social and economic benefits outweigh the risks) if there are no technological alternatives. If less risky alternatives exist, the substance under consideration has to be substituted.

3. Implementing REACH in Germany

Germany's Role in the Political Process

Germany's Government played an important role in the decision and realization process of the REACH policy. As Germany is home to the largest chemicals industry within the EU there was a controversy between consumers protection associations and NGOs on the one hand and the requirements of the industry on the other hand to weaken the original REACH

Table 5.2 Schedule for the REACH Implementation Process

1 June 2007	REACH enters into force
June 2007 until June 2008	Former chemicals regulations are still in force. <i>During that period of time, the industry (including downstream users) is supposed to inform itself about the new legislation and carry out an inventory of their substances used to identify the substances which have to be pre-registered</i>
June 2008 until December 2008	Pre-registration phase
January 2008	The agency will publish the list of pre-registered substances
November 2010	First registration phase: substances > 1,000 t/a, > 100 t/a for environmental hazardous substances (R50/53), > 1 t/a for CMR-substances
May 2013	Second registration phase: substances > 100 t/a
May 2018	Third registration phase: substances > 1 t/a

goals, which were aiming at the immediate re-evaluation and eventual substitution of up to 30,000 chemicals based on the volume-oriented approach of involving all produced volumes larger than 1 tonne per year under REACH.

Through its representatives and relevant channels the German delegation put pressure on both the EU Parliament and the Commission to alter the REACH requirements relative to its draft proposal. In the end, it was mainly Germany that altered the produced volumes of chemicals for which REACH would account for. The final version of the regulation which was adopted on 18th December 2006 by the Parliament and Council did not include the immediate “1 tonne per year” requirement anymore but shifted that quite low volume approach to a much later time period (May 2018). Instead the REACH requirements are in the first phase restricted to those chemicals with a production of more than 1,000 tonnes per year.

This meant that the numbers of chemicals to be re-evaluated was assumingly reduced from the originally ca. 30,000 to approx. 10,000. Without Germany’s involvement the REACH regulation would most likely have been more strict and consumer friendly.

REACH Helpdesks in Germany

Due to the fact the REACH system is quite complex and demands additional work and responsibility for the industry, a number of information and training campaigns have been started by public authorities, industry associations but also private consultancies both on the European and on the national level to help the industry to prepare for the new legislation. Especially SMEs, which often have little experience with the registration of chemical substances, and no particular administrative department, are especially affected by REACH. Therefore, the respective public authorities of the EU member states have been prompted to install REACH helpdesks on their websites.

The helpdesk of the Federal institute for Occupational Safety and Health (BAuA, see links), the official German helpdesk, is a good example. It includes a glossary, FAQs (frequently asked questions), a guideline for the definition and classification of substances, an explanation of the pre-registration phase and describes the demands for downstream users. Under “What do I have to do with REACH?” a questionnaire leads companies through a set of questions concerning their kind of business and the chemical substances they use

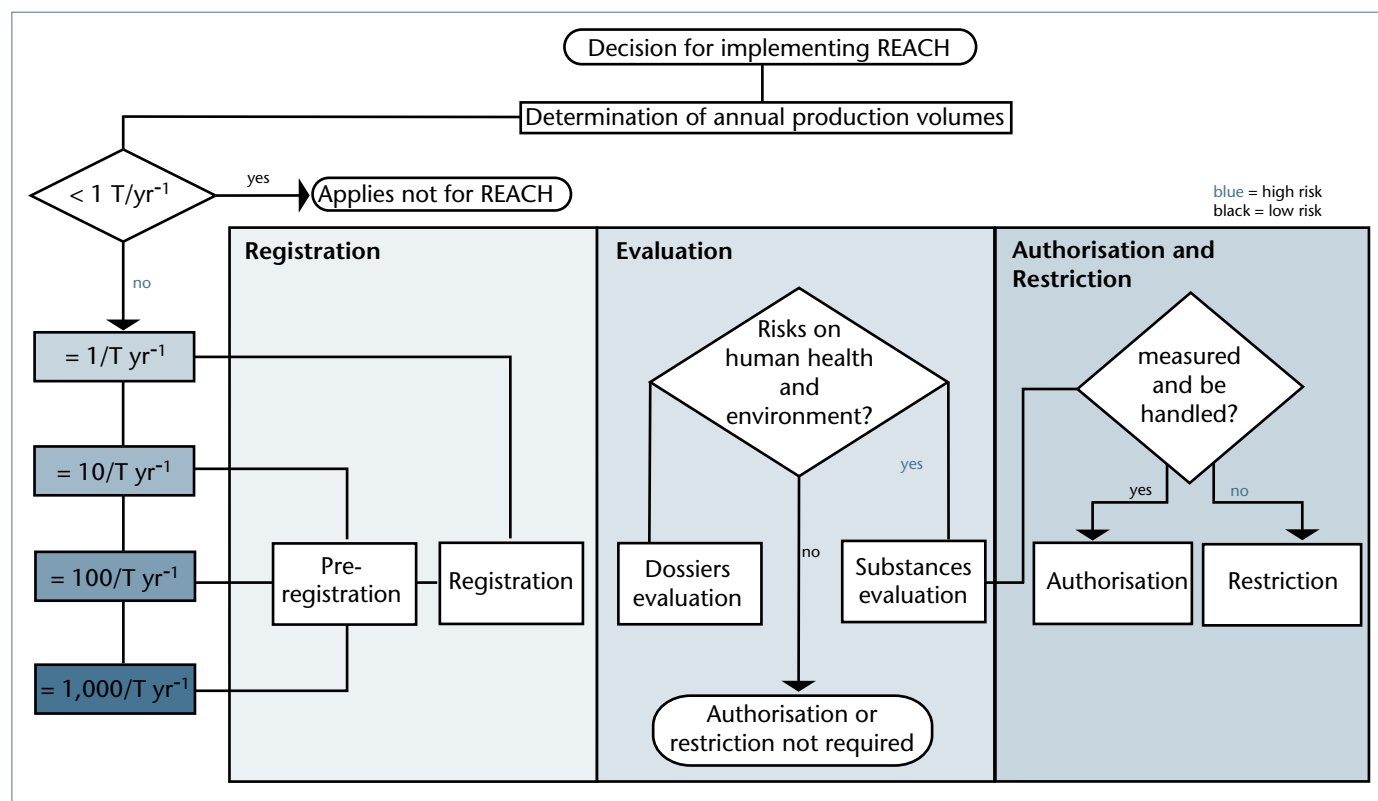


Figure 5.1 Flow sheet on the decision of implementing REACH into an SME [taken from: Silvia Guether/SAXONIA, 2006]

