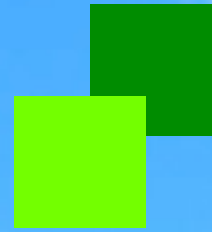




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Municipal Environmental Management

In the future, it is necessary for municipalities to apply a modest, cost-saving and effective use of resources as e.g. energy and water. On the one hand easy going on financial resources is needed, more important however is the municipalities' contribution to the preservation of the natural environment for future generations. Municipal environmental management gives a basic approach for the implementation of this goal. This guideline gives municipal decision-makers, administrations and civil society actors of the local agenda 21 an insight into the practice of municipal environmental management.



Hans-Martin Mulisch  
*umwelt-cert®-program*

# Municipal Environmental Management

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Hans-Martin Mulisch

A Guideline for Decision-Makers in Municipalities



Hans-Martin Mulisch  
*umwelt-cert*<sup>®</sup>-program „Municipal Environmental Management“

**Municipal Environmental Management**

– A Guideline for Decision-Makers in Municipalities –

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**Hans-Martin Mulisch**  
*umwelt-cert®-program*

# **Municipal Environmental Management**

**A Guideline for Decision-Makers  
in Municipalities**

**BÖLL.**  
HEINRICH-BÖLL-STIFTUNG  
BRANDENBURG

***The balloon said: „Growth is good“ and popped.  
The giant said: „Growth is bad.“ And ate the dwarfs.  
The fire said: „Growth is good.“ And only ashes remained.  
Death said: „Growth is bad.“ And laughed.  
„I don't know at all what you are talking about.“ Said the caterpillar  
and turned into a butterfly.***

*Jens Bergmann, Peter Lau in brand eins 03/2003*

The thought of sustainability is reluctant to an imagination of growth in the sense of growth for growth's sake, as it has been dominating our way of doing business for way over 100 years. Sustainability aims at another way of treating earthly resources. Three criteria are at the centre of the thought: Efficiency, sufficiency and consistency. So when we reflect on sustainability today, we look for strategies that are oriented to these criteria. One such strategy is the Local Agenda 21, with whose help a sustainable development should be implemented in the municipalities in three areas: Environment, social affairs and economy.

The Local Agenda 21 is based on cooperation of local actors from administrations, the economic sector and from civil society. Interaction of these three groups should promote the municipalities' development towards sustainability and a higher level of economicalness in the future. In our European project „Sustainable Development, Local Agenda 21. Public Participation, Economic Perspectives and Environmental Management“ we have put at the centre of our discussions civil society participation, economic development and concrete implementation strategies for administrations, amongst others the strategy for environmental management.

As part of the project, a workshop and a conference were organized and held. Experts from eight newly acceded EU Member States from Central Eastern Europe (CEE) and from Germany participated in both events. They came from various sectors: from administrations, science, the economy and from citizens' initiatives.

The concept of the Local Agenda 21 faces special difficulties in the CEE countries and also in Brandenburg, the main federal German State active in

the project. At the moment, other problems than questions of doing business sustainable are in the foreground of societal discussions. The economic reconstruction, from the socialist state planned economy to a market economy, has led to a deindustrialization of large areas. At the same time, new work fields have been established only slowly and with fewer jobs. In most of these countries unemployment is very high. In all these countries rural regions are becoming economically uncoupled peripheries. Urban ways of doing business and urban lifestyles dominate the development. Extreme disparities seem to characterize the future of the Central East European regions.

In these regions, politically responsible people as well as citizens have hardly put and still hardly put sustainability at the centre of attention in their considerations. Frequently, sustainability is even given the image of blocking economic development. However, in view of the current economic, ecological and social problems we've long known that this is a short term reflection, that does not only fade out the rights of future generations but burdens us already today with future mortgages through high costs and natural catastrophes. Nonetheless in all countries named, it is difficult to convey the concept of sustainability and depict the advantages of the strategy.

The Local Agenda 21 sets in at the municipalities. Here sustainability should be anchored in a mutual process. Administrations, the economy and citizens should develop perspectives together. But often the municipalities' administrations are plagued by other worries than the implementation of the Local Agenda 21. Many German municipalities e.g. lack sufficient financial means to master all the tasks. This was demonstrated by various examples presented at our events. For the Agenda process there are hardly funds available.

The challenges for municipal future perspectives are not only seen in the necessity to do business economically, but most of all in the implementation of an efficient way of doing business connected to basic approaches that take care of the environment and utilize technologically modern procedures. As an answer, environmental management was developed as procedure. Environmental management links technological approaches and management techniques in order to support municipalities in their sustainability strategies.

The following guideline for an environmental management in municipalities takes up this level of procedure. It aims at calling the attention and interest of actors in administrations and propagating procedures that go easy on the environment and support the administrations in solving pressing problems at the same time. Ecology and economy are to be linked in order to attain a higher level of economicalness for enterprises as well as for municipalities in the future. The guideline for environmental management for municipalities takes up the municipal administration's tasks from waste over water to energy provision. The short descriptions are first hints at possible solutions. With it, we intend to arouse interest in this management procedure

But the Local Agenda 21 is not only a task for administrations it is also a task for citizens. Their participation is needed. By introducing specific advantages of municipal environmental management in a clear way, it can be of use as argumentative aid also to engaged citizens, in order to convince the administration of their hometowns of the necessity and chances of an environmental management system.

Our project „Sustainable Development, Local Agenda 21. Public Participation, Economic Perspectives and Environmental Management“ began with an exchange between the CEE countries and Brandenburg. This exchange was very productive and should be further pursued for concrete subjects. Many of the possible subjects are mentioned in the present guideline. It can be starting point for continuing this exchange of experiences.

We would like to thank Hans-Martin Mulisch for creating the guideline. We would like to thank Rebecca Budde for translating it from German. We would like to thank the Phare-Small-Projects-Program funding of the European Union for making this publication possible.

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<b>INTRODUCTION</b>	6
<b>1 INSTRUMENTS FOR AN EFFECTIVE OPERATIONAL ENVIRONMENTAL POLICY AND THE PROCESS OF LOCAL AGENDA-21</b>	9
1.1 Global environmental policy for sustainable development	9
1.2 European environmental policy for sustainable development	12
1.3 German environmental policy for sustainable development at national level	13
1.4 Environmental policy of organisations as strategy for a sustainable business management development	15
<b>2 ENVIRONMENTAL MANAGEMENT</b>	18
2.1 Environmental management and sustainability	18
2.2 Certifiable Environmental management- Assessment, Planning, Implementation, Responsibilities, Control and Adjustment Measures	19
2.3 Internal audit and environmental entrepreneurial audit	31
2.4 Environmental Declaration	33
2.5 Certification or Validation	34
<b>3 LEGAL REQUIREMENTS – ENVIRONMENTAL LAW</b>	35
<b>4 MATERIAL STREAM AND ECO-BALANCE</b>	36
4.1 Basic principals of resource- and management material stream management	36
4.2 Eco-balances	37
4.3 Weak point analysis	39
<b>5 ENERGY MANAGEMENT</b>	39
5.1 Sustainable technologies	40
5.2 Energy recovery from waste	43
5.3 Energy efficient planning of buildings	44

---

<b>6</b>	<b>IMMISSION / EMISSIONS, WATER PROTECTION, WASTE MANAGEMENT</b>	45
<b>7</b>	<b>ENVIRONMENTAL HYGIENE</b>	48
7.1	Possibilities for the substitution of hazardous substances	49
7.2	Occupational safety- and health management	52
7.3	Workplace-endangerment-analysis	53
<b>8</b>	<b>PRODUCT INTEGRATED ENVIRONMENTAL PROTECTION</b>	55
<b>9</b>	<b>INSPECTION OF LOCATION OF MUNICIPALITIES FOR ENTERPRISES / ORGANISATIONS</b>	56
<b>10</b>	<b>BENEFIT OF A MUNICIPAL ENVIRONMENTAL MANAGEMENT SYSTEM</b>	58
	<b>INDEX</b>	60
	<b>ANNEX</b>	66
	Annex 1: Example of a municipal environmental policy	67
	Annex 2: Necessary procedures and steps for the establishment of an environmental management system (according to validation-checklist – EMAS and DIN ISO EN 14001)	72
	Annex 3: Example of structural points of the report on the first environmental audit	86
	Annex 4: Example of a cadastre o lows (here for a German communal transport enterprise)	90
	Annex 5: Example of a safety data sheet according to 91/155/EC (in an abridged version)	93
	Annex 6: Example of a supplier request through procurement	94
	Annex 7: Example of a sequence table during an environmental certification	95

## Introduction

In recognising the responsibility for environmental provision, protection of the environment, conservation of nature and going easy on raw material resources have become one of the most crucial questions in society. This is true in particular with regard to the Local Agenda 21<sup>1</sup>, that is devoted to sustainable and future-oriented development in regional areas. Due to these developments, also at the municipal level - both from public and from non-public organisations - in future contributions to future-oriented concepts for sustainable environment protection, which comply with the modern demand for societal transparency and acceptance, will be supported.

There is no doubt that the communes are increasingly taking voice not only in discussions on saving energy and resources, but must already today set concrete, appropriate actions, in order to be able to introduce a turnaround of public spending in these areas. Consultation through experts in introducing and accomplishing these processes is always useful, when the municipality is not active by itself for whatever reasons or the implementation of the processes shall be accelerated.

The Umweltbüro Dipl.-Ing. Mulisch GmbH (environment office) consults municipalities, enterprises and other organisations on water, waste and energy management since the beginning of the 90ies. These activities have led to the main focus of the office: municipal environmental management. In this field, scientific- technical analyses and planning are linked to organisational and communications consulting in administrations, but also between administrations, Local Agenda offices, local enterprises and other external protagonists such as associations, citizen movements etc.

The essential concerns of environmental management<sup>2</sup> are the protection of natural resources and energy. In this respect, the administration's or municipal enterprises' operational procedures shall be simplified and designed more effectively. The main objective is an ecological development which is economically profitable and indeed contributes to cost saving. There is an enormous potential

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<sup>1</sup> Agenda 21 is the action programme for the 21st century. It contains in its 40 chapters recommendations for a sustainable resource management. It is directed not only to the governments of different countries but also to individual citizens, self-administered corporations and societal groups.

<sup>2</sup> „To manage means first and foremost to cope with life, to solve daily problems and to actually realize the things one decided to do.“ (Willmott 1997)

for this, especially in the municipalities. However, the exploitation of this potential, e.g. in the municipal administrations, makes sense only when the saving in operational costs is transferred to the cost accounts, i.e. the balancing and depreciation practice according to accounting principles is established in the municipalities or municipal enterprises so that successes are more visible.

The most important precondition for a functioning municipal environmental management system however is the readiness and devotion of the municipal politics and staff to develop successful concepts of sustainable development in the municipality, to inscribe them in a management system and – with justifiable expenditure – to continue further developing them in dialogue and cooperation with citizens and lobbies.

The development of an environmental management system, its orientation to a municipal and entrepreneurial, respectively administration specific environmental policy, its registration and evaluation through audits and its accreditation are concrete measures which not only serve the anticipatory protection of the environment, but also the protection of the personally responsible staff member in the municipal administration itself. Naturally – next to this group of people – this manual is also created for responsible officials in the field of environment, e.g. municipal building authorities or local enterprises and especially for the city mayor as a main decision-maker.

Municipal environmental management means the implementation of defined steps for sustainable development in environmental protection on the municipal level. It compiles:

- Setting up and passing „municipal environmental policies“ by approval of the municipal councillors
- The active inclusion of citizens and local enterprises, communal administrations and other organisations as *corporate* - in the meaning of responsible and conscious citizens – in the process of the Local Agenda
- The creation of entrepreneurial environmental management structures for the investigation of ecological entrapments and for the organisational development in municipal administrations and operations and the local enterprises as well as in other organisations (internal entrepreneurial and municipal environmental measures through standards-oriented environmental management)
- The setting up of a municipal “environmental team” as planning, leading and controlling body of a continual process of improvement (e.g. under the presidency of the city mayor and with participation of Agenda-protagonists).

The manual presented here should serve as an introduction to the subject and offers incentives for concrete steps on how to shape the launch of an environment-oriented and sustainable development of municipalities efficiently. The transfer into an environmental management system however can generally not be achieved in one big step. More important is to act in a consequent and step by step manner, taking into consideration the present situation in the municipality as well as the existing potentials.

## **1 Instruments for an effective operational environmental policy and the process of Local Agenda-21**

Politics in a broad sense is concerned with the regulation and steering of societal interrelations. It establishes structures for living together such as laws, regulations, procedures etc. in order to balance out the different demands of individuals, groups and institutions. As a result, politics are always linked to a learning process respectively to a forming of consciousness.

Environment has been one of the most important policy issues for more than 30 years. However, the opinions and attitudes of political parties, enterprises, associations and citizens towards environmental issues differ. Environmental taxes and constraints that have an effect on citizens as well as enterprises lead to criticism and debate.

Environmental policy evolved with the realisation that our way of doing business is not sustainable and destroys our own living base. Approaches of environment friendly developments that are presented to politics by economy and society as well as those developed in public and political institutions have an impact on the technical and economic developments of a society.