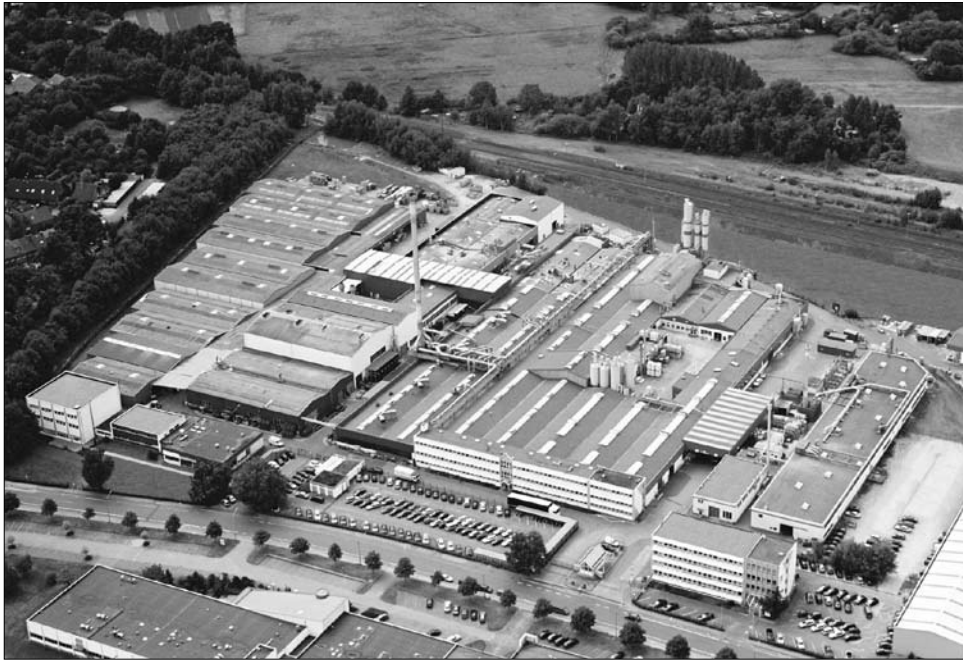


Figure 5.2 Aerial view of Foseco GmbH Borken, Germany, which is hosting the REACH coordination team for all European sites. The Borken Plant had in 2006 a total area of 94,000 m², 681 employees and 30 trainees.

in a simple way in order to help them identify their role under REACH and the tasks they have to fulfil in order to comply with the legislation.

4. Implementing REACH in the Multinational Enterprise Foseco GmbH

The Foseco Company

The British-German based company Foseco, founded in 1932, develops, produces and distributes products and processes, which are used for the formation, casting and smelting in the steel and foundry industry worldwide. In fact, the company is the world market leader in products and solutions for the improving foundry and steel mill performance. Foseco, which produced a total of approximately 116.000 tonnes generated a turnover of about 592 million euros in 2006, operates 74 branches (sites) in 32 countries including 29 plants in 17 countries and employs about 3,100 people. In Europe, Foseco is located in Germany, the Benelux Countries, France, Great Britain, Italy, Poland, Portugal, Russia, Sweden, Spain, Czech Republic, and Turkey. Today, Fosecos's ongoing commitment is evident in the benefits they deliver to the foundry and steel mill industries worldwide: improved yield, reduced scrap, better quality, increased productivity and improved safety and environmental performance. Their impact is experienced daily by many through the metal industry's output, much of which is used in the auto-motive and transport markets.

Foseco operates an integrated management (IMS) system consisting of

- Quality Management, QMS (ISO 9000:2000 series)
- Environmental Management, EMS (ISO 14000:2004 series)
- Occupational Health and safety Management (mainly based on the British OHSAS 18000 standard)

As part of the IMS, Foseco started early to adapt to the REACH requirements using – besides others – students and expertise from the University of Applied Sciences Zittau/Goerlitz. Students are involved in all steps of the implementation process as part of their diploma theses.

Dealing with the new REACH Legislation

With respect to the REACH system, Foseco can be classified as a downstream user and importer of chemicals. This means that Foseco is not a producer of chemicals. For its metallur-

Box 2 REACH Help Desks

REACH regulation Article 121 stipulates that member States shall establish national helpdesks to provide advice to manufacturers, importers, downstream users and any other interested parties on their respective responsibilities and obligations under this Regulation.

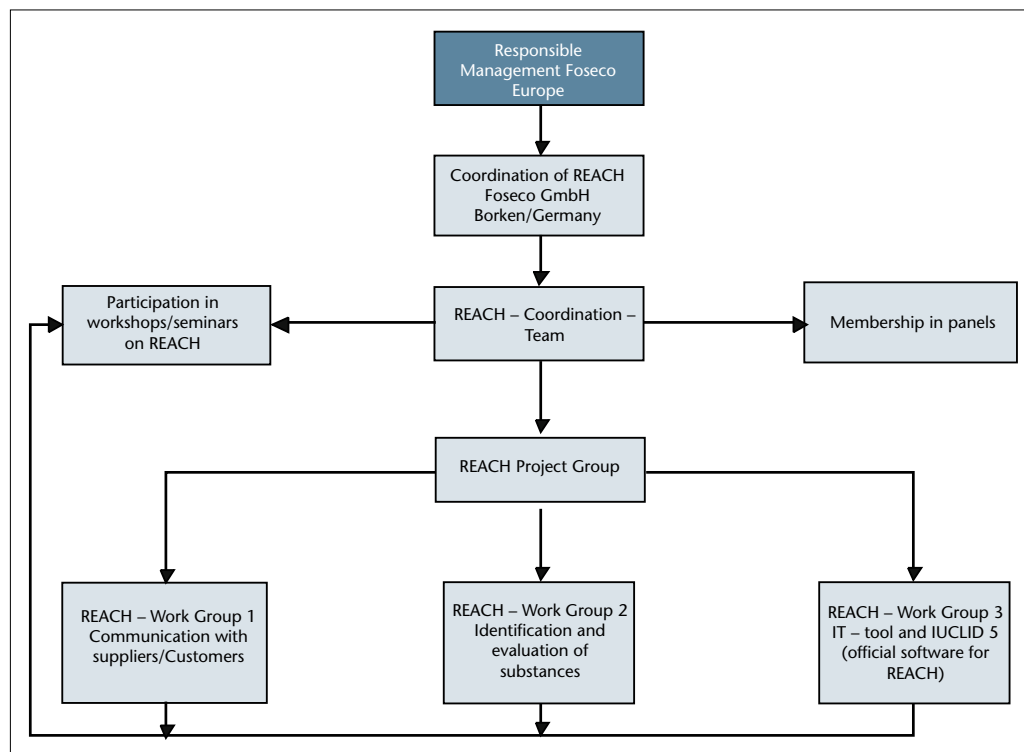


Figure 5.3 Organization of REACH for Foseco Europe

gical products and services Foseco is processing a relatively large number of chemical substances (approx. 500) of which a number will apply for REACH. The current duties and tasks of the company with respect to adoption of the REACH requirements are

- to establish an efficient, legally compliant and workable REACH system
- to determine a REACH operation representative who reports directly to the responsible management representative
- the acquisition of more detailed information and requirements on REACH, as there is hardly any experience to benefit from.

In detail, this includes the registration process (data requirements, costs, dossiers etc.), the establishment of a workable communication down the supply chain, the categories of use and exposition of chemicals, and, as a downstream user, to complete the safety data sheets on all chemicals used in any of the plant's processes.

It is important to note that all European plants and sites have to be included in the REACH implementation process subsequently. So far, a project group as well as several working groups have been installed at Foseco GmbH in Borken, Germany for the implementation of REACH. This consists

of internal experts from the departments of health, safety and environment, IT, purchasing, marketing, and research and development (R&D). Since 2004, Foseco's employees actively participate in different industry association and regularly take part in informative meetings and workshops about REACH provided by different associations, agencies and consultants. Additionally, telephone conferences are regularly carried out regarding the diverse RIP (REACH Implementation Process) projects.