### **1.1 Global environmental policy for sustainable development**

The Earth Summit of 1992 in Rio de Janeiro, the United Nations Conference on Environment and Development (UNCED), was the expression for an increasing consciousness of the dangers of the globally increasing environmental problems. It made "sustainable development" leading principle for future global actions.

The Brundtland-Commission<sup>3</sup> had introduced the term „sustainable development“ and defined it as follows: „The present generation should satisfy its needs without inhibiting future generations of satisfying *their* needs.“ This short but meaningful sentence means nothing less but the obligation to turn away from a living and doing business on other's costs and at the expense of future generations.

Besides important and far-reaching decisions, a declaration was passed at the Rio Summit that binds the International Community to important environmental policy guiding principles (Rio declaration on environment and development):

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<sup>3</sup> The Brundtland-Commission was the „World commission for environment and development“ that was introduced by the UN General Assembly in 1983. It was named after its head, the then Norwegian Prime Minister Gro Harlem-Brundtland.

- The provision principle obliges states to a reduction of risks for humans and environment according to the progressive status of science and technology in addition to combating concrete dangers
- The fault principle means, that the one responsible for environmental damages has to come up for their prevention or clearance.
- According to the cooperation principle, environmental protection is a joint task of state, citizen and economy.
- The integration principle means, that environmental protection is not an isolated issue, but that in the implementation of many other policy areas such as transport, energy, agricultural and development policy aspects of environment have to be taken into account.

For the implementation of the guiding principle of sustainable development, the Local Agenda 21, a world wide action programme for the 21<sup>st</sup> century was decided in Rio. It calls on all states to elaborate concepts and strategies for a sustainable development.

For realising sustainable development the Rio Summit had assigned a common responsibility to industrial and developing countries, differentiated according to their varying status of development:

- „The industrialised countries confront the task to coordinate durably their environmentally impacting and resource intensive living and business behaviour with the natural living bases of the earth. For this, the industrialised states must not only change their behaviour fundamentally but also have to help developing countries to follow paths that enable a rise in living standard with a notably lesser use of energy and resources and a significantly lower level of polluting emissions.“
- „For developing countries the eradication of poverty is priority. Poverty is an essential cause for inadequate, unsustainable production and living conditions. The economic development required for this must also be directed by ecological criteria“.

Ten years after the conference in Rio the *World Summit on Sustainable Development*, held in Johannesburg, South Africa from August 26- September 4, 2002, drew balance and gave the policy field “sustainable development” a new impulse. The summit concentrated on the following themes:

- Protection of resources and resource efficiency
- Globalisation and sustainable development
- Poverty and Environment

- Strengthening of the United Nations in the field of environment and sustainable development on the whole
- Finances
- Transfer of technology

For monitoring these international work programmes of Agenda 21, “sustainability indicators” shall be elaborated.

A first step in this direction was the work programme on sustainability indicators published by the UN committee on sustainable development (CSD) in 1995, with which an internationally applicable system of indicators was elaborated until the year 2000<sup>4</sup>. In view of the increasing interweaving of the global economy that also leads to an intensified competition between different business locations a consensus on international environmental standards is becoming more urgent. For this the following seven “elements of a global ecological polity frame“ are seen as especially important (BMU 2000):

- 1 International environmental conventions with fastidious standards
- 2 Agreements on international strategies for elaborating environmental minimum standards, for example in the frame of OECD and UNEP
- 3 Pilot projects for disseminating these minimum standards in selected areas
- 4 Consideration of the environmental standards in the standards of the International Standard Organisation (ISO)
- 5 Further development of the OECD guidelines for multilateral enterprises
- 6 Environment manuals of international finance institutions
- 7 Voluntary international approaches as for example self commitment of organisations such as industry, (municipal) enterprises and administrations, as well as other organisations such as associations, clubs, etc. or the in the EU installed environmental audit system (EMAS respectively DIN ISO EN 14001 ff) of a controlled entrepreneurial environmental management system.

The last point demonstrates on an international level the demand for a sustainable ecological development in local respectively regional spaces and refers directly to the introduction of environmental management systems. Particular value is assigned to a stronger integration of environmental aspects also in other policy

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<sup>4</sup> See also: [http://www.bmu.de/files/pdfs/allgemein/application/pdf/csd\\_06.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/csd_06.pdf),  
[http://www.bmu.de/files/pdfs/allgemein/application/pdf/csd\\_03.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/csd_03.pdf) and  
[http://www.bmu.de/files/pdfs/allgemein/application/pdf/csd\\_01.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/csd_01.pdf)

areas as well as in pursuing international sustainability strategies (e.g. in development aid).

## 1.2 European environmental policy for sustainable development

Environmental policy belongs to the central tasks of the European Union (EU). The EU continually gives new impulses and regulations for the development of national environmental legislation. In many fields, the EU gives the minimum standards which are adopted by member states to a higher or the same standard on the national level. From the German point of view the following goals are important (BMU 2002):

- Protection of the earth's atmosphere: development and implementation of the climate protection strategy
- Environment-friendly mobility: further diminution of pollutant emissions and fuel consumption
- To go easy on resources: development of an Integrated Product Policy (IPP), including strategies for the implementation of product responsibility
- Protection of nature's household: creation of a European network of protected areas (Natura 2000 in the framework of the directives about fauna, flora and habitats) and of framework regulations on water and groundwater protection
- Further development of environmental policy instruments: revision and complementation of the police law with the goal to shape the regulations more transparently and easier executable, as well as an intensified use of flexible instruments that complement the police law in order to raise the efficiency of environmental policies
- Integration of policies: Fulfilment of obligations anchored in the EC- Treaty to take into consideration the environmental point of view in other municipal policies

In Göteborg, Sweden in June 2001, the European Council agreed on a strategy for sustainable development (EU 2001). Above all, goals and measures in four priority fields are addressed: climate protection, transport, health and natural resources. In addition, the European Council extended the Lisbon Strategy<sup>5</sup> by the

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<sup>5</sup> The Lisbon strategy compiles measures to renew Europe economically, socially and ecologically. In March 2000, the European Council presented this ten year strategy at its meeting in Lisbon, with whose help the EU shall develop to the most dynamic and competitive economic area world wide. (see also: [http://europa.eu.int/growthandjobs/key/index\\_en.htm](http://europa.eu.int/growthandjobs/key/index_en.htm) and [http://www.bmu.de/files/pdfs/allgemein/application/pdf/lissabon\\_sds.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/lissabon_sds.pdf)).

environmental dimension. At the moment, the EU sustainability strategy is being revised. For this, the European Commission launched a broad public consultation for evaluating and further developing the EU sustainability strategy, which is closed by now. It is foreseen that the European Council passes the revised EU sustainability strategy by the end of 2005.

### **1.3 German environmental policy for sustainable development at national level**

In Germany, the environment is seen as a task area to be regulated by the state since the 1960s. With the economic crisis at the end of the 1970s environmental issues were set back against the more pressing issues of economy and especially the securing of jobs. Environment and the protection of the environment were not put on the overall political agenda and re-valued as a political forming principle until the 1980s. The guiding principle of the eco-social market economy is officially represented by the state; conflicts between objectives and interests of state, economy and lobbies are being debated broadly in the media. With the conference in Rio in 1992, sustainable development reached the role of a guiding principle for politics also in Germany, which as a consequence also involves a change in production, products and consumer behaviour. The implementation of new ideas and new products and procedures as innovation takes place mainly in the enterprises. Here, however, the success rate of innovations is especially dependent on social institutional and organisational changes. The meaning or significance of the "Local Agenda 21" is relatively limited compared to decisions made by the economy and the possibilities of the economy: its potential has not yet been fully exploited.

Germany has introduced an own national „environmental barometer“, with which the overall development in the field of environment shall be anchored more firmly in public consciousness on the basis of summarised indicators. At the moment it compiles indicators for climate, air, soil, nature, water as well as energy and raw material consumption.

The sustainability strategy also needs such indicators. With 21 key indicators for a sustainable development, the federal government wants to show in regular intervals where we stand on our way to sustainable development, which progress has been achieved and where more action is needed.

The indicators are a basic component of a management concept for the implementation and continual further development of the sustainability strategy. The aims and indicators show the direction in which the development should go in

the coming decades in benchmark values and they serve particularly as a success control mechanism.

The 21 indicators for the 21st century are (online 2005):

- 1 *Energy and raw material productivity*
- 2 *Emissions of the six hot house gases of the Kyoto- protocol*
- 3 *Share of renewable energies in energy consumption*
- 4 *Increase in settlement and transport space*
- 5 Development of stock of selected fauna species
- 6 Finance saldo of the state sector
- 7 *Investment quota*
- 8 Private and public spending on research and development
- 9 Educational degrees of the 25 year olds and number of university entrants
- 10 Gross Domestic Product
- 11 *Intensity of transport and share of rail in goods transportation*
- 12 Share of ecological farming and overall balance of nitrogen surplus
- 13 *Air Pollution*
- 14 Satisfaction with health
- 15 Number of robberies in apartments
- 16 Employment rate
- 17 Number of day care centres
- 18 Relation of male/ female annual salaries
- 19 Number of migrant school leavers
- 20 Spending on development aid
- 21 EU Imports from developing countries

The indicators are benchmark values for state and society actors of sustainable development. They are linked to concrete and – where useful and possible – with quantifiable goals<sup>6</sup>.

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<sup>6</sup> For example, by 2020 energy productivity in Germany shall be doubled compared to 1990. I.e. with a certain amount of energy approximately double the amount of 1990 can be produced.

The sustainability indicators demonstrated in italics have a direct reference to environment and are a direct, respectively indirect aspect of municipal environmental management. The number of key indicators was kept small purposely. With few indicators a quick overview of important developments should be made possible<sup>7</sup>.

In the future the task will be to bundle these positive aspects on a regional level, to integrate the economy into Local Agenda processes, to develop sustainability strategies on a municipal level via indicators and to commonly implement them in the frame of an individual “operational” environmental management system that is adjusted to municipal circumstances.

#### **1.4 Environmental policy of organisations as strategy for a sustainable business management development**

Every organisation pursues a policy of enterprise. If we view a municipality as an enterprise as every other organisation, entrepreneurial policy has the task to establish corresponding enterprise structures in order to pursue internal interests of the enterprise interactively with the public and non-public sphere, or rather implement different viewpoints, foci and interests. Viewing environmental policy as part of a policy of enterprise, as well as personal or quality policies, it becomes evident that the need for regulation to the advantage of the organisation (enterprises, municipalities and other organisations) exists, i.e. the entrepreneurial environmental policy has to deliver corresponding instruments in order to be implemented efficiently (see [table 1](#) and [chapter 2.3.1](#)).

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<sup>7</sup> See e.g. sustainability report of the city of Beelitz (2003), manuscript available at the Umweltbüro Mulisch GmbH Potsdam, Germany

**Table 1** Efficient instruments for the implementation of an environmental policy

- Audit [eco-audit, environmental audit, social audit, sustainability audit, legal compliance audit, performance audit, system audit]
- Benchmarking [Eco-Benchmarking]
- Report [Environmental report, environmental declaration, sustainability report]
- Entrepreneurial environmental information system [EELS]
- Controlling [eco-controlling, environmental controlling, integrated controlling, sustainability controlling]
- Emissions certificate trading
- Environmental Shareholder Value [added value EM]
- Risk analysis
- Substance stream analysis [Substance flow analysis. Material flow analysis]
- Total Quality Environmental Management [TQEM]
- Environmental management system [EMAS, DIN EN ISO 14001] and quality management system [DIN EN ISO 9001]

The overview in [table 1](#) demonstrates a selection of different or rather complementing instruments for the implementation of an environmental policy. Without going into further detail on the individual instruments, the effective instruments are the provision of information for an evaluation and judging of the environmental situation (=> environmental aspects) e.g. in the form of reports or risk monitoring, the establishment of organisational structures as a precondition for an entrepreneurial system, a policy e.g. in the form of a (management) and controlling manual.

A standard-oriented environmental management (see [chapter 2.2](#)) according to EMAS<sup>8</sup> (*Environmental Management and Audit Scheme*, also known as eco-audit regulation) and the DIN EN ISO 14001 ff (*International Standard Organisation*) binds most of the above mentioned individual instruments to a complex system of organisational, informational and controlling structures. The advantage lies in the simple combination possibility with other management objectives such as quality, maintenance of industrial health and safety standards, security, staff, finances, etc.

The essential environmental goals for an organisation are:

- Promotion of the public image through e.g. self-obligations or technical improvements such as going easy on the environment by reducing pollutant

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<sup>8</sup> Apart from national solo efforts, such as the British Standard (BS) 7750, which is important for development because of its initiative character but it doesn't provoke a further broad application, the EMAS was the first significant policy for environmental management systems. The EMAS is an EU policy that means it is in its legal sense comparable to a German law. It describes a broad/inclusive system for entrepreneurial environmental protection from the to be elaborated environmental policy of the organisation to the approval and observation through environmental reviewers.

emissions, warmth, radiation etc. (ecological market safeguarding strategy =>clean)

- Disclosure of hidden environmental costs e.g. saving costs through controlled energy, resource and material management, increase in effectiveness of processes and organisational procedures (ecological cost strategy => efficient)
- Ecological innovation in product and service marketing (ecological differentiation strategy =>innovative)
- Observance of societal ecological claims, e.g. in the legal certainty of decisions, propositions and changes of market conditions in the ecological sense (ecological market development strategy =>progressive)

Hereby the organisation pursues a voluntary sustainability strategy in its environmental policy, as it wants to survive on the market. It will therefore make use of cost saving potentials, design its own processes more effectively and diminish emissions, if it sees an advantage in these actions and the necessary investments for the processes are beneficial.

Similar to an entrepreneurial environmental policy, a communal environmental policy is articulated in terms of long-term guidelines and short- to middle-term environmental goals. An example of fixing communal environmental guidelines is included in the annex. (see [annex 1](#)). Environmental policy is precondition and central element of a (standards-oriented) environmental management system (EMS)

The policy has to be set by the highest leader (mayor, municipal councillor's assembly) and has to secure that this entity

- a. concerning manner, extent and environmental effects of its activities, products and services is appropriate
- b. contains an obligation to a continual improvement and prevention of environmental pollutants
- c. contains an obligation for the observance of relevant environmental laws and regulations and other demands the organisation is obliged to
- d. forms the frame for the regulation and evaluation of the aims and individual goals referring to the environment
- e. documents, implements and maintains how all staff members gain knowledge
- f. is open to the public

An example for the regulation of municipal environmental guidelines can be found in the annex and in [chapter 2.3.1](#). The municipal administration should strive for

ensuring that deliverers and all persons acting under a municipal contract are working in line with the municipal environmental policy.

## 2 Environmental management

### 2.1 Environmental management and sustainability

Organisations first and foremost develop in and with their „market environment“. Taking a closer look this is true for almost all forms of organisation. Environmental managers are therefore well advised to work in a market-oriented way<sup>9</sup>.

Even though doing business via the market is not free of problems from an ecological perspective, markets can also become mediators for sustainability, as functioning markets deactivate squandering, enable to act de-centrally, provoke new solutions to problems, increase the quality of life through remunerating performance and therefore promote self-responsibility. They are a part of an open society and can implement goals of sustainability in an “entrepreneurial” way.

In view of this the question arises, what market orientation consequently means for environmental management. Firstly, one can in an ideal typical view understand „market-oriented“ environmental management as the implementation of ecological aims under the principle of market forces. The market actions are taken “voluntarily” because of the different options given. The efficiency of the market order derives from this autonomous standpoint of the market partners: The decisions affect those actors “de-centrally”, who can judge the use of the transaction best for themselves (Streit 1991): “Markets generate efficiency, they endow freedom and enable progress through self-reinforcing tendencies of coordination between the changing desires of the consumers and innovative performance of the providers”.

Despite of these functional advantages, ecological and social problems have made visible that the steering capacity of the market reaches limits as soon as hazardous consequences of production and action for certain *stakeholders* are taken into account in the market prices only incompletely. In economics we talk of external costs, meaning effects that are not carried by the provider or consumer but are shifted to outsiders. External costs and „free riders“ lead to an over-usage

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<sup>9</sup>Whereas the institutional viewpoint emphasises market regulation through guidelines of normative principles, the metaphor of the mechanism stresses the self-regulative function of markets for supply and distribution of goods. The market mechanism helps to overcome shortness through voluntary, de-central decisions of market participants, who, because of limited information on prices, amounts and qualities of goods, strive to maximise their benefit through trading activities (Richter and Furubotn 1996).

of public goods such as air and water, for whose use no adequate market price can be paid as long as no one can be excluded from usage. This over-usage, as a consequence of external costs, is a market failure (Fritsch, Wein et al. 1999).

The problem that arises for the entrepreneurial environmental management is that only those additional costs for environmental protection can be transferred to the clients that include an individual profit advantage from a viewpoint of the clients. In the frame of municipal environmental management however, the implementation of environmental goals takes place in terms of measures that do not spare costs or don't endow an additional profit but on the other hand, via additional obligations, give entrance to market processes.

In addition, the tendency shows that prices for environmental resources are being intensified, profit potentials and price relations are in a constant flow as supply and demand, legal regulations, information media and technologies further develop so that the above mentioned market failure in the entrepreneurial environmental management is increasingly defused. By this, the conditions for environmental management on an entrepreneurial level shift towards conditions on a communal level. This is also reflected in the decisions taken by the European Commission to open standards-oriented environmental management to all organisations *and* to municipal administrations and enterprises.

## **2.2 Certifiable Environmental management- Assessment, Planning, Implementation, Responsibilities, Control and Adjustment Measures**

Standard and accreditation systems form incentives for „voluntary improvements“ of environmental protection in organisations. Instead of state restrictions in terms of prohibitions and sanctions, environmental accreditation systems hold out the prospect of reward through distinction of the organisation and/or its products and services. Generally all organisations can be accredited, such as e.g. commercial economy enterprises, municipal enterprises, industry, associations, administrations, institutions and research institutes as well as free lancers and lawyers, medical doctors or engineers etc. The certificate can be used as market instrument. The organisation is not bound to strict guidelines but can decide itself in what fields activities would be convenient and promising.

Accreditation systems are published by the state and private institutions; therefore there is a selection of public and private law systems. The introduction of environmental management systems according to the standards EMAS as well as DIN EN ISO 14001ff stand in the foreground of this guideline. Here, especially ISO 14001, 14004, 14011, and 14012 (cp. Footnote 12) are relevant for environmental management systems as well as some German standards of the 33000ff-series.

The participation in EMAS and DIN EN ISO 14001 does not mutually exclude one another. On the municipal level the decision will generally lie on a participation in EMAS, whereas the international standard ISO 14001 is convincing for organisation with an international outreach. In effect, the further development of DIN EN ISO 14001 has basically erased differences with EMAS, so that an assimilation in content has taken place since 2004. Apart from some still to be clarified amendments, the challenges to environmental management systems according to both systems are principally the same.

The regulations compiled in EMAS are distributed to different single standards in the world of standards:

- ISO 14020ff for product labels such as eco-label
- ISO 14031 for the environmental performance evaluation<sup>10</sup>
- ISO 14040ff with guidelines for the product related eco-balancing<sup>11</sup>.

The goal of EMAS in environmental management is described as follows:

Improvement of entrepreneurial environmental protection through:

1. The creation and implementation of environmental management systems in organisations,
2. A systematic and regular evaluation of these systems (management review),
3. Information of the public and interested parties on entrepreneurial measures for environmental protection (environmental declaration)
4. An increased participation of staff and participants

Here, the last aspect is a relatively newly incorporated goal in EMAS and ISO 14001. In the following table 2 the key points of EMAS and the amended points of the new DIN EN ISO 14001 are opposed in order to highlight basic similarities and differences (see table 2).

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<sup>10</sup> In the ISO-standard 14031 an effective system for the regulation of environment performance indicators is described, built on an environmental management system that isn't necessarily certified. These indicators refer to all relevant environmental aspects.

<sup>11</sup> An essential instrument for the evaluation of the environmental impact of products form eco-balances that should meet certain claims set out in ISO-standard 14040ff.

**Table 2** Key points of EMAS and DIN EN ISO 14001 as standards-oriented environmental management systems

EMAS	DIN EN ISO 14001ff
Implementation of a first environmental audit to capture and evaluate relevant environmental aspects	Suggestion for implementation of a first environmental audit
Creation of an environmental management system according to claims of DIN EN ISO 14001, amended by <ul style="list-style-type: none"> <li>- proof of legal security</li> <li>- evaluation of environmental aspects with the help of comprehensible criteria</li> <li>- involvement of staff</li> <li>- communication with external lobbies</li> </ul>	Creation of an environmental management system according to claims of DIN EN ISO 14001, since 2004 amended by <ul style="list-style-type: none"> <li>- proof of legal security</li> <li>- evaluation of environmental aspects with the help of comprehensible criteria</li> <li>- involvement of staff</li> <li>- communication with external lobbies</li> </ul>
Regular implementation of an entrepreneurial environmental audit for evaluating entrepreneurial/communal environmental protection (performance and system aspects)	Regular implementation of internal environmental management system audits for evaluating the environmental management system according to DIN EN ISO 19011:2002 <sup>12</sup>
Elaboration of an environmental declaration	-
Examination of the environmental audit and Entrepreneurial environment- audit procedure, the environmental management system and the environmental declaration through an accredited environmental reviewer	Examination of the environmental management system through an external auditor (environmental reviewer or auditor of an accredited certification organisation)
Signing of the environmental declaration by the environmental reviewer (validity declaration)	Issuing of a certificate by the environmental reviewer or the certification organisation
Sending of the environmental declaration to the responsible entity (industry and commerce chamber) and registration of the organisation in the register (after check-up with the monitoring organisation)	-
Publication of the environmental declaration and usage of the EMAS label for advertisement purposes (No product advertisement)	Usage of the certificate for advertisement purposes (No product advertisement)

<sup>12</sup> By substitution of a series of standards such as DIN EN ISO 14010:1996-11, DIN EN ISO 14011:1996-11, DIN EN ISO 14012:1996-11 and DIN EN ISO 10011-1:1992-06, DIN EN ISO 10011-2:1992-06, DIN EN ISO 10011-3:1992-06 the volume of standards for instructions on actions connected to the conformity evaluation of quality and environmental management systems was compressed to a "standard principle". This standard gives instructions on the management of audit programmes, the implementation of internal/external audits and on the qualification and evaluation of auditors.

### 2.2.1 First environmental audit

EMAS foresees a primary environmental audit for all participating organisations or communes. For the implementation of the primary environmental audit there are a variety of demands concerning content, but only few demands in procedure.

According to DIN EN ISO 14001, the first environmental audit is only suggested. Essential since DIN EN ISO 14001:2004 is the discovery and evaluation of relevant environmental aspects.

With the help of the primary environmental audit the environmental aspects of the organisations shall be captured und evaluated with respect to their significance. The objectives are:

- To find starting points for continual improvement that is strived for and
- To identify the activities or processes with the significant environmental aspects that require a guidance in procedure (in the frame of the environmental management)

Here, a differentiation is made between direct and indirect environmental aspects. Direct environmental aspects are all direct effects the organisation has on the environment, i.e. that the organisation itself influences or is able to change:

- a. emissions into atmosphere,
- b. introduction and derivations in waters,
- c. Diminution, usage, re-usage, shipment, dumping of solid and other waste, in particular hazardous waste,
- d. Usage and contamination of soils
- e. Usage of natural resources and raw materials (including energy)
- f. Local phenomena (noise, commotions, smells, aesthetic derogations etc.)
- g. Transport
- h. Dangers of environmental accidents and of environmental impact that result or can result from incidents, accidents and potential emergency situations
- i. Impact on bio-diversity

All those aspects are defined as indirect environmental aspects that organisations cannot control directly or that only occur in a certain geographic distance or after a certain period of time. By this, environmental aspects are meant that can originally be ascribed to the viewed activity, but which enfold their impact in another place. Among others they can include the following:

- a. product related impact (design, development, packaging, transport, usage and re-usage/ waste disposal)
- b. capital investments, credit, insurance services
- c. new markets
- d. selection and composition of services
- e. administration and planning decisions
- f. composition of product supply
- g. Environmental performance and environmental behaviour of contractors, sub-contractors and suppliers.

The organisation has to be able to prove that essential environmental aspects have been ascertained in the context of their procurement and essential environmental impact that relates to these aspects are taken into account in the management system. In the evaluation of indirect environmental aspects the organisation has to prove to what extent these aspects can also influence suppliers and what measures can be taken to reduce this impact.<sup>13</sup>

Within the first environmental audit, capturing the environmental aspects occurs in a „process-oriented“<sup>14</sup> way. Of course the structure of environmental aspects according to processes or activities implies a definition of the process. The advantage of a process structure lies in its transferability to other management systems (maintenance of industrial health and safety standards, quality, hygiene) of holistic systems. Other possible structures for the capturing of environmental aspects could e.g. be (Clausen and Wruck 2002):

- Machines and facilities
- Products
- Environmental aspects and impact

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<sup>13</sup> For clarification purposes an example for an indirect environmental impact may help: While acquiring a hazardous material (e.g. for the municipal construction section) a municipality doesn't pay attention to acquire a security data sheet belonging to the material and does not create an operating manual for dealing with the hazardous material. From the failure on the level of the (indirect) office activity a significant environmental impact may result, in the form of accidents through false handling with the hazardous material. This then would be an indirect environmental aspect of acquisition. However, an administration and/or planning decision can be worse than the above mentioned indirect environmental impact. For example: the building authorities do not pay attention to an assigned protection area for drinking water supply or to potential or inherited waste on the site. The consequence can be a contamination of drinking water that has a considerable health impact on the population supplied.