It proves to be difficult to estimate the right time to start with the REACH implementation process. On one hand, there seems to be still enough time for the pre-registration and subsequent registration. On the other hand, the implementation process will consume a lot of time. Many activities could already be carried out but others, such as sending out detailed questionnaires to suppliers and customers, should be carried out at a later more appropriate date. With respect to the time management, the option of using external support has to be considered as well as the risk of false estimation of the time needed has to be taken into consideration.

The Project Team

The installed project team in the German Foseco headquarter location at Borken has already taken up work. Currently, they are being informed and trained on specific features and

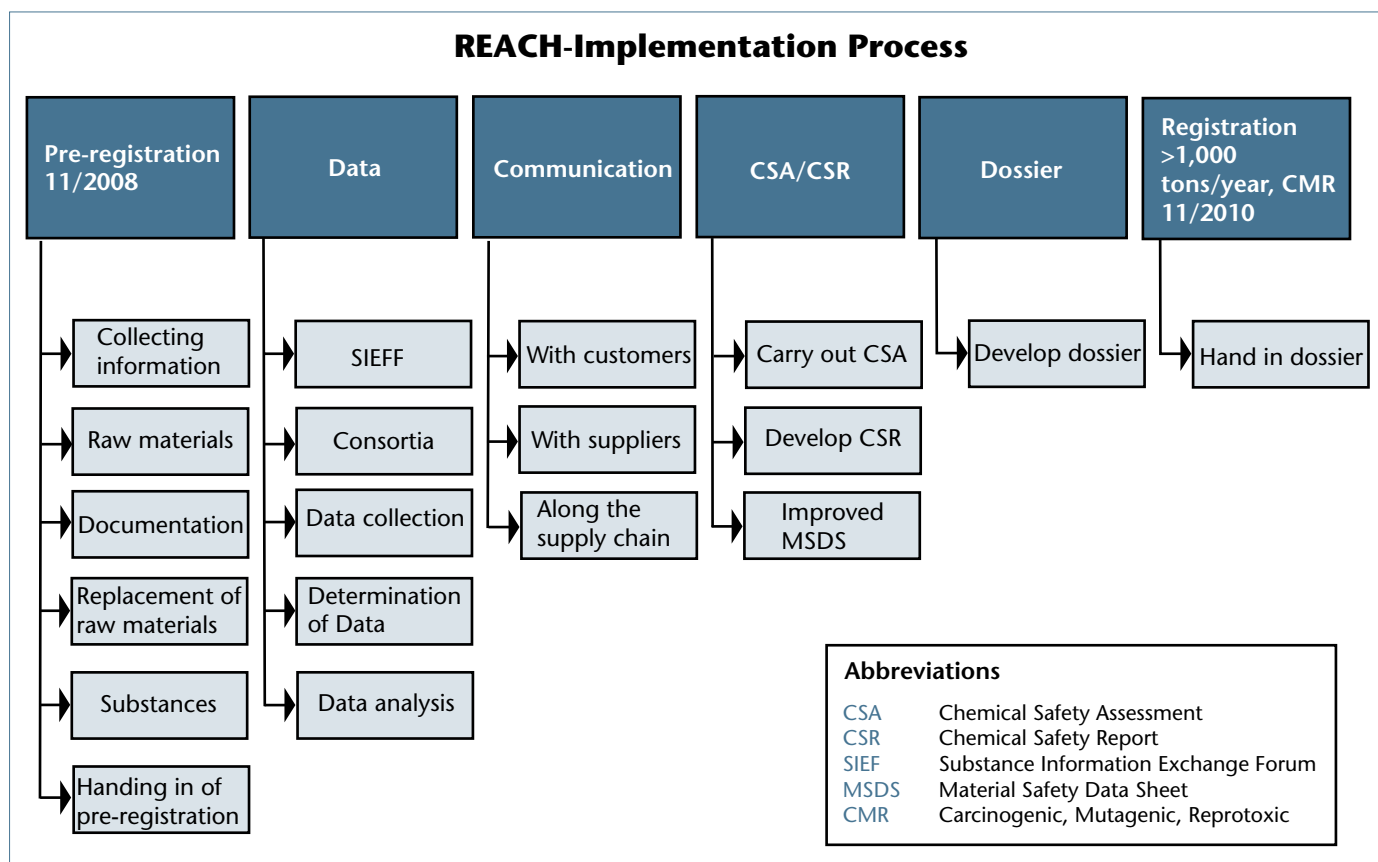


Figure 5.4 REACH implementation process [after S. Schneider/ Foseco, translated by G. Pollack]

requirements of REACH. Communication with Foseco's suppliers and customers are taking place and they are working on the evaluation of all chemicals in use on any of Foseco's sites. This means looking at the substance registers, the classification of applied substances according to the REACH policy, the calculation of annual consumed quantities of individual substances per plant and the classification of the applied substances according to CAS (Chemical Abstracts Service) registry number, international standard labelling for chemical substances, EINECS and ELINCS (European List of Notified Chemical Substances) numbers, respectively. At present the team is reviewing the some 500 chemical substances used in the company to see which of these have to undergo REACH registration.

Figures 5.3 and 5.4 illustrates the organisation and the individual steps of implementing REACH into Foseco's IMS.

A Competitive Advantage

Future activities of the REACH project team include further development of the project plan, ongoing information collec-

tion and training on REACH, the identification of missing data per substance under the consideration of waiving, analogy estimation, the calculation of the annual volumes of each substance and an estimation of the total costs, and the pre-registration of the demanded substances within the REACH process.

Thanks to its innovative and future-oriented management, Foseco belongs to those industrial enterprises which seem to have understood the complexity and scope of the new European chemical policy REACH early enough. Due to the early start in dealing with the issue and the early and pro-active participation in informative meeting and workshops, the company has the chance to be adequately prepared for the REACH requirements and thus, has a good starting point for fulfilling the REACH requirements due to the legislation becoming effective in June 2007.

Foseco regards the fulfilling of the REACH requirements as a chance to improve its competitiveness.

5. Comment on REACH and its Consequences

Advantages and Costs of REACH for Companies

“Once you go through the REACH process, you have chemicals that have a ‘blessing’, and you can create better markets” argues Robert Donkers, the environmental counsellor to the EU’s delegation to the United States and the person credited as the author of REACH. (From 1 April 1999 until 1 October 2003, Robert Donkers was Acting Head/Deputy Head of the Chemicals Unit and inter alia responsible for coordinating the development of the new EU Chemicals policy and legislative framework.)

REACH is, no doubt, to all parties involved a necessary and useful approach to improving both knowledge and handling of chemical substances in every day processes. This improves, on one hand, consumers confidence in buying products and at the same time helps to improve industrial competitiveness within the European market mainly by reducing risks and liabilities associated to the application of not sufficiently evaluated chemicals and their potential hazards. REACH is, on the other hand, considered a heavy burden particularly to small and medium sized enterprises (SMEs). This may be concluded from the considerable workloads and costs resulting from individual implementation steps such as pre-registration, registration, consortia building, dossier evaluation, tests evaluation etc. As this was recognized by the Commission during a quite early state of the REACH development process, a suggestion from the U.K. and Hungary – the so-called OSOR initiative (One Substance, One Registration) – was proposed particularly to SMEs to reduce their efforts by sharing the duties linked to the REACH implementation.