<sup>14</sup> Operational sequences of an organisation/municipality are divided into processes (inherently closed procedures) and sub-processes

When choosing the structure for data collection it should be taken into consideration that within the framework of the implemented environmental management system relevant environmental aspects are to be regularly newly registered and evaluated. The data collection itself does not have to be acerbic nor highly scientific, but it should in any case deliver evaluable data. A sensible overview of the environmental aspects is generally sufficient as long as it can be checked on significance. For this, criteria are to be specified according to EMAS which are taken into account in the evaluation. These criteria should be sufficiently complex and reproducible, and should be able to stand an independent audit. Criteria are e. g.:

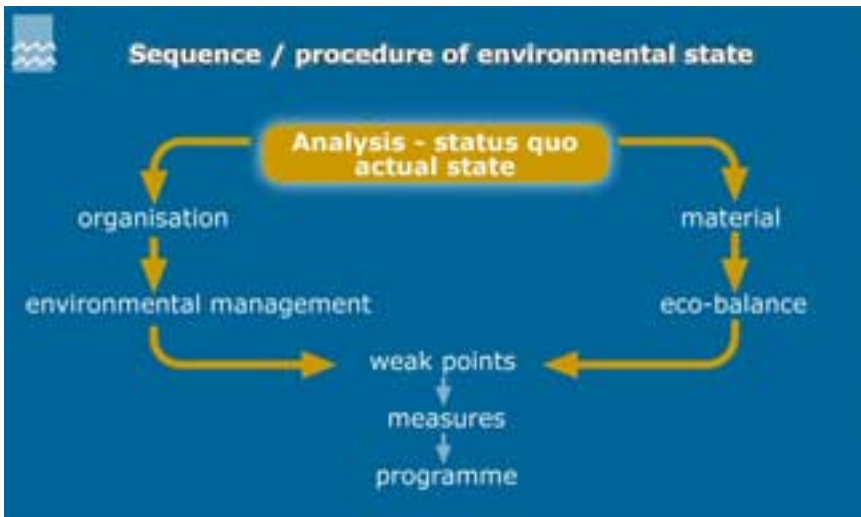
- Establishment of figures and their comparison with figures of other enterprises (benchmarking) or internally (annual comparison). Generally, this procedure is easily applicable for direct environmental aspects, for indirect environmental aspects it is at least problematic.
- A relative evaluation using points. E.g. the processes or also instalments, used materials and products ( among others services ) can be evaluated according to different criteria as e. g. legal requirements, material usage, emissions, waste, risk potential etc.
- A purely verbal evaluation: For small organisational units a purely verbal – argumentative evaluation is often the method of choice. A problem here is the difficulty of verification and reproduction, especially with respect to a possible certification.

How should the first environment audit really be done? In this respect EMAS is not much of a help, but gives some useful hints by creating a demand for documentation, guidelines for procedures and descriptions. Annex 2 gives a very detailed overview and can be also used very well as guideline for the formal documentary part of EMS. The guideline from DIN 33924 is also good:

- A listing of all environment relevant activities related to environmental aspects should be elaborated
- An index of legal provisions and internal environment relevant regulations should be prepared
- Any important environmental impact should be elaborated e.g. in an *input-output- analysis*
- All environment relevant risks and dangers of accidents should be presented on a list
- The existing organisation of the entrepreneurial environmental protection should be described

- The evaluation should include, as far as sensible, a comparison with the state of the art of currently available technology.<sup>15</sup>

At this point it needs to be pointed out, that a detailed realisation of the first environmental audit helps to spare a lot of work during the development of the management system. Therefore it makes sense to prepend the registration of important environmental aspects to the system development in terms of the environmental audit, in order to have this knowledge at disposition as early as possible (Clausen and Wruck 2002). A model structure of the first environmental audit is depicted in annex 3. Image 1 gives an overview of the first environmental audit.



**Image 1** Basic sequence of first environmental audit (© by Daniel Bischoff UBM)

## 2.2.2 Implementation

An environmental management system (EMS) is an instrument to delegate entrepreneurial tasks related to the environment in a proper and reliable way. The term implies usual techniques of steering complex systems: planning, implementation and control (see image 2). After the implementation of the first environmental audit and the setting up of an environmental policy (respectively the environmental guidelines) the environmental programme is established by setting

<sup>15</sup> The state of the art of currently available technology is a term for progressive technology that is economically reasonable under the local circumstances.

goals and measures that have to be implemented in a fixed time frame. The check whether the environmental goals have been implemented is done on a regular basis through an entrepreneurial environmental audit, etc. Organisational establishment as well as a sufficient documentation and an establishment-sequence control are necessary for this regular cycle (**Clausen and Wruck 2002**).



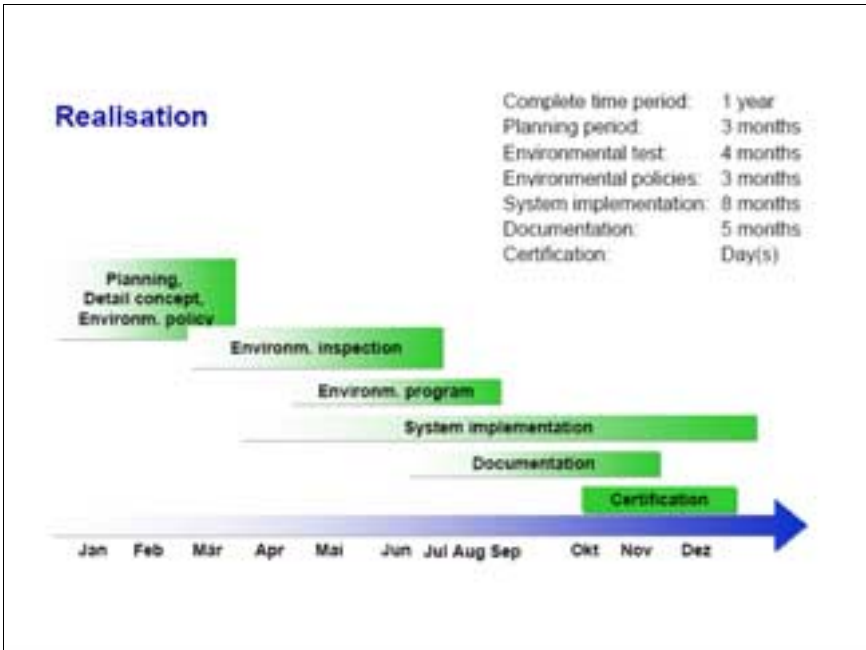
**Image 2** Basic principles of an environmental management system (© by Daniel Bischoff UBM)

On the municipal level, the introduction and implementation of an environmental management system is the most promising when creating an „environment team” under the presidency of the mayor. The environment team comprises of heads of departments of the municipal administrations, the managers of the participating municipal enterprises and representatives of the Agenda office. The environment team meets regularly (generally every 4-6 weeks), in order to implement actions, to exchange experiences and to come to necessary conclusions in the EMS. The procedural sequence for introducing communal EMS is depicted in [table 3](#).

**Table 3** Depiction of procedural sequence for introducing a communal environmental management system

Activities	Comment	Participants
Initiation of the eco-audit	Municipality, citizens, organisations or individuals	Initiator, Mayor
Decision of municipal council	Basic positive decision	Municipal council
Choose locations	Advice: administration, purification plant, waterworks, school	Mayor, construction department leader, treasurer, administration employee, Local Agenda office, consultant
Compose environment team	Team members should afford 0,5-1 day for the eco-audit	Mayor, department leader, employee of administration, chairman/manager of selected locations, consultant
Set up project plan	Time frame, means, responsibilities	Environment team
Environmental audit	Collection of data, numbers, facts on water/waste water, information, energy, waste, hazardous material	Environment team
Evaluation	Basis for environmental objectives and programmes	Environment team
Define environmental objectives and programme	Ecological necessity, technical feasibility, finance ability, acceptance, legal situation	Environment team
Establish environmental management system	Manual/guideline, instructions, responsibilities	Environment team
Staff training	Creation of training plan, information of staff on EMS	Environment team, all employees
Implement self-audits	Check on functionality of the EMS through internal audit	Employees of other departments
<i>management-review</i>	Evaluation of EMS through highest management	Mayor
Creation of environmental declaration	Depiction of (planned) environmental performance in the municipality	Environment team, section public relations
Audit	External evaluation through EMS	Independent certified environmental auditor
Certificate	Registration in the local register of EU	Chamber of industry and commerce

For implementation of the whole procedure one can calculate a time frame of 1-3 years, according to engagement and time of employees and the environment team. (see [image 3](#)).



**Image 3** Timeframe for implementation of a municipal EMS

The material demands of DIN EN ISO 14001 : 2004 are oriented towards the basic structure of the standards line ISO 9001 : 2000 for quality management systems and are structured into single elements. (cp. Table 4).

**Table 4** System elements of environmental management systems, according to DIN EN ISO14001 : 2004

4	Challenges to an environmental management system.
4.1	General requirements
4.2	Environmental policy
4.3	Planning
4.3.1	Environmental aspects
4.3.2	Legal obligations and other challenges
4.3.3	Goals, single objectives and programme (s)
4.4	Realisation and operation
4.4.1	Resources, tasks, responsibility and competence
4.4.2	Ability, training and consciousness
4.4.3	Communication
4.4.4	Documentation
4.4.5	allocation of documents
4.4.6	process steering
4.4.7	Emergency provision and danger aversion
4.5	Verification
4.5.1	Surveillance and measuring
4.5.2	Assessment of adherence to legislative provisions
4.5.3	Non- conformity, corrective and preventative measures.
4.5.4	allocation of notes
4.5.5	Internal audit
4.6	Management evaluation

In the following, the most significant points shall be discussed in brief.

– *Environmental policy ( 4.2)*

The basis for any environmental management system is an environmental policy. On about 1-2 pages the principles of environmental protection in the municipalities are presented as a guideline, from which the other measures are derived. (see also [chapter 1.4](#) and [annex 1](#)) The environmental policy has to contain an obligation to adherence to all laws and to a consequent improvement of environmental protection, respectively to improve the environmental management system. The environmental policy has to be regularly verified and be put at the public's disposal.

– *Planning (4.3)*

The planning elements, legal and other demands, environmental aspects, environmental goals and programmes are the basis for deriving the necessary sequential control (implementation and realisation) and for the necessary improvement process. One can say that this is the regular repetition of the first environmental audit (however with a considerably smaller effort)

In the system description (environment manual, process, procedural and/or working instructions etc.) rules and responsibilities for the implementation of the plan must be defined. In relation to legislative provisions there are new regulations

in the DIN EN ISO 14001:2004. The organisation must introduce, put into practice and uphold procedures to:

- a. ascertain and have accessible the valid legal obligations and other demands, to which the organisation has obliged itself in relation to its environmental aspects
- b. define how these demands can be applied to its environmental aspects

The organisation must ensure that these valid legal obligations and other demands which the organisation obliged itself to will be taken into account by introducing, putting into practice and upholding the procedure“.

– *Realisation and operation (4.4)*

The elements that are summarised in the DIN EN ISO 14001 under point 4.4 “realisation and operation” should rule and guarantee the consideration of environmental protection in every day work. Its final aim is the implementation of the environmental policy and the planning. The process control has to be suitable for:

- guaranteeing the abidance to laws, regulations and other juridical demands
- ensuring achievement of the environmental goals and the implementation of the programmes

In the field of realisation and operation of EMS, there are some aspects which have to be regulated under all circumstances, such as:

- under point 4.4.2 ability, training and consciousness the qualification of the co-workers and all other, active by order of .....
- under point 4.4.4 documentation and distribution of system documentation

In addition, there is the wide field of „process allocation“, which is to be understood as necessary rules specific to the organisation. Here, those sequences are to be regulated that are connected to the important environmental aspects detected, in order to ensure that they will be carried out under determined conditions through a) documented procedures b) operative guidelines or c) the announcement of applicable procedures and requirements to suppliers, including contractors.

Following EMAS the communication in the DIN EN ISO 14001 was newly defined: „With regard to its environmental aspects and its environmental management system, the organisation has to introduce, implement and uphold a procedure for:

- the internal communication between different levels and working fields of the organisation

- the reception, documentation and answering of relevant opinions from external groups of interests.

According to DIN EN ISO 14001 the organisation merely has to take into consideration the active communication about environmental affairs and document its decisions, EMAS demands an open dialog with interested entities, to get to know the preoccupations of the groups of interest. The environmental statement (cp. chapter 2.4.) is an example of an instrument that serves this purpose.

- *Verification (4.5)*

The verification contains among others the regular surveillance and measuring of essential features of its working sequences as well as the realisation of internal audits (cp. chapter 2.5). Furthermore, dealing with “real and potential non-conformity” and “taking corrective and preventative measures” as well as a allocation of documentation are anchored here..

- *Management evaluation (4.6)*

The regular management evaluation through „the highest management board“ shall secure the continued aptitude of the system and if necessary introduce measures to secure sustainable success of the system. Generally, all necessary information will be compiled and forwarded to the board of the organisation annually. For this evaluation, rules for a) preparation b) implementation and c) documentation must be assigned in the system documentation.

### **2.3 Internal audit and environmental entrepreneurial audit**

According to EMAS the environmental entrepreneurial audit (EEA) is an evaluation of the entire entrepreneurial, respectively municipal environmental protection, i.e:

- An assessment of the environmental management system according to DIN EN ISO 14001 (System check) and
- A checking of the adherence to existing environmental legislative provisions

Point of reference for the conformity evaluation of the environmental management system are the audit principles (cp. DIN EN ISO 19011:2002) to be acknowledged and realised by the auditors, such as:

- Ethical behaviour
- Factual description
- Adequate professional accuracy
- Independence and
- A strategy based on evidence

The start of the conformity evaluation through audits is the „management of the audit programme“. It should support the user with:

- Placing responsibilities for the management of audit programmes
- Decisions on goals of the audit programme
- Coordinating audit activities
- Offering sufficient audit resources.