The Data Sharing Dilemma

Soon enough it turned out that the OSOR approach required the sharing of a certain amount of confidential data and information of several kinds. This is not accepted voluntarily by those who are involved. After a first phase of enthusiasm particularly SMEs feel frustrated due to the fact that, though they are in many cases the “junior” partners, they fully have to share all costs within a consortium, They feel that the larger companies in some cases try to use process or product related data on chemicals and substances displayed and shared within the consortia for their own purposes (e.g. identification and subsequent copy of specific formulas) and, thus, they fear a loss of competitiveness. This, of course, has never been the intention of REACH but was maybe not thought of deeply enough by those who designed the new European Chemicals Policy.

It may turn out that – like other legislative innovation – industry together with relevant authorities and experienced

implementation tools such as national helpdesks will find practical and case related individual solutions to adapt to the REACH requirements at an acceptable level of time consumption and financial burden. Finally SMEs, too, may understand that the benefits of implementing REACH will outweigh the negative consequences and help to improve competition and better trading in general.

Abbreviations

Cefic	Conseil Européen de l’Industrie Chimique / European Chemical Industry Council
UNICE	Union of Industrial and Employers’ Confederation of Europe
OECD	Organisation for Economic Cooperation and Development
CAS	Chemical Abstracts Service; 2540 Olentangy River Road; Columbus, OH 43202, USA
SIEF	Substance Information Exchange Forum
SMEs	Small and Medium Sized Enterprises (up to 500 employees)

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Internet Resources

German Federal Institute for Occupational Safety and Health
http://www.baua.de/en/Topics-from-A-to-Z/Chemicals-Act-biocide-procedure/Notification-Unit-Chemicals-Act.html__nnn=true

The REACH official legislative text:
http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_396/l_39620061230en00010849.pdf

Information about REACH from the European Commission:
http://ec.europa.eu/enterprise/reach/index_en.htm

Information about REACH from Cefic:
<http://www.cefic.org/Templates/shwStory.asp?NID=494&HID=441>

The official German REACH helpdesk:
http://www.baua.de/de/Chemikaliengesetz-Biozidverfahren/Neue-Chemikalienpolitik/Helpdesk/Reach-Helpdesk.html__nnn=true



Voluntary Action Makes Licensing Easy

1. Introduction

The Company

Roskilde Galvanisering A/S (Roskilde Electroplating Ltd) is one of Denmark's largest electro-technical industries founded as early as 1946. It moved to its present location in Roskilde not far from Copenhagen in 1972. Major expansions and technological modernisations occurred in 1979 and 1995. The number of employees is presently around 25 people.

The basic operation in electroplating is to cover metal surfaces with a thin protective layer of zinc. A total of some 20 tonnes of zinc is used yearly for this purpose. This is equivalent to surface-treating some 200,000 m² of material a year.

The production is organised in four separate zinc-galvanizing lines with the latest line set up in 1999. All kinds of objects are treated from small screws to large metal sheets, used in industries. Many objects are also covered with chromium after zinc plating, and some with a copper surface.

It is obvious that this kind of industrial production is environmentally hazardous. Large amounts of heavy metals as well as other environmentally hazardous components are used and these may not be released to the environment.

Techniques Used

In the production lines the objects are either mounted to be dipped, or mounted on cylindrical drums to be rotated, treated in a series of baths. The broadest surfaces covered are up to 7 meters in width.

In the zinc plating bath an electric current between the object (which becomes the cathode) and an anodic surface of metallic zinc makes the zinc move and be deposited on the object, which thus is "plated" with the metal. The plating is followed by a series of rinsing steps.

Each line has four sequences or 'baths':

- a) alkaline degrease
- b) priming
- c) electrolytic degrease and
- d) coating.

After each sequence the items are water-rinsed in a total of five rinses. The water from the rinses goes through an ion-exchanger, in which remaining zinc is picked up to be used again. The rinsing water then continues to an internal wastewater cleaning system and is recycled to be used again for the rinsing.

For some objects additional chromium plating are made. The chromium layer increases the resistance to corrosion and improves the capacity for lacquering or painting of the objects. The chromium layer itself may also be given various shades from blue, yellow, black etc.

In addition some objects are given a plating of copper.

Environmental Impacts

The environmental concerns are mostly caused by the use of large amounts of heavy metals, the release of wastewater from



Figure 6.1 Rinsing bath. Last rinsing before going to the bath for the electroplating, i.e. being covered by a thin layer of zinc. You see 'spray-rinsing' instead of dipping the whole item in the bath. Means less polluted water in the process. (Photo: Roskilde Municipality Environmental Inspection office)

the process, and solid waste management. An additional concern is the use of electric power.

Net use of water, measured as water discharged to the public sewage system, is in the licence maximised at 4,000 m³/year at a temperature of max 35°C and a pH-value between 6.5 and 9.0.

As mentioned above the total use of zinc is in the range of 20 tons/year. Some 30% of this is lost in the process, but retained with the sludge in the water cleaning process. From here it is sent for recovery and reuse as part of the waste management system. This is discussed further below.

All along, work has been done to minimise resource use and environmental impact. Already when moving to the new premises in 1972, purposely built for an electroplating industry, environmental impact reduction was part of the planning process. Floors were constructed as 'double' floors to allow for collection of spillage in the production hall before it went to the drain as well as other measures to prevent direct spillage and impact on the environment in the vicinity. Savings in use of raw materials and process chemicals and other substances became a driving force later in the 70's and into the 80's. For management it quite quickly developed into an outright 'sport' to see, how far one could go and for which input. This will be illustrated below.

2. Environmental Permits and Certificates

Environmental Permits

An environmental permit was requested for Roskilde Electroplating for the first time after its expansion in 1979. The permit was issued in 1981.

A new and comprehensive licensing procedure was initiated after the 1995 expansion. This was now for the first time made in accordance with the IPPC directive, then newly implemented in Danish environmental regulation. The licence was issued in 1996.

After 10 years of operation, a review of the 1996 licence was initiated, in 2006. No major changes in production had however been made since 1996. In May 2007 in the permit was renewed without any important changes of the terms of the licence.

Environmental Management Systems

The company has done a considerable work to introduce both an environmental and a quality management system. It is today certified according to ISO 9001:2000 and the ISO 14001:2004 standards.

Environmental Award

The Roskilde Bank gave in 2001 their environmental award to Roskilde Galvanising Ltd. The company is one of the polluting industries in Roskilde, but the prize was nevertheless well deserved, the awarding committee stated. The company had over many years made remarkable – and successful – efforts to reduce the environmental impact from its production. An example is a 93% reduction of water usage over the last 15 years while the production in the same period has increased by 100%. It is also confirmed by the fact that the company is certified according to the ISO 14001 environmental standard.

3. Applying for a Permit According to the IPPC Directive

Application

As an 'Installation for surface treatment of metals and plastic materials using an electrolytic or chemical process where the volume of the treatment vats [storage containers] exceeds 30 m³', Roskilde Electroplating is on the Annex-1 list to the IPPC directive and thereby also on the Danish Annex-1 listing for companies. Thus an integrated permit is required for its activity. As an Annex-1 company it is subject to the most intensive scrutinizing subsequent control and inspection. It is a so-called 'i-marked' industry.

In order to obtain a comprehensive licence, the 'i-marked' companies must submit an extensive application, describing all aspects of environmental relevance in great detail and documenting how BAT/cleaner technology requirements are met or handled.

The application (for Denmark, see Ministerial Order 1640 of 13/12/2006) should supply the Competent Authority with all necessary background for issuing an environmental licence. The licence should include the conditions necessary to make the company reach a high level of environmental performance. The licence should be supplemented by monitoring and inspection to the extent needed. In the case of Roskilde Electroplating, the Municipality of Roskilde was the Competent Authority, and the application was managed by its office for environmental inspection and control.