The demands of the environmental entrepreneurial audit are described in annex 2 of EMAS.

The extent of this internal environmental entrepreneurial audit (EEA) can reach from simple procedures to complex activities. Within a certain period of time however, all activities of an organisation should be audited. The internal auditors who implement the EEA have to be sufficiently independent of the to be audited activities, in order to present an objective and unbiased evaluation. For municipal EEA trained staff from other departments or external auditors can be hired. The EEA is to be implemented by persons:

- Who have sufficient knowledge of the sectors and areas to be audited including knowledge and experience concerning relevant/significant environmental and management questions as well as technical and legal ones and
- Whose education and experience in the specific audit activity ensure that the set goals- within the frame of a given time and approved means- are reached.

In the environmental entrepreneurial audit programme the aims and objectives of every EEA, every entrepreneurial audit cycle including the frequency of audits and all activities are to be documented. This particularly includes the evaluation of existing management systems and the audit whether they are conform with the environmental guidelines of the municipality and whether the most significant environmental regulations and statutes are abided to.

The extent of the municipal EEA, respectively the individual phases of a cycle are set by the following data:

- the included fields/areas
- the to be proved/audited activities
- the environmental criteria to be taken into account
- the time period seized by the EEA

The EEA includes talks with the staff, audit of the circumstances and the equipment in the respective area, the audit of protocols of written procedures and

other data, with the aim to evaluate the environmental performance of the audited activity. Here it is proved, whether

- the valid norms and regulations are abided to,
- the legal overall and individual environmental aims are reached,
- the according demands are fulfilled and
- the environmental management is effective and suitable.

According to EMAS, annex III, the following measures are to be taken by the auditors:

- Evaluation of the strengths and weaknesses and understanding of the management system
- The registration of relevant verification
- Evaluation of the results of the EEA and
- Written report on the insight and conclusions (environmental audit report) to the municipal environmental team, respectively the mayor.

After the EEA, a corrective measures plan is set up and implemented.

The EEA is to be carried out in regular periods with intervals that may not exceed 3 years. Complex activities with significant environmental impact are generally audited more often.

Before the first validation, EMAS does not require a complete EEA. In this way the following formulation relativises the effort which is required to be performed before the first audit: A programme exists for the environmental entrepreneurial audit according to EMAS, annex II, whose planning is concluded and that has already been started (the activity with the highest environmental risk has to be audited by EEA at least once).

## **2.4 Environmental Declaration**

According to EMAS, an environmental declaration is to be written after setting up an environmental management system. This environmental declaration is renewed annually. It is audited by an external environmental auditor. The DIN EN ISO 14001 does not know this environmental declaration (but can e.g. happen as environmental auditing as well).

In the presentation of environmental protection measures, the environmental declaration also includes the obligation to active environmental protection as well as the chance to communicate to target groups the successes of environmental protection. Essentially, it has the following contents:

- a. A precise description of the municipal enterprise that is getting registered in EMAS and a summary of its activities, products and services as well as, if needed, the relation to the municipality;
- b. The environmental policy and a brief description of the EMS in the municipal enterprise and its relation to the guidelines of the municipality;
- c. A description of all essential direct and indirect environmental aspects, that lead to significant environmental impact and a declaration on the form of the impact (cp. EMAS annex VI, [chapter 6](#));
- d. A description of the environmental aims and individual objectives in relation to the essential environmental aspects and impact;
- e. A summary of the available data on environmental performance, measured by the environmental aims and individual objectives and in relation to their most significant environmental impact. The summary should include numerical data on emissions, waste production, use of raw material, energy and water, noise pollution as well as other aspects according to EMAS, annex VI. The data should enable a comparison on an annual basis (respectively be able to engage in a benchmarking with equivalent branches) in order to be able to judge how the environmental performance has developed;
- f. Other factors of environmental performance, including the abiding to legal regulations with respect to their most significant environmental impact, as well as
- g. The validity declaration with the name and registration number of the external environmental auditor.

## **2.5 Certification or Validation**

Certification or validation is done through external auditing of the EMS and is expression and demonstrative means for the validity of the system. It demonstrates the public the environmental performance of the enterprise or the municipality. However certification or validation is not coercively necessary for a functioning environmental management system.

There are significant differences in external auditing according to EMAS and DIN EN ISO 14001. For EMAS, a governmentally organized accreditation and monitoring system is established in Europe. Environmental auditors are certified after an exam at the accreditation and certification association of the respective member state and they also underlie their supervision. Environmental auditors are allowed to audit according to EMAS as well as according to DIN EN ISO 14001.

Accredited certification organisations are also allowed to audit according to DIN EN ISO 14001. This accreditation is organised worldwide and purely private-law.

There are also differences in the extent of the audit. Whereas, according to DIN EN ISO 14001, the environmental management system is proved on completeness, suitability and effectiveness (pure system audit) the auditing tasks of the environmental auditor according to EMAS go further (Clausen and Wruck 2002). He essentially proves:

- The abidance to all regulations of EMAS, especially concerning the first environmental audit of the EMS, the programme for the EEA and the environmental declaration,
- The correctness of data and information of the environmental declaration, respectively environmental information,
- The implement ability of the EMS according to EMAS, annex I,
- The inclusion of areas with significant environmental impact,
- The auditing of the environmental programme by the leader of the enterprise, respectively the commune,
- The creations of the written declaration according to EMAS annex III, section 3.2 (chapter 2.4).

The essential points go further than the demands of DIN EN ISO 14001 concern the audit of the environmental declaration and the here included data and information on the environmental performance. An example of the sequence of a certification is depicted in annex 4 (simplified).

Both EMAS and DIN EN ISO 14001: 2004 take note of the auditing of abidance to legal regulations. The environmental auditor should not validate the environmental declaration if he realizes during the auditing that certain legal regulations are not being abided to.

### **3 Legal requirements – Environmental law**

Dealing with legal regulations has always been very problematic and experiences show that municipal enterprises or administrations do not always abide to environmentally relevant legal regulations due to their complexity and continual updating.

On the European level, environmental law has grown historically and has therefore been complicated and confusing at times. Generally there is a differentiation between European guidelines and regulations: Guidelines have to be included in national law in a suitable and fixed time and European regulations are valid in the

member states immediately after ratification. Besides, the effective implementation of environmental law requires a high monitoring effort through the responsible administrations.

By introducing an EMS in municipal administrations and enterprises - and the inherent self monitoring - a significant step towards deregulation is made. Precondition is the knowledge of and abidance to the environmental legal regulations valid for the respective organisation.

Therefore, in the frame of an environmental management system a cadastre of environmental law as well as a procedure to secure its binding character, its being up-to-date and information on relevant legal regulations are needed.

By fixing the procedures, competencies and responsibilities the compliance of (European, national, departmental and communal) environmental protection exigencies are guaranteed. In a procedural order, the systemic collection and care for these regulations should be demonstrated. For environmental protection the following complexes are of significance:

- Emission protection law
- Water and land law
- Waste law
- maintenance of industrial health and safety standards and hazardous material law

Essential precondition for the abidance to the environment relevant legal regulations is the knowledge, the procurement and availability of the environmental legal regulations relevant to the organisation. This is reached through setting up and continually up dating of a rights cadastre (e.g. in a computer network) so that every staff member has the possibility to view it. A structure of the cadastre via thematic areas and according to categories of the publisher is advantageous: e.g. European Union law, national law, state law, departmental regulation, statutes, etc. [Annex 5](#) shows an example of a German legal cadastre for a municipal transport enterprise.

## **4 Material stream and eco-balance**

### **4.1 Basic principals of resource- and management material stream management**

Material flows are detected in the frame of a strengths-weakness-balance and in the process-oriented *input-output-analysis* carried out in the first environmental

audit and the following environmental entrepreneurial audits. With this, a precise balance of resource usage, of the product, respectively of the performance described in the process and of the effected environmental aspects can be recorded for each defined process, from which environmental objectives for the next time period can be derived (cp. [chapter 2.2.1](#) and examples in [table 5](#) and [table 6](#)).

**Table 5** Simplified example of an input-output analysis of a municipal administration in the environmental declaration

input	output
Energy	Decisions, projects
Material, Auxiliary and working materials	
Information- and communication means	Remnants, waste
Packing	Hazardous waste
Water	Sewage

In connection with an input-output analysis the environmental impact that derives from the activities of the organisation are to be evaluated systematically from inside and out. The to be implemented analyses do not only concern the material flow of the organisation but e.g. also energy and information flow. E.g. a municipal administration should analyse how extensive planning decisions or administrative information influences environmental aspects of construction performances etc.

The environmental impact is starting point for conclusions for the environmental optimizing of the inner process e.g. in the performance of a service as well as the environment-oriented quality of the service. The conclusions are written down in the environmental objectives.

**Table 6** Examples for a description of environmental objectives of a municipal administration in the environmental declaration

Process	Environmental objective	Responsible	Date
Office work - copying	Substitution of copy paper by recycled paper	Fr. Müller, dept. x	31.12.2006

## 4.2 Eco-balances

Further going analyses can e.g. be made in eco-balances. Eco-balances are not only possible for processes but also for products (and by products, services may be understood as well). Product eco-balances can give insight into the possible environmental influences and energy contents as a basis for an improvement, the evaluation or the comparison of products. With these characteristics, eco-balances

have prevailed as instrument for an ecological and economic product management.

Product eco-balances look at a life cycle of a product from the winning of raw material, its preparation, the production of the product from the raw material by using energy and environmental means, its usage and disposal. By this, eco balances connect these different life cycles and can hereby reveal displacements of ecological and with it economic problems in the whole cycle.

Eco balances are structured into four components according to DIN<sup>16</sup>:

1. Fixing of the objective and the investigation frame,
2. Inventory balance
3. Estimation of effects
4. Evaluation or optimizing analysis

When fixing the investigation frame there is often a lack of time, data or funds to cover investigation of all material and energy flows. Certain life cycles and modules should be taken into account under all circumstances:

- Raw material production and preparation
- Production of auxiliary and working materials
- Transports
- Winning and using primary energy carriers, electricity and heat
- Usage of products
- Disposal and usage of process waste and products

Effect categories, meaning: What pollutions have an impact on environmental media such as water, soil, air or organisms should demonstrate the environmental impact (environmental aspects) of the product appropriately.

The inventory balance consists of the collection and calculation of data over the whole life cycle of a product (Analysis of input-output flows). In practice there is no optimal procedure for this one has to rather proceed in a case to case manner.

In the estimation of effects the inputs and outputs collected in the inventory balance are summarised and evaluated with respect to their potential

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<sup>16</sup> Since 1997 the standards DIN EN ISO 14040:1997 environmental management- eco-balance. Principals and general challenges, DIN EN ISO 14041:1998 for the inventory balance, DIN EN ISO 14042:2000 for the estimation of effects and the DIN EN ISO 14043:2000 for the evaluation of eco-balances have been ratified for eco-balancing.

environmental impact (e.g. climate change), in order to be able to assess their potential environmental impact (effect categories<sup>17</sup>). In the evaluation according to DIN EN ISO 14043 results are analysed, conclusions are made and recommendations are articulated that can then be transformed and defined as environmental objectives.

### **4.3 Weak point analysis**

The weak point analysis is a targeted investigation of procedural sequences (sometimes as auditing in the frame of environmental audits) to inquire on process and/or procedural errors (implausibility, non-conformities) with the aim to secure processes and procedures. It can be linked to products as well as processes (manufacturing, service and organisation processes). Objective of the weak point analysis is always the consequential environmentally just optimization of products and processes.

## **5 Energy management**

The systematic and holistic approach of the municipal energy management creates a connection between economy and ecology and by this opens new leeway for necessary and goal-oriented investments for sanitation and maintenance measures of public immovable real estates.

Municipal energy management has an effect on various areas. Besides the rational energy usage, contract management, energy controlling and monitoring the influence on the consumer behaviour plays an important role.

The objective is to reduce the level of energy consumption and to hereby raise the quality and value of municipal immovable real estates without increasing the surplus load of the public household. By this new possibilities arise for financing investments to economically index existing energy saving potentials.

One way of indexing these potentials is the introduction of an entrepreneurial energy and material stream management in the municipal enterprises in the frame of EMS. By this, energy saving possibilities of the enterprises are uncovered and measures to increase the energy efficiency are introduced.

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<sup>17</sup> The effect categories are not catalogued or fixed in a strict way in DIN EN ISO 14042, but are ascribed to the substances from the activity (e.g. usage of colours=> heavy metal connections=> human toxicity=>carcinogenicity or other irreversible illnesses, eco toxicity; agriculture=> methane=> green house effect; burning, transport=> CO<sub>2</sub>; NO<sub>x</sub>, SO<sub>2</sub> => green house effect, water and soil acidity, human toxicity, eco toxicity, summer smog, water and soil eutrophication etc.)

Next to the benefit for the environment these measures bring perceptible cost relief for the enterprises.

The energy and material flow management comprises various tasks and services that can be summarised as follows, according to EMS:

- Description of the structure operations and production sequences, creation of an enterprise model,
- Description of the actual state of material and energy flows, the emissions, entrepreneurial data structure etc. as detailed enterprise analysis,
- Detailed description of measures, ecological saving potentials, an economic evaluation and the creation of advice for measures as well as a concept for its implementation.