Environmental Reporting

There is an extensive duty for the company to provide environmental information in relation to licensing.

Being 'i-marked' the company is automatically obliged (Ministerial Order no. 1515 14/12/2006) to provide Annual 'Green Accounts' alongside the financial Annual Accounts. These 'Green Accounts' should state the environmental performance of the company for the financial year.

4. The Environmental Permit

Topics Covered in the Permit

The topics in the licence were the following:

1. Production capacity, layout, technology and process hours
2. Discharge to air
3. Noise
4. Solid and hazardous waste
5. BAT/cleaner technology initiatives

Production Data Requested in the Report

The terms of the 1996 licence were that production data should be available for the environmental authorities on request and kept for 5 years. They should comprise information on:

Resource use:

- Consumption of raw materials, especially cyanide and heavy metal containing raw materials, at the (then) three production lines
- Water consumption in the production (see the terms of the wastewater permit).
- Electricity consumption for the production processes and for lighting.
- Consumption of oil for heating.

- Production volume (ex. calculated from the consumption of zinc anode)

The wastewater treatment plant:

- Consumption of chemicals (sulphuric acid, sodium hydroxide, hypochlorite) for the different tanks.
- Results from analyses in order to maintain the resin plant (see the wastewater permit)
- Quantity and time for export of hazardous waste, name of transporters and receiver of export.
- Quantity and receiver of incombustible waste and paper for recycling.

Conditions for avoiding air pollution

- Measures to ensure that air pollution may pass through the pipes
- Measures to protect against unnecessary noise to the surroundings,
- Measures to ascertain that the gates and other natural openings have to be closed unless the production prevents this.

Reports on changes

- Changes and extensions, which influence the environment, have to be reported to the environmental authorities.

Discharges and Noise

The permitted discharges to the air are summarized in Table 6.1. It includes specific concentrations of the heavy metals nickel, chromium-VI, chromium-III, copper, and zinc. It should be noted that chromium of valency 6 (chromium-VI) is particularly toxic and has a low b-value (0.0001 mg/m³) together with nickel.

Several other chemicals used in the electroplating process are also toxic, such as cyanide and its organic compounds, caustic soda (NaOH) and hydrochloric acid and are regulated but on a higher level.

The terms for noise are summarized in Table 6.2. The total contribution of noise may not exceed the given maximum standards. The values are lower during nights and off normal work hours.

Storage of Hazardous Substances and Spillage

The licence has standards for storage of hazardous substances, requiring that they are stored

- in a locked room
- so that mixing cannot occur
- in drums no bigger than 200 L

- in a room with a floor prohibiting spillage to the soil and to the sewage system
- under roof and with capacity to contain liquid at the amount, equivalent to the biggest container stored

Following the Daily Work – Monitoring

The permits also include conditions for safety procedures to minimize risk for spillage in day time as well as outside working hours, and standards for self-monitoring of on air pollution and noise.

The standards set for annual reporting on emission data, for use of water, cyanide and raw materials containing heavy metals.

The report should as far as possible include performance indicator, such as use or emission per tonne or m² of ready-made goods.

Table 6.1 Materials in pipes. *The concentration of materials in the pipe may not reach the following mass stream and emission limits:*

Substance	Main Group	Mass stream Limit (g/h)	Emission Limit (mg/m ³)	B-Value (mg/m ³)
Nickel	1	0.5	0.5	0.0001
Chromium (VI)	1	0.5	0.5	0.0001
Chromium (III)	2	25	5	0.001
Copper	2	25	5	0.01
Zinc	2	25	5	0.06
Cyanide	2	25	5	0.06
NaOH	2	25	5	0.005
Cyanides	2	50	5	0.06
Hydrochloric Acid	2	50	100	0.05

Table 6.2 Noise levels. *The total contribution of noise in the equivalent corrected noise level in db (A) may not exceed the following maximum standards – monitored outdoors at the property limit to the North:*

Monday to Friday	7:00 AM to 6:00 PM	55 db (A)
	6:00 PM to 10:00 PM	45 db (A)
Saturday	7:00 AM to 2:00 PM	55 db (A)
	2:00 PM to 10:00 PM	45 db (A)
Sunday	2:00 PM to 10:00 PM	45 db (A)
All days	10:00 PM to 7:00 AM	40 db (A)

BAT/Cleaner Technology Initiatives

The renewed 2007 licence includes conditions regarding cleaner technology (BAT) initiatives. It was addressed by the company in the following way:

1. An EMS in place, including a certified ISO 14001 system, securing collection of all relevant production and environmental data on a current basis; this requires good order and effective maintenance of equipment and update of procedures
2. Management had on a current basis over the years improved and optimized the production lines leading to less use of resources and reduced environmental impact. The introduced techniques included ion-exchangers to recycle metals; spray-rinsing and other effective rinsing techniques made recycling and reuse of water possible; a substantial reduction of the total water consumption
3. Reduction of spillage and waste of chemicals and raw materials throughout the process. This included the shipment out of the company of solid and hazardous waste for recovering and reuse.
4. Substitution of more hazardous chemicals with less hazardous materials. This included the substitution of zinc cyanide with ‘sour’ zinc; the use of electrolytic degreasing to replace degreasing chemicals with volatile organic components and with water-based degreasing chemicals
5. Annual ‘Green Accounts’ with detailed figures on performance on key parameters, making the relation between achievements and stated aims directly measurable.

Licensing

The very developed Environmental Management profile and the achievements on preventative measures led the Municipality to the conclusion, that the 2007 renewal of the environmental licence did not require tightening or change of terms already included in the 1996 licence. This had partly to do with the ISO 14001-certification, which implies, that all the production and emission data will be provided by the company on a current basis, which increases the transparency of the company activities and makes access to data easy.

There was a clear and, for the environment, very positive synergy between licensing requirements, the ISO 14001 and Green Accounts requests to the company. Roskilde Electroplating was able to take stock of the managerial and financial ‘investment’ made over a long time, taking the company to a high level, also and not least in the eyes of the municipality.

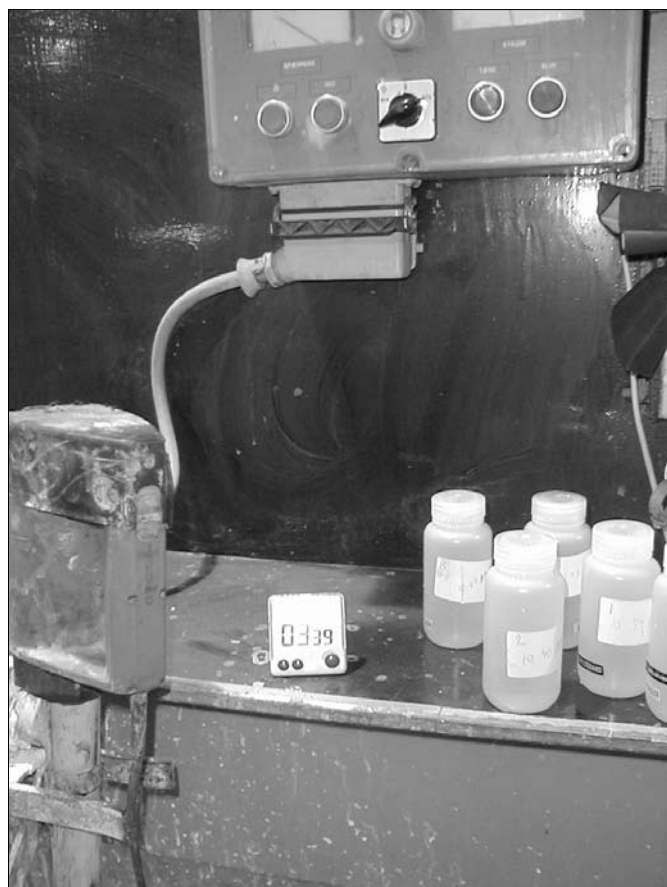


Figure 6.2 Sample solutions. *The solutions in the baths (samples in plastic bottles) are analysed. This makes it possible to add the correct amount of chemicals to have the baths operate properly. (Photo: Roskilde Municipality Environmental Inspection office)*

5. Wastewater Discharge Permit – Parameters and Terms

Wastewater Discharge Permit

Wastewater discharge is regulated by a – separate – wastewater discharge permit, which sets the terms for the company's discharge of wastewater, either directly to surface water via its own wastewater treatment facility, or by connecting to the municipal wastewater sewage system. This last option is used by Roskilde Electroplating. Roskilde Municipality is the competent authority to issue the wastewater discharge permit.

The wastewater permit is normally issued, and reviewed, in connection with the issuance and reviewing of the environmental licence, to secure the holistic approach to licensing, targeted by the IPPC directive. But the wastewater permit is a separate document and may be reviewed and terms changed independently from its licensing procedure and time frame.

Wastewater Characteristics

As described above the zinc galvanizing lines each has four baths: alkaline degrease, priming, electrolytic degrease and coating. After each sequence the items are water-rinsed in a total of five rinses. The water from the rinses goes through an ion-exchanger to an internal wastewater cleaning system and is then used again for the rinsing.

The company can use a maximum of 4,000 m³ of water annually, measured as water discharged to the public sewage system. The released wastewater may have a maximum temperature of 35°C and a pH-value of no more than 9.0 and no less than 6.5. The standards set in the wastewater permit for the key substances used in the process are given in Table 6.3. A considerable amount of metal is, as already explained, recovered from the water through ion exchange before it is released in the wastewater. Some 6 tonnes of zinc is recovered in the sludge from the wastewater treatment.

Monitoring and Control

Other important terms and conditions in the wastewater permit are concerned with monitoring and control, including strict regulations for the samplings, e.g.:

- Samples must be taken at the first well after the discharge from the production, i.e. from the company wastewater treatment plant and taken during normal production hours.
- Samples must be taken and analyzed by an accredited laboratory and methods chosen for the analysis able to detect 10-times lower limits than the annual average standards.
- Roskilde Municipality (the Competent Authority) must be informed about planned sampling a week in advance and the results of the analysis sent to the authority within 5 weeks of the sampling. If it deviates from the terms in the permit, the company must supplement the report with explanations and description of steps taken to avoid reoccurrence.

Table 6.3 Key substances in wastewater. *The average daily value may not at any time exceed the annual standard average with more than a factor of two.*

Parameter	Yearly average Standard (mg/l)	Maximum Annual Quantity (kg)
Chromium	0.5	2.0
Copper	0.5	2.0
Nickel	0.5	2.0
Zinc	0.5	2.0
Cyanide (total)	0.5	2.0
Cyanide (Chlorine ox.)	0.1	0.4

- The company must monitor use of water, recycling of water and discharge of wastewater on a daily basis, and every fortnight sample the ion-exchangers and analyse for iron-content and register total amount of wastewater passing through. All results should be recorded in the water manual.
- In case of production or discharge irregularities between sampling periods potentially or actually leading to violation of the terms set in the permit for one or more parameters the company must immediately inform the municipality

6. Environmental Reporting – the Results so Far

Total Resource Use and Recycling

The exact use of raw materials and amount of waste of different kind is documented in the Green Accounts from where the following key figures are extracted. Total environmental impact over the five years period 2001/02-2005/06 is summarised in Table 6.4.

Most remarkable is that the recycling of material as chemical, paper and metal waste has increased dramatically, while deposited waste has decreased by almost 90%. Resource use has not changed much, although total chemical use has decreased by 10% over the 5-year period.

Zinc Recycling

Zinc is a main resource used in the company. Over the years several attempts were made to recover zinc, which was lost in the process with the rinsing baths. First the company tried to recover the zinc from the rinsing vessels, but the cost at the current prices of zinc was too high. The cost/recovery rate was 2:1. This led to a substantial amount of zinc ending up in the

sludge, which was treated as toxic waste, and sent to the Danish Joint Municipal Toxic Waste Incineration Plant. This plant only deposited it without any attempt at recovery. High and increasing charges had to be paid for the sludge delivered to the station, which made this a quite costly solution.

From 2003 the sludge has been sent to a German facility instead, which has been able to regenerate the zinc and send it back to the company for use.

Today zinc has become 3 times more expensive than earlier and it may be worthwhile trying to recover the zinc directly from the rinsing vessels. It will mean a dramatic savings on the sludge, which can then be treated as non-toxic.

Water Consumption and Wastewater Discharge

Water consumption was in the late 1970's and early 1980's at the level of 150 m³/day. There was a sensor in each vessel with the baths consisting of water and the active substance(s). Whenever the concentration of the active substances became too high, fresh water was added automatically until the concentration was adjusted. By introducing more rinses it was possible to make the baths work with lower concentrations, and the water from the rinses was led back to the vessels when supplements were needed. At the end of these efforts water consumption was reduced dramatically. It is now at about 10-12 m³/day or in total 4,000 m³ yearly. This is a reduction of more than 90% in water consumption. At the same time now the production has expanded to four lines compared with 1½ lines at the time of the 150 m³/day in water consumption. Some investments were needed, but at a reduction rate at this level, the pay back time is short.

The discharges to wastewater have also been reduced. From Tables 6.5a and 6.5b it is clear that discharges of metals and cyanide in wastewater in the period 2003-05 was well

Table 6.4 Environmental impact over 5 years 2001/02 – 2005/06. Key parameters, in kgs. when not stated otherwise: (Source: Annual Green Accounts 2005-2006)

Parameter/ year	01/02	02/03	03/04	04/05	05/06
Electricity/kWh	1,253,853	1,296,737	1,236,950	1,170,881	1,160,641
Water use, m ³	3,701	3,690	3,527	3,409	3,371
Anode use	25,948	19,380	20,550	18,870	21,600
Chemicals, total	150,175	177,604	147,601	146,595	134,329
Waste water m ³	3,023	3,157	2,842	2,678	2,722
Chemical waste (deposited)	19,650	974	3,240	916	2,530
Flammable waste (incineration)	3,020	5,450	7,140	3,140	4,000
Chemical waste (recover)	0	17,320	18,060	16,110	18,410
Paper/Cardboard (recover)	3,520	3,340	4,520	4,765	7,410
Scrap metal (recover)	6,260	2,640	8,300	2,500	6,180

Table 6.5 Wastewater.

A: Total content of heavy metals and cyanide during the three years 2003-2005 and related to the terms of the Wastewater Permit. All figures in kgs.

B: Relative content of heavy metals and cyanide during the four years period 2003-2006 related to the terms of the Wastewater Permit. All figures in mg/l.