If the implementation of the foreseen measures for increasing energy efficiency should not be carried out by the enterprises or administrations themselves, energy contracting e.g. is a practical way.

Contracting is a practical way for municipalities, public institutions and companies to energetically sanitize their technical building and energy supply instalments without having to perform financial pre-payments themselves.

The contractor finances the necessary investments. The re-financing of the investments as well as the operational expense of the contractor takes place in a contractually fixed period of time via the saved energy costs or via a service contract.

The contractor has guaranteed savings for the buildings' energy and operation costs through the improved and optimised installed technology and is professionally consulted on all energy management questions. Through the economic indexing of existing energy saving potentials resources are spared and the environment is disburdened.

## **5.1 Sustainable technologies**

In the meantime large amounts of power, heat and fuels can be produced with the help of regenerative energy sources and new technologies, without burdening the climate with fossil carbon dioxide emissions. Nowadays, the possibilities of using renewable energy sources are practically unlimited. The spectrum reaches from solar cells to wind parks. In order to use the potential of the regenerative or rather sustainable energies economically, the won energy has to be usefully included in the existing energy system.

Power generation from renewable energy sources has progressed significantly in the past years. According to the climate protection programmes of the countries, one of the environmental policy goals is to cover 5% of the end energy consumption from renewable energy sources by the years 2005/2010. Wind energy, water power, biomass, biogas, solar thermes, photovoltaic and geo thermes are powerful hopes for the future in order to achieve a significant reduction of gas emissions dangerous to the climate- primarily CO<sub>2</sub>:

- The so called solar energy instalments are technically not yet at the state in order to be an alternative to power generated from fossil energy carriers, such as carbon and oil or nuclear power in moderate European climate zones. Cause is the still very high instalment costs, which do not provide for a re-financing of investments at comparable and competitive energy prices. It is estimated that in about 10 year's time, the technology will be offered in such economic way, that solar energy can be fed into the net at a price of 5 ct. At the moment, solar energy instalments are not economical without public funding.
- Water power plants are an uncontested alternative, yet their insertion is locally limited and underlie strong fluctuation e.g. through irregular rain. An extension of these instalments is possible only in limited areas.
- Soil heat generation is an in the meantime far developed technology that will be able to operate economically in the near future. However, the technology prerequisites a continual consumption of electrical energy for operating the heat pump.
- Wind power plants have been a source for energy for a long time but they are to an even larger extent dependent on weather conditions than water power. This unpredictability in availability is a very big weak point. When calculating the economical efficiency of investment costs according to the current state of technology without public funding, wind power plants are a luxury product. Without a development of possibilities of economical energy storage and a technically improved penetration of the instalments no security of exertion is respectively identifiable.

Biogas production and electricity via BHKW is one of the most promising alternative energies. At the moment, the efficiency of these instalments is given only where the thermal energy generated by this process can be used efficiently. The generation of biogas is possible from the below listed raw material sources:

- Agricultural waste of animal production (liquid manure).
- Agricultural farming such as grass and corn silages, grain fruits etc.
- Waste of food production

- Waste disposal of slaughterhouse and knacker's yards
- Food residue disposals in canteen kitchens, restaurants and meal producers
- Fat from organic fat extractors
- Wood, wood waste and straw

From a current viewpoint biogas energy is the most promising alternative energy source. In this area the following research which is being done at the moment has to be completed (see also e.g. results of the 10<sup>th</sup> chamber of engineer's day of Brandenburg's engineering chamber):

- Gas preparation has to reach the quality of natural gas in order to feed the natural gas net with the methane gas for de-central supply systems
- The efficient de-sulphurization of the methane gas is to be secured in order to enable the life of the gas motors to a maximum of 35,000 Th
- Development of new types of power wheel generators is to be completed in order to reduce the size of the current reactors by 65% and to hereby reduce investment costs to about 2.150 €/kW

Considering the previously demonstrated criteria at the moment, energy production is possible for the same price as energy production from fossil fuels.

Currently bio gas plants can be efficiently operated in connection with:

- Biogas plants-bio diesel plants
- Biogas plant- distilleries
- Biogas plants- breweries
- Biogas plants- production of ethereal oils
- Biogas plants- chipboard factories

Basically all productions can be listed, whose by-products promote or enable the bio process. More examples are:

- Slaughterhouses and knacker's yards
- Grain drying facilities
- Fish breeding
- Poultry slaughter factories
- Sawmills with coupled/linked wood drying
- Laundries

and many more.

## 5.2 Energy recovery from waste

According to the German “Abfallablagerungsverordnung” (Waste disposal regulation) no un-pre-treated settlement waste may be brought to the landfills in Germany since June 2005. Settlement waste or rest waste from private households as well as household similar waste from offices, practices, schools and kindergartens. Also bulk rubbish, street rubbish, construction waste, faeces and sludges are included. In the future the named waste has to be pre-treated mechanically-biologically or thermically.

One of the most important options for treating the rest waste of reusable materials is the thermic use with energy retrieval. Objectives of the thermic treatment are:

- The destruction of organic contaminants of the rest waste
- The separation of inorganic contaminants into as many as possible pure material streams and their extensive use
- The transformation of non-usable rests left over after the rest waste treatment into an environment- friendly form
- Minimize the volume of the left over rests
- Usage of the energy available in the waste

Smoke gas cleansing technology has been developed so far in Western Europe in the past decades that threshold values can be notably underscored e.g. even in Germany where the threshold value according to “Bundesimmissionsschutzgesetz” (BImSchG - German immission protection law) was lowered significantly. However, solid materials have to still be regarded as problematic. In parts, ashes and slags still have to be deposited in secured landfills, residuals of the smoke gas cleansing have to be disposed of as hazardous waste. The solution to this problem is to melt down these rests. In the past years, other procedures besides combustion on the grate were developed as well as degassing and carburization in part up to a serial maturity (Thomé-Kozmiensky 1994).

If municipalities confront the decision on future procedures to be implemented now, the situation becomes confusing for them because of the „new“ procedures, as e.g. was the case when the Pyrolyse was newly discovered at the beginning of the eighties. At that time decisions that were due were postponed in the hopes of a miraculous solution. A hesitant approach of the decision-makers leads in large parts to a disposal crisis, as is the case e.g. in the new EU member states. Necessary decisions today have to be made on the basis of information available today, if welfare and provision duties are to be taken seriously. Possibilities and limits of the new and old procedures have to be estimated at the right decision-

making time and may not be postponed in the hopes of advantages of a procedure possibly offered in the future.

In the decision-making it has to be considered, that

- all thermic procedures are at the end combustions, whereby the reactions-degassing, carburation and combustion- are executed in one or more reactors
- thanks to the high stage of development of smoke gas cleansing the threshold values for each thermic waste treatment procedure can be notably underscored and contaminated frights can be minimized
- the treatment of rest waste with the objective to produce usable and depositable products is controllable in all procedures

In view of these facts, decisions for one or another thermic procedure will hardly lead to a decision on a significantly higher or lower environmental protection. However it requires a profound knowledge of the procedure and the definition of regional objectives, as the rest waste that is accrued despite all avoidance and reuse efforts cannot be deposited in the present form nor after biological-mechanical treatment.

### **5.3 Energy efficient planning of buildings**

About 30% of the CO<sub>2</sub>-Emissions result from the energy use of building facilities for heating, air-conditioning, lighting and warm water generation. An important step on the way to a sustainable energy future in the municipalities is to use energy economically and responsibly.

Studies of the federal agency for environment in Germany show that through a rationale energy use about 35-45% of the current energy use could be saved in the buildings ([www.umweltbundesamt.de](http://www.umweltbundesamt.de)). A big portion could be mobilised by accelerating the modernisation of old buildings, another significant portion could be mobilised through a quick introduction of energy saving technologies in the buildings.

Through a rationale energy change and use less energy can be used and more use can be derived from each energy kilowatt hour. In planning, construction and modernisation of buildings particular attention has to be paid to:

- Warmth isolation to the exterior
- Denseness of the building
- Alignment and energy efficient room planning in the building
- Avoidance of heat bridges

- an energy efficient choice of construction materials

and modern heating measures (see e.g. results of the 10<sup>th</sup> engineering day of Brandenburg's engineering chamber 2005).

## 6 Immission / emissions, water protection, waste management

The traditional areas of environmental protection and development of preventive avoidance strategies or rather of post-caring environmental technologies in form of emission reduction technologies, respectively immission protection are:

- The immission of instalments respectively the emissions of pollutants, noise, dusts or equivalents into environmental media such as water, soil and air or rather the living environment (humans, flora, fauna)
- Water protection (ground and surface water, drinking water) and
- The treatment of waste, landfills and old neglected deposits of toxic waste (e.g. contaminated soils, ground waters, buildings and others)

What is meant is therefore all direct environmental aspects that are provoked by activities in the municipality or have a direct influence on decision-makers. In capturing and evaluating the aspects for future "sustainable decisions" all current demands of environmental law, environmental economy, environmental management and the environmental computer science to the municipal practice and their implementation possibilities are to be considered.

The collection and evaluation of direct environmental aspects and the demonstration of measures are depicted via examples in the following:

### Example 1: Importance of environmental aspects

*Due to the administrative activities and the included communal enterprises the following aspects with a significant influence on the environment are to be evaluated and to be considered accordingly:*

Direct environmental aspects	Evaluation example
Energy use	++
Water use	+
Avoidance, use, re-use and disposal of waste	+
Emission of air pollutants at location or in connection with transports	+
Noise emission	-
Usage and pollution of soil	+

## Evaluation criteria (example based on location X)

Very important	++
important	+
To be considered	-

### Example 2: Energy

*Our primary energy forms are electricity and natural gas. We need natural gas to operate our heating system as well as for generating warm water. Electrical energy is used mainly for lighting and air conditioning of office space. The overall energy consumption was reduced significantly during the past years. The variable usage of natural gas are due to the differing temperatures during the cold season. The reduction of energy consumption was reached through the installation of an energy saving lighting device in production in the year 2000.*

### Example 3: Drinking water/ waste water

*We draw our drinking water from the municipal water provision. The waste water is composed as the waste water in private households. The major part of the needed water is used in the sanitary units. The high water consumption in the year 2002 is due to leakages in the toilet flushes that no attention was paid to. This additional consumption has been stopped in the meantime through installation of gaskets. The most important objective is the saving of water.*

### Example 4: waste

*A significant part of our waste is waste for usage. By collecting the waste separately the remaining waste has been reduced to 30%, based on the used aggregate. The delivery of goods in returnable packaging or rather collective instead of single packaging reduced the paper and carton waste by 47%.*

### Example 5: air

*The major part of the emissions polluting the air is produced by the heating device and is monitored through regular measurement of the emissions. The measuring values in this sector are e.g. 3% of the permitted threshold values (in the least favourable case).*

### Example 6: noise

*The noise influence at work is monitored regularly. There are no significant sources of noise at the moment. By setting up absorption walls in noise intensive areas (busy streets, schools,...) the internal noise could be further*

reduced. There were no complaints about noise by neighbours in the last entrepreneurial audit cycle.

**Example 7:** soil

*The municipal administration and most municipal enterprises are set up in areas formerly used in agriculture and free of inherited waste. Since the introduction of the municipal EMS the city X has continually taken on protective provisions in order to avoid soil pollution. The provisions reach as far as the observance of the „Grünflächenamt“ (department responsible for public green space) that takes care of the grass and green areas. Materials hazardous to waters are controlled by inception and restraining measures in deposit and transport.*

**Example 8:** Suggestions for measures

*The environmental aspects are considered by the following: A reduction of energy consumption is reached e.g. through optimizing heating systems, warmth isolation of the surfaces and the usage of warmth re-winning instalments or rather warmth pumps. The reduction of water usage is to realized by installing according sanitary units. The waste water is basically identical to the water usage. By using grey water e.g. for toilet flush waste water can be further reduced. Materials used for services that are used and recycled later on are checked on environment friendliness. In choosing the deliverers their environmental performance is taken into account. This is done through an according survey or audits.*

**Example 9:** Realisation of environmental objective

<b>Objectives from environmental declaration 2000</b>	<b>Comments</b>	<b>Objective realised</b>
Reduction of natural gas consumption by 2% through optimising thermic losses	The natural gas consumption was reduced by 15% compared to the year 1999.	yes
Lower deviation of the medium noise level of 80 dB(A)	Installation of absorption walls was realised. The measurement of noise level is yet to be implemented	partly
Reduction of energy consumption by 30%	In the town hall a new energy saving lighting device with lighting management system was installed. The installed performance of the lighting devices was reduced from 232 kW to 157 kW. This means a reduction of energy consumption by 32% at constant duration of lighting. Through intelligent lighting management an additional but not exactly quantifiable energy saving was reached.	yes

### Example 10: Environmental programme 2005 – 2007

Objectives	Measures	Date	Responsible
Reduction of water and energy need in the school by 10%	Optimizing of sanitary units and heating	March 2006	School director
Reduction of vehicle movement by 20%. By this a reduction of transport kilometres is reached as well.	Concentration of incoming freights to one conveyance	Aug 2006	Acquisition
Further reduction of energy consumption for lighting the town hall by 5%	Lighting management	May 2005	Department Facility-Management

*The values of material and energy balances from the year 2003 are the basis for the environmental programme 2005-2007.*

## 7 Environmental hygiene

The special field of environmental hygiene is concerned with effects of environmental pollutions and contaminations that damage the living environment, i.e. in particular investigations on the impact on human health. Taking a refined look, environmental hygiene also includes municipal hygiene respectively settlement and housing hygiene as well as work hygiene<sup>18</sup>.