Parameter/year	2003	2004	2005	Permit
Copper	0.16	0.01	0.01	2
Chrome	0.01	0.05	0.03	2
Nickel	0.01	0.00	0.00	2
Zinc	0.61	0.07	0.05	2
Tin	-	-	-	2
Total cyanide	0.03	0.03	0.03	2
Volatile cyanide	0.01	0.01	0.01	0.4

A

Parameter/year	2003	2004	2005	2006	Permit
Copper	0.129	0.058	0.019	0.015	0.5
Chrome	0.107	0.386	0.004	0.018	0.5
Nickel	0.046	0.002	0.005	0.004	0.5
Zinc	0.337	0.512	0.150	0.135	0.5
Tin	-	-	-	0.001	0.5
Total Cyanide	0.253	0.253	0.054	0.752	0.5
Volatile Cyanide	0.056	0.056	0.013	0.058	0.2

B

below the values in the permits. It is also clear (Table 6.5a) that the real discharges have decreased considerably.

Production and Performance Indicators

Table 6.6 reports on production and performance indicators for the 6-year period 2000/01-2005/06 for the four production lines. All lines except No 3 use less zinc although the number of items is about the same. Also for all lines except No 3 the amount of zinc per item has decreased.

7. Final Remarks

A successful case

The case demonstrates, that also smaller companies in a somewhat environmentally difficult sector have all the potentials needed to become an environmental front-runner. Getting the positive spiral up and running is the key to success. Management must be attentive and ready to act constructively if and when the Competent Authority brings the necessary and well-timed and patient push to the company's decision-making on environmental impact and investment.

When changes are made at an early point in time in relation to the requirements, further steps are logical and not difficult to take, and more often than not they bring benefits to the company. These may be in terms of cost reductions for raw materials and auxiliary substances and inputs needed.

Table 6.6 Performance indicators. Presentation of the results in the period 2005-2006 with results and reference figures as far back as 2000. Measures in kgs. when not stated otherwise. Remarks: The increase from 2004/2005 to 2005/2006 on line 1 is due to a change in the product mix.

Line	Parameter/Year	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06
1	Zinc (kg)	21,302	19,400	10,729	13,525	12,820	14,675
	Goods items	10,529	9,985	8,614	9,593	8,559	8,650
	kg/item	2.02	1.94	1.25	1.4	1.50	1.70
2	Zinc (kg)	723	775	819	1,025	650	575
	Goods items	4,742	4,228	5,192	5,560	4,771	4,622
	kg/item	0.15	0.17	0.16	0.18	0.15	0.12
3	Zinc (kg)	3,250	3,899	5,765	3,775	1,875	4,800
	Goods items	4,449	561	6,655	5,409	4,386	5,180
	kg/item	0.73	0.85	0.87	0.70	0.43	0.92
4	Zinc (kg)	2,050	1,875	1,995	2,225	2,050	1,550
	Goods items	4,321	3,330	4,318	5,506	5,328	5,344
	kg/item	0.47	0.56	0.46	0.40	0.38	0.29
1-4	Zinc (kg)	27,325	25,949	19,308	20,550	17,395	21,600
	Goods items	24,041	22,104	24,779	26,068	23,044	23,796
	kg/item	1.14	1.17	0.78	0.79	0.76	0.91

Synergy Between Voluntary Measures and Regulation

The case of Roskilde Electroplating shows the synergy between the different elements of environmental instruments and requirements. It started with technological developments in the production process in 1995. It continued with the full environmental licensing in 1996, the Annual 'Green Accounts' in 1998, the licensing according to ISO 9000 and ISO 14001 leading up to a completely unproblematic renewal process of the environmental licence in 2007. The company even got a great deal of praise from the Competent Authority on these 10 years of achievements.

In this way Roskilde Electroplating has had an 'easy go' with the environmental regulation and the implementing authorities. In this the company has been able to focus all its attention on its core business activities.

Effective implementation of the environmental regulation is helped greatly by competent management – and is highly dependent upon the correct understanding of its role and clever action by the Competent Environmental Authority.

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Sources

Licences

The 1996 environmental licence for the company
The 2007 renewal of the licence
Annual 'Green Accounts' for 2005-2006, covering data for the last 5 years of Accounts

Acts and other regulations:

EU-IPPC-Directive
DK Ministerial Orders, making the transposition and implementation of the directive.

Interviews:

Director of Roskilde Galvanisering, Mr. Joern Jensen
Environmental coordinator at Roskilde Galvanisering, Ms. Birgitte Jensen
A civil servant, previously employed by the Roskilde Municipality

Internet Resources

Information on plating techniques

<http://electrochem.cwru.edu/ed/encycl/art-e01-electroplat.htm>

IPPC directive Council Directive 96/61/EC of 24 September 1996

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0061:EN:HTML>

Danish environmental regulation, implementing the IPPC directive

(Ministerial Order no. 1640 of 13/12/2006)

http://www.retsinfo.dk/_LINK_0/0&ACCN/B20060164005

Danish Ministerial Order no. 1515 14/12/2006 on Green Accounting

<http://eogs-lw.lovportaler.dk/showdoc.aspx?docId=bek20061515-full>

Green accounts (Environmental reports) of Roskilde Galvanisering A/S may be ordered at

<http://www.cvr.dk/Site/Forms/CompanySearch/ListCompanyReports.aspx?cvnrnr=33911114>

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The Baltic University Programme

<http://www.balticuniv.uu.se>



A regional university network

The Baltic University Programme is a network of 190 universities and other institutes of higher learning in the Baltic Sea region. All countries within or partly within the Baltic Sea drainage basin are represented: Belarus, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden and more marginally Czech Republic, Norway, Slovakia, and Ukraine.

A large network of researchers and teachers at the universities has developed. The number of individuals who have contributed at some stage in the Programme are more than 1,500. The network is coordinated by a Secretariat at Uppsala University, Sweden.

Sustainable development and democracy

The Programme focuses on questions of sustainable development, environmental protection, and democracy in the region. The aim is to support the key role that universities play in a democratic, peaceful and sustainable development. This is achieved by developing university courses for students but also to participate in applied projects in cooperation with authorities, municipalities and others.



The Baltic University Centre at Belarusian National Technical University in Minsk (Photo: Lars Rydén).

Many arrangements for students

The Baltic University courses attract close to 10,000 students yearly in some 350 student groups. The courses are run separately by each university but there is much communication between course groups. Video conferencing, audio-telephone conferencing and computer conferencing over Internet allow students from different countries to meet and discuss. During summers many different activities are arranged, including a sailing seminar on the Baltic Sea and other summer courses. Student conferences and a student parliament is organized every year.

A variety of courses

The Programme offers a variety of courses for studies of the region, its environment, social change, and sustainable development. These constitute the combined efforts of a large number of scientific experts from all over the Baltic Sea region. The course material, consists of books, booklets, films and websites. The language is English but some material has been translated into Polish, Russian, and Latvian. Printed material, films and websites contribute to a rich learning environment for the students.

Our courses are multi-disciplinary, international, problem oriented, based on ongoing research at the participating universities and they all have an element of regional studies. This book is one in a series of four on environmental management and also the basic material for a Baltic University course.



Lecture on the ship S/Y Fryderyk Chopin while sailing the Baltic Sea (Photo: Agnieszka Trzupek).

Read more about The Baltic University Programme at <http://www.balticuniv.uu.se/>

The Baltic University

Environmental Management Courses

Environmental Management is a package of four courses on master level for higher education in the Baltic Sea region. The courses convey knowledge of environmental management in all kinds of organisations, particularly in the industrial sector, and describe how environmental issues are addressed by different stakeholders in a society. The courses describe the environmental authorities and the legal and economic tool used for inspection and control, including the directives of the European Union; the formal management systems, such as ISO 14001 and EMAS, applicable to all kinds of organisations; industrial production and how to reduce environmental impact and increase resource efficiency; finally the design of products and how to assess the complete life cycle of products in society.

The courses provide a platform for environmental management education in all parts of society. They are well suited for competence development of professionals.

The four partial courses each have a course book, accompanied by a CD containing films, work tools, databases, material for training, and the textbook in PDF-format.

Each course corresponds to 7.5 ECTS credits, or the whole set to half a year of full-time studies.

Web support

The web page of the course package features teaching guides for teachers and additional material for students, such as proposed tasks for group work. The links in the books are kept updated on the web page, and new links are added. Figures etc. from the books may be downloaded to be used in PowerPoint or other types of presentations.

You will find the web pages for the EM courses at <http://www.balticuniv.uu.se/> under the menu: Courses/ Environmental Management.

1. Environmental Policy

– Legal and Economic Instruments

This course describes legal and economic policy instruments, including environmental impact assessment, environmental legislation permits, and inspections and controls. Special emphasis is made on how companies and organisations can work to improve environmental performance and quality themselves, e.g. by green labelling, certification, and proper management tools. The role of inspections, both for control and in consultation to improve environmental performance in a company, is discussed. Environmental fines and taxes, although mostly of national concern, are described. The EU legislation is treated in some detail as well as the most important national legislation.

Course book: 276 pages; theoretical part and cases.

Films: Cases from Sweden and Lithuania (on CD).

Data base: European environmental legislation (on CD).

Website: Teachers' guide and group work for students.

2. Cleaner Production

– Technologies and Tools for Resource Efficient Production

Cleaner technologies refer to production processes where pollution is minimized at the source and efficiency of resource use is carefully improved. The course describes a series of production processes and how to improve energy, water and material resource management and improve production technologies. It describes how the implementation of cleaner technologies not only improves environmental performance, but also economic viability and the quality of the production process.

Course book: Approx. 324 pages; theoretical part and 6 cases.

Films: Cases from Sweden and Lithuania (on CD).

Data base: Cleaner Production Practices (on CD).

Website: Teachers' guide and group work for students.

3. Product Design and Life Cycle Assessment

The design of products and their use are major concerns to improve environmental performance and resource flow in society. The course treats this by applying environmental management, ecodesign and life cycle assessment techniques. A series of indicators for environmental impact are examined, throughout the life cycles of products. The techniques are illustrated by many cases of ecodesign, dematerialisation, use of indicators and LCA calculations.

Course book: 312 pages; theoretical part and 7 cases.

Films: Case from the Netherlands (on CD).

Data base: Applications for Life Cycle Assessments (on CD).

Website: Teachers' guide and group work for students.

4. Environmental Management Systems and Certification

The basis of environmental management is the systematic review, or audit, of an activity in an organisation, industry, or business to map environmental impact and resource use. The course describes how this is done and gives a series of tools to reduce impact. The practicalities of ISO 14001 and EMAS certification are described.

Course book: 266 pages; theoretical part and 7 cases.

Films: Cases from Sweden and Germany (on CD)

Data base: Tools for EMS (on CD).

Website: Teachers' guide and group work for students.



Baltic University Press

*Our books are interdisciplinary, international,
and based on latest research*



Environmental Science

© 2003. 824 p. SEK 500.

by: Rydén, L., Migula, P and M. Andersson (eds.).

Contents: Environmental Science is an extensive and interdisciplinary review of environmental issues with a focus on the Baltic Sea region.

English for Environmental Science

© 2003. 166 p. SEK 150.

by: E. Korshuk, I. Kryba, E. Savich, P. Solovyov, A. Tamarina.

Contents: English language course using texts and concepts from the Environmental Science text book.

The Baltic Sea Region – Cultures, Politics, Societies

© 2002. 676 p. SEK 375.

Contents: Regional development; history, culture, languages, democracy, multicultural societies, peace and security, social conditions and economies in the Baltic Sea region.

A Sustainable Baltic Region

© 1997. 10 booklets, 50 pages each. SEK 50 each.

Contents: Sustainable development is treated in ten thematic booklets; energy, material flows, agriculture, industrial production, transport and habitation, ethics and law, ecological economics, and Agenda 21.

Sustainable Water Management

© 2000. 3 books, 230-250 pages each. SEK 200 each.

Contents: Hydrology, water quantity and quality, water management in agriculture, cities and industry, water and cities, transport, fishing, tourism and environmental protection, institutions and law, management plans, water conflicts, and international cooperation.

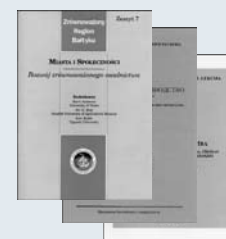
Sustainable Community Development (Superbs Case Studies)

© 2002. 4 booklets, 80 pages each. SEK 75 each.

Contents: City development, energy, material flows, urban planning, transport and habitation, illustrated by 35 case studies from 10 cities in the Baltic Sea region.

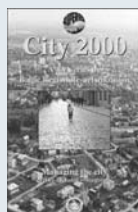
Translations:

Belarusian
Latvian
Polish
Russian
Ukrainian



Film material

Video tapes/CDs that add to the books, and other written material, are also available for most of the courses.



To order our books and films, please visit: <http://www.balticuniv.uu.se/webshop>

The Environmental Management Book Series

Environmental issues are becoming increasingly important in all parts of society. Up till now good educational material has largely been lacking. The present Baltic University series of books, and other material connected to them, support master level training in environmental management in higher education. The books can be used for all relevant university level educational programmes, although they are especially suitable for engineering programmes. The series is the result of a cooperation between specialists at universities and practitioners in the Baltic Sea region: Sweden, Denmark, Germany, Poland, Lithuania, Belarus as well as the Netherlands. The material consists of books with theoretical backgrounds and CDs with films, cases, practical exercises, tools, and databases. It covers four courses in environmental management. A web support to the courses offers teachers' guides and student group works, as well as updated links and other material.

Environmental Policy – Legal and Economic Instruments

Environmental regulation of all commercial activities in the Baltic Sea region is today based on a common body of environmental legislation within the European Union. The book, as well as the accompanying CD, reviews the way that these regulations have developed and are implemented in all kinds of activities, with an emphasis on industry. The focus is on businesses' own responsibility for their environmental impact. A multitude of means and opportunities for voluntary action is provided within or related to the legislation. The environmental authorities are increasingly involved in cooperation with companies on smart ways to secure compliance and beyond, with sustainable production as the ultimate goal. Economic policy instruments, in particular taxes and carbon trading, are treated from the perspective of sustainable development. Special sections deal with best practice of environmental inspection and control, EU environmental legislation, and case studies.

The Baltic University Programme

The BUP is a cooperation between 180 universities in 14 countries in the Baltic Sea region, coordinated by Uppsala University, Sweden. The Programme develops interdisciplinary education on sustainable development and environmental science throughout the Baltic Sea region. It also works with applied projects in cooperation with governmental authorities, local administration and business, as well as with research and information.



www.balticuniv.uu.se

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