Environmental hygiene, interpreted a new is e.g. confronted with the „development of healthy cities“ (*healthy cities* in the meaning applied by the WHO), with construction and building materials and technical house devices, which require a continual observance and hygienic evaluation of these developments in order to avoid impairments such as those summarised by the term „sick-building syndrome“<sup>19</sup>. Besides new materials that are environmental contaminants, new knowledge on old materials that are pollutants is also of significance. Even the trend to reflect and go back to natural materials in the modern „construction/building biology“ requires an accompaniment and evaluation of settlement hygiene, e.g. concerning their attractiveness to varmints or their significance for allergic reactions (H. Lange-Asschenfeldt 2000).

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<sup>18</sup> With progress made in the field of settlement hygiene it has become clear that its approach which derives from the illness/disease appearance in the population is not sufficient for the modern, highly technical society. This is especially true for expositions to chemicals from environmental media. In the last 30-40 years the field of „environment and health“ arose in the frame of environmental protection, which extended the traditional settlement hygiene for one by this second aspect of health impact through environmental chemicals as well as by individual and social psychological aspects, such as in noise impact research.

<sup>19</sup> A contaminated and health damaging building

New aspects of environmental and settlement hygiene also derive from the approaches to an environmentally just further development of settlement techniques: Water saving, low temperatures in warm water distribution due to energy saving measures and systems for use-water usage can again facilitate the spread of pathogenic germs via water and question hygiene standards already reached. Therefore new and old technologies have to be evaluated as to their hygienic consequences and risks have to be recognized and be evaluated. Analogous to this, e.g. new approaches to composting house waste on a municipal level have to be evaluated as to their consequences on air hygiene.

As more often than not there are no environmental and health institutions on the municipal level to take on consultation, it is necessary to extend and keep up the co-operational and communications net between the Federal Republic, the States and the departments concerning preventative health protection institutions. In this frame, this task is mainly ascribed to the environmental management.

### **7.1 Possibilities for the substitution of hazardous substances**

In nearly all circumstances of life we are surrounded by chemical materials. In order to protect mankind and environment against possible detrimental impact of these substances, the risk deriving from chemicals is evaluated to then be reduced if needed. This is the objective of a preventative environmental and health policy. On February 13, 2001 the European Commission (EU) presented a strategy for a future chemicals policy of the EU<sup>20</sup>. Its objectives are:

- More protection against potential risks through chemicals for mankind and the environment
- More transparency in complex evaluation procedures
- An assimilation of the evaluation of new and old materials
- More responsibility in the chemical industry as well as
- A quicker and more efficient evaluation of old materials

In this sector there is an especially large lack of data, residuals in evaluation and management deficits.

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<sup>20</sup> The evaluation, classification and labelling of chemical materials in the EU is already highly harmonised. There is a differentiation between materials that have to be newly registered and so called old materials, i.e. those materials that have been traded on the common European market already before September 18, 1981. The more than 100.000 old materials comprise for 99% of the current market share. Should chemicals be brought onto the market, they have to be registered by the industry through the responsible administrations.

We are also confronted with old materials on a daily basis that have not been (sufficiently) evaluated concerning their risk on health in our work field. In the frame of the environmental management we however want to avoid the exposition to such materials respectively substitute them through less hazardous substances (materials).

The procedure is to firstly obtain the information on the materials used, that are available at the manufacturers. In maintenance of industrial safety and health standards management as well as in environmental management the categorizing of all relevant hazardous substances is obligatory. According to a new hazardous substance law the entity under whose responsibility hazardous substances are dealt with is obliged to have a central hazardous substance- index.

Such a hazardous substance index has to include at least the following information:

1. Name of the hazardous substance
2. Classification of the hazardous substance (c-corrosive, t-toxic, feasibly inflammable...)
3. R- phrases (reference to special dangers)
4. Average amount of hazardous substance
5. Work area/ deposit where hazardous substance is kept

The work place safety law in Germany is much more precise than the requirements in the frame of environmental management systems. Therefore the combination of environmental and work security management is recommended in any case, in order to integrate the valid regulations and especially the documentation obligations into the management system right away. For this, an excursion into the current German labour law with reference to the entrepreneurial security regulation may be permitted here.

The entrepreneurial security regulation ("*Betriebssicherheitsverordnung*"- BetrSichV) complements the existing labour security law and substantiates it concerning the usage of tools, machines and installations. The "BetrSichV" substitutes and summarises various former regulations e.g. elevator regulation, regulation on inflammable liquids, pressure container regulation, steam vessel regulation, regulation on electrical facilities in installations at risk of explosion, acetylene regulation and others. At the same time, this leads to a cancellation of at least 40, most probably significantly more, accident prevention regulations of the employer's liability insurance association or rather the accident insurances. By this, the legislator has truly made a step towards deregulation. The fire and

explosion protection was sharpened significantly. For sectors in which explosions can happen, explosion protection documents have to be written.

Based on defined protection objectives and minimum requirements to means of labour the responsible persons have to implement risk assessments that now also have to take into consideration tools, machines and the usage of installations. In addition, reciprocation between machines, construction and work materials have to be assessed. As usual, the risk assessments are to be documented.

For means of labour, test deadlines have to be self-appointed, challenges to testing persons as well. The tests are to be documented.

Due to the deregulations according to the legal regulations there is a widespread obligation for self-initiative in entrepreneurial environmental protection and documentation through the responsible person already today.

Essentially the documentation comprises of security data sheets (cp. [annex 6](#)) on the used products and materials with the respective security references and descriptions of possible health or environmental dangers. In the frame of a continual improvement of the environmental performance, the environmental management system requests a substitution of those materials with potential risk and that -providing economic and process adequate reasonableness- can be substituted by other materials. (cp. e.g. Ahrens, Böhm et al. 2001). The EMS does not require a scientific evaluation of potential environmental and health dangers of used materials or other entrepreneurial means, but rather a comparison and evaluation of equivalent alternatives. This can be realized rather easily by e.g. suppliers' requests and acquisition. Here, the aspirations of the supplier concerning his entrepreneurial environmental protection can be inquired at the same time. (cp. e.g. [annex 7](#)).

The search for equivalent alternative materials is relatively easy as long as substitution is searched for simple, easily overviewed operating means (e.g. substitution of copy paper with recycled paper). Substitution of usage material that is used for certain processes and that has essential, specific characteristics for a complicated manufacturing process, is a lot more difficult. Here experts for material flow management are needed who, confronted with specific questions, create detailed analyses on entry, procedure and retention of the used materials and of the targeted conduction of material flows taking into consideration the operational costs and who evaluate the collected data from economic as well as ecologic viewpoints. In reality, this is a costly but very rewarding process that generally includes a cost optimisation in the field of water, energy and waste.

## 7.2 Occupational safety- and health management

The maintenance of industrial health and safety standards and labour security of the employees in the municipal administrations respectively the municipal enterprises offer various interfaces with environmental management, e.g.

- in the sanitary evaluation of and dealings with dangerous substances, radiation etc.
- the protection equipment and security technology
- while working in contaminated areas
- and in many other work areas

Through the exact description of the correspondent interfaces the maintenance of industrial health and safety standards management system is easily connected to other management systems such as quality or environmental management systems according to ISO 9001:2000 or rather ISO 14001:2004 to an integrated management system.

This is without a doubt the most efficient instrument to integrate the maintenance of industrial health and safety standards into the overall organisation the way they were planned: oriented to the objectives and systematically, to document this in an appropriate way and to care for and further develop it with the aim of continually improving the process. By this the maintenance of industrial health and safety standards can also contribute to the sustainable usage of previously dormant resources.

Well planned and implemented measures for the maintenance of industrial health and safety standards reduce the risk of accidents and health damages, of legal sanctions and in particular of outages due to accidents or illness. With the help of an additionally integrated maintenance of industrial health and safety standards management into the environmental management, the necessary organisational elements and processes can be extended to an optimal maintenance of industrial health and safety standards. By this, many causes for security deficiencies and violations against regulations can be suppressed. The „maintenance of industrial health and safety standards management“ should be oriented to the guidelines of the International Labour Organisation (ILO) in Geneva.

Because of this, every case should be proved individually, to find out what possibility exists to combine the municipal environmental management with the maintenance of industrial health and safety standards management and to document it for all areas in a common manual.

### 7.3 Workplace-endangerment-analysis

Work place analyses serve the purpose of registering professional requirements. After an adjustment to the individual capacities of the employee suggestions for measures of relation and behavioural prevention can be elaborated by the security engineer respectively the expert for occupational safety.

According to the European general guideline „maintenance of industrial health and safety standards“ the work place analysis is obligatory for all enterprises / organisations. It serves the purpose of depicting possible physical or psychological health dangers so that the employer can introduce appropriate measures on the basis of the won knowledge.

The work place analysis is not a scientific investigation that can be implemented only by experts on occupational safety. It draws from different methods that can normally be implemented by the organisation's specialist on work place safety in contact with the occupational health physician. However a safety engineer should always be available for consultation.

The essential prevailing conditions for implementing a work place analysis as well as demands to the analysing methods can be drawn from the legal requirements:

- The work place analysis is compulsory for the employer. He can delegate the task, but he remains responsible.
- To be analysed are the work place, work surroundings, the work task, the work process and the working means. The employee is to be included in the analysis concerning his qualification. In addition the information and instruction of the staff is to be checked and documented,
- In the documentation only depicted deficiencies are to be listed. Non-contested details, i.e. fulfilled requirements are not to be documented further.
- The documentation must describe the depicted deficiencies and the planned measures for their removal, the dates as well as the dealing with the deficiency (check-up) have to be included.
- The work place analysis must be open for amendments and changes, in order to be able to re-implement and/or update it under varying conditions of the organisation, work processes and staff structure.
- *Sample* -checks are acceptable as long as the working conditions are identical. Due to the variety of the objects that are analysed similarity can not be expected for all evaluation criteria, partial identities however can be found very often and these can be evaluated uniformly.

A differentiation needs to be made between describing and evaluating procedures in the used methods.

- Registration of general ergonomical conditions (physical, climate, ergonomic/safety and organisational parameters of the work place)
- A detailed description of the working process, including the subdivisions in partial activities as well as information on the volume of partial activities within the entire working time, parameters of manual charge manipulations (charge weights, form of manipulation, distances, frequencies/duration etc.)

Evaluating procedures are e.g. in Germany

- the guiding principal method (procedure for endangerment analysis of activities with charge manipulation)
- procedures for defining physical postures (e.g. OWAS, OrthoSon) are implemented in combination with working process studies and they allow a allocation of fuselage departments and charge weights of certain partial activities

Legal policies and sub-policies of each member state are to be considered. In Germany there is an extensive experience in evaluation and design of work places so that an extensive policy (e.g. of the *Berufsgenossenschaften* (BG) employer's liability insurance association) is available for consultation:

- Work place regulation and guidelines
- Laws: *Arbeitsschutzgesetz*: law on maintenance of industrial health and safety standards, *Arbeitssicherheitsgesetz*: law on occupational safety, *Bundes-Immissionsschutzgesetz*: law on immission protection, *Gerätesicherheitsgesetz*: law on tool safety, *Chemikaliengesetz*: law on chemicals, *BetrVG*, and more
- Regulations: *Betriebssicherheitsverordnung*: entrepreneurial safety regulation, *Arbeitsmittelbenutzungsverordnung*: regulation on working means use, *Aufzugsverordnung*: elevator regulation, *Baustellenverordnung*: construction site regulation, *Biostoffverordnung*: bio material regulation, *Dampfkesselverordnung*: steam vessel regulation, *Druckbehälterverordnung*: pressure container regulation, *Druckluftverordnung*: air pressure regulation, *Gefahrstoffverordnung*: hazardous material regulation, *PSA-Benutzungsverordnung*: use of PVA regulation, *Störfallverordnung*: accident regulation, *Strahlenschutzverordnung*: regulation on radiation protection, regulation on flammable fluids, monitor regulation and more
- Technical Rules: TRD, TRB, TRG, TRA, TRAC, TRBF, TRGS, TRBA and more

- Regulations of the employer's liability insurance association (BG): ZH1-indexes, accident prevention regulations with instructions for implementation, ZH1-guidelines, BG-safety rules (cp. e.g. [www.vbg.de](http://www.vbg.de))
- Work place models of the BG: work places in offices, laboratories, storage, sales; monitor and tele- work places, machine and welding work places, noise protected work places
- Current norms and non governmental guidelines with short presentations: DIN-standards, VDI-/VdS-guidelines

## 8 Product integrated environmental protection

With the concept of „Integrated Product Policy (IPP)“ and the development of new political approaches the environmental impact of products should be minimized through a step-by-step exclusion of hazardous materials. The latter is especially significant in view of the objective to reduce the impact of waste on health. Therefore it has highest priority.

Product integrated environmental protection is not only oriented to products but also includes that the material and energy use in services and infrastructures is significantly reduced. Therefore it is an important element on the way to do business sustainably, as production is generally more cost saving and farsighted, in order to adjust to trend and developments as early as possible.

With the help of an Integrated Product Policy Agenda projects can be taken on and themes of product related environmental protection can be treated.

Examples from Germany are (Höhn 2003):

- The working group for environment friendly trade of construction material that informs on for environment friendly trade of construction material
- The initiative 2000plus – School material made of recycled paper from the consumer centre of the land Nordrhein-Westfalen aims at promoting the demand for school material made of recycled paper
- The network sustainable resources aims at improving the exchange of information on the subject of sustainable resources.

There are many subjects that can be taken up regionally by the agenda offices.

The European Commission has defined its strategy for promoting environment friendly products in the frame of an Integrated Product Policy in five principles:

- Thinking in life cycles should be strengthened. This means that already in the development of the product, the whole life cycle from production to use and

disposal are considered. By this the shifting of environmental burdens can be avoided from one life cycle to the next.

- IPP is flexible in the form of measures and works together with the market. I.e. by promoting the supply of environment friendly products as well as the demand, incentives are set that contribute to the sustainable development of the market.
- In the IPP all participants should be included, as various actors have an influence on the environmental impact of the product during a life cycle; e.g. in designing the product, in producing it and marketing it, down to retail and end consumption.
- Different instruments such as taxes, norms or voluntary agreements should be implemented flexibly because of the number and complexity of the products. According to the EU, the focal point should lie on voluntary agreements. The demand is as such: it should also lead to the most efficient measure.
- In the frame of different EU measures voluntary pilot projects should be promoted and products with the greatest potentials for environment related improvements should be identified. The implementation of more than one pilot project should demonstrate the possible benefit of IPP in practice.

The greatest potentials for municipalities surely lie in the fulfilment of external demands, especially the citizens' demand for products designed in an environment friendly way and services as well as infrastructures.

## **9 Inspection of location of municipalities for enterprises / organisations**

Organisations in the sector of municipal and regional economic promotion are confronted with new challenges. Structural changes in the field of economy as well as the intensification of competition of locations and a higher location dynamic form the background for important trends the municipal politics have to react to today in the frame of marketing locations and regions concerning commercial territory and real estate and the connected settlement strategies. The most important trends include:

- An increased competition between regions or rather locations connected to a continually widening multimedial settlement offer in particular on the internet that makes the search and selection of locations more diverse and more transparent for interested enterprises. Selection periods in particular for the primary pre-selection are shortened significantly and the claims concerning individual information insight are exalted significantly;

- The shifting of accents from purely national to international location planning of medium enterprises;
- The decline of big industrial settlements with a high demand for space on the one hand and on the other hand the increase of smaller scale settlement activities in the industrial service area and in enterprises of the „new economy“ with a stronger interest in existing real estate as rental or leasing objects,
- Especially in Europe the competitive situation between extremely promoted regions and non-promoted areas and the municipal financial shortages and saving constraints.

High unemployment and increasing social tensions intensify the pressure to act on municipalities and create conflicts with other areas of policy (Kieschoweit and Sicking 2005).

In the frame of an open plan economic division of work municipalities and regions are forced to specialise and depict and develop more clearly their economic profile. At the same time they have to adjust their regional and municipal economic policy to the changed prevailing conditions and have to give economic policy a greater importance in local politics in order to influence the economic development process positively.

Economic funding of municipalities or regions has an increasing self-understanding of being a *clearing*-interface between enterprises and administrations. The objective is to develop economic funding to a municipal service point that is first contact person for all questions related to location and that coordinates and promotes the necessary administrative procedures within the administration.

For this, information and consultation on the location has to be provided by the municipalities that is oriented to the individual case and fitted to the individual enterprise's needs as well as the offer of solutions to problems for all entrepreneurial concerns that are connected to the decision on the location. By this, service orientation is the best argument for the location.

An extensive area and project management for coordinating different usage claims on is gaining importance on the one hand and on the other hand (re) utilization of existing and appearing fallow land. Area management and area recycling have to incorporate in their objectives the reduction of spatial separation of kind-of-use – where possible – in order to promote a sustainable internal development. It is also necessary that the duration of planning and permission procedures is shortened without leaving out the consideration of other (municipal policy) concerns and the concerns of the population.

Essential criteria for a successful municipal economic policy in connection with the search for an appropriate location for enterprises lies in the tooth system of the policy areas as defined in the environmental guidelines and objectives of the municipality and that have a sustainable influence on the quality of the municipal locations as e.g. culture entertainment and environmental policy. Regional and local economic policy has to be sustainable, go easy on energy and natural resources and has to look out for the dialogue with the citizens in the process of the local agenda.

## **10 Benefit of a municipal environmental management system**

The expectations towards the success of a municipal environmental management system vary significantly depending on the attitude with which such a project is approached. The same is true for the actual success that does not always equal the former expectations. As examples the following may be said:

- A result that is expected and also reached is the reduction of environmentally relevant costs. This can e.g. be the consideration of environmental protection in acquisition, in which not only asset costs but also operational and disposal costs are considered or it can be achieved through a reduction of usage due to measures in the operational work flow
- Not to be underestimated are the successes that result from organisation and clear definitions of responsibilities for all task areas. The environmental management system can hardly be separated from areas of labour security, environmental hygiene and quality. Experiences show that the analysis of the environmental organisation generally leads to an uncovering and improvement in the general operational work flow; this often reveals the essential success reflecting on municipal environmental management, which in itself justifies the costs of the system more than enough.
- In particular in municipal administrations, risk minimizing is in the foreground. What is meant by this is risk minimizing considering personal risks of executive personnel and risks of environmentally relevant incidents (e.g. in planning decisions, measurements, etc.). For this, a clean and documented delegation of risk relevant tasks is very suitable.
- Obviously, municipal enterprises and administrations have a guardian role in entrepreneurial environmental protection for the enterprises located there and they can be a model for effective environmental protection. They show the commercial enterprises the way to an improved regional development, to more self-responsibility and deregulation e.g. in simplifying permission and planning procedures.

- Communication between administrations, enterprises and active participants of the Local Agenda is significantly improved by introducing and maintaining a municipal environmental management system. The improvement can be achieved, however not by demonstrating a municipal environmental declaration or certificate but rather by building contacts in the process of setting up the municipal environmental management system. Therefore an intensified co-operation in the sense of the Local Agenda is supported and accelerated.

Besides this, a continual improvement of municipal and entrepreneurial environmental protection as “the essential result” is achieved. Generally this leads to an enhanced attractiveness of the region and therefore to an image win, that then again could e.g. result in a more attractive tourism.

In summary it can be said, and the experiences show this very clearly, that the costs of establishing a municipal environmental management system on the level of municipal administrations and enterprises is in any case beneficial for the municipality and for the citizens and enterprises within the municipality and it pays off already after a short period of time.

Therefore I would like to encourage you to engage or initiate, establish or continue a “municipal environmental management” project in your municipality!

With this, you promote a controlled, sustainable development in your region!

## **Index**

1. Terms and Abbreviations
2. Images
3. Tables
4. Bibliography

## 1. Terms and Abbreviations

Organisation of procedure	Process of task fulfilment taking into account factual-logical, staff and time-space aspects
Accreditation	Formal acknowledgement of competency, e.g. by environmental reviewers/auditors
structuring organisation	Structure of the engineering office in positions and departments of leader, staff and communications relations
DIN EN ISO 14001	Environmental management systems, specification and guideline for implementation, 2004
DIN EN ISO 14001	
EMAS	Eco-Management and Audit Scheme
Management review	Evaluation of the environmental management system with respect to its continual suitability, appropriateness and effectiveness by the management of the engineering office in set periodic timelines
Eco-Audit	Monitoring and evaluation of the environmental management system with respect to an environment-oriented working method and the observance of legal regulations
Eco-balance	Evaluation of activities, products or services on the basis of comprehensible evaluation criteria with the aim of weighing environmental effects in their relative significance to one another, in order to identify weaknesses and to derive measures for an ecological optimisation.
Environmental effects	Every positive or negative change of the environment, that is completely or partly a result of activities, products or services of the municipality.
Entrepreneurial environmental audit	Management instrument that allows a systematic, in defined periodic timelines to be repeated objective evaluation of the performance of the enterprise concerning its environmental management system in the context of the structural process
Environmental declaration	The public declaration of the organisation or

	municipality, according to the demand of the EC eco-audit regulation, especially article 5 concerning environmentally just working.
Environmental reviewer/auditor	A certified, from the evaluating engineering office independent person or organisation.
Environmental management system	The part of the management system that includes organisational structure, competencies, behaviours, formal procedures, procedures and means for the regulation and implementation of the environmental policy.
Environmental programme	Description of the aims and measures of the engineering office for the improvement of entrepreneurial environmental protection
Environmental audit	First analysis and evaluation of the environmental specific strengths and weaknesses available in the engineering office
Environmental goals	Quantifiable intentions of an organisation or municipality concerning the performance in entrepreneurial environmental protection strived for

## 2. Images

**Image 1** Basic sequence of first environmental audit .....20

**Image 2** Basic principles of an environmental management system.....21

**Image 3** Timeframe for implementation of a municipal EMS .....23

### 3. Tables

<b>Table 1</b> Efficient instruments for the implementation of an environmental policy .	11
<b>Table 2</b> Key points of EMAS and DIN EN ISO 14001 as standards-oriented environmental management systems .....	16
<b>Table 3</b> Depiction of procedural sequence for introducing a communal environmental management system .....	22
<b>Table 4</b> System elements of environmental management systems, according to DIN EN ISO14001 : 2004.....	24
<b>Table 5</b> Simplified example of an input-output analysis of a municipal administration in the environmental declaration.....	32
<b>Table 6</b> Examples for a description of environmental objectives of a municipal administration in the environmental declaration.....	32

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## **Annex**

Annex 1: Example of a municipal environmental policy

Annex 2: Necessary procedures and steps for the establishment of an environmental management system (according to validation check list - EMAS and DIN ISO EN 14001)

Annex 3: Example of structural points of the report on the first environmental audit

Annex 4: Example of a cadastre o lows (here for a German communal transport enterprise)

Annex 5: Example of a safety data sheet according to 91/155/EC (in an abridged version)

Annex 6: Example of a work flow table during an environmental certification

Annex 7: Example of a sequence table during an environmental certification

## **Annex 1:** Example of a municipal environmental policy

Example of a decision draft for the municipal councillor assembly

Proposition:

The councillors decide on the regulation of environmental policy on the basis of the presented draft. The administration is ordered to a step by step implementation of these guidelines in cooperation with ....

Rationale:

The eco-audit is an approved instrument of voluntary operational environmental protection, that binds environmental and resource protection to cost saving. It is suggested to use the advantages of the eco-audit also for administrations in the city of .....

The project to elaborate an environmental management system for the city..... works according to the EC-ECO-Audit regulation.

Since February 1998 when the federal ministry for environment passed the extension regulation to the environmental audit law (UAG-ErwVO), the participation of public administrations in the eco-audit- community system is possible.

Through the establishment of a continual environmental management system, environmental protection and sustainability are anchored in the whole administration and individual instruments are better bundled and coordinated.

### **Environmental guidelines for the city administration.....**

The environmental guidelines are structured in two parts: the first part as preamble names the overall objective of the foreseen action referring to the environment. The second part names the contents of the environmental guidelines individually.

*Preamble:*

The city..... acknowledges the necessity of an environment- friendly policy. It is expression of the responsibility for its citizens, the environment and future generations and leads to the obligation of a long-term protection of the environment. The objective is to take into account environmental viewpoints adequately.

*Environmental policy:*

1. Organisational structure and municipal management

In order to secure compliance with the environmental guidelines and to adjust them to new challenges, an environmental management system is introduced and continually refined.

## 2. Compliance with legal regulations

Compliance with all environmental protection standards is seen as minimum requirement; negative environmental impact shall be reduced with the help of all available technical, political and planning instruments. For this, an evaluation system that is as objective as possible, with clear guidelines and responsibilities on all levels is developed.

## 3. Introduction of instruments of self control

The effect of activities on the environment are regularly monitored and evaluated, in order to ensure avoidance of essential environmental pollution.

The ecological impact is evaluated in advance for new activities, operations and procedures.

## 4. Continual improvement of environmental protection

The environmental activities of the city are periodically evaluated with the objectives of detecting weaknesses and of taking on measures for their correction. On this level, the commune sets its own goals as a scale for the continual improvement process.

## 5. Avoidance and reduction of resource use and environmental pollution

The data on all incoming and outgoing resources in the organisational units are documented in order to secure a precise control of resource usage, emissions, ecological effects and saving potentials.

## 6. Communication with the public

Through continual and consequent public relations activities information on city activities, environmental objectives and measures are given. In addition, all existing information that is needed is made available in a comprehensible way in order to do justice to the legally guaranteed information claim. An open dialogue with all interested parties for the promotion of active participation of the population in the environmental guidelines and their implementation process is strived for, in particular the cooperation and involvement of the formed or to be formed working groups in the frame of the Local Agenda 21.

## 7. Promotion of staff

The staff is actively integrated in environmental protection. Through training they are conveyed the necessary know-how.

## **Comment of the environmental guidelines for the city administration....**

### *– Comment on the preamble*

The extension regulation (UAG-ErWV)<sup>21</sup> extends the scope of validity in part 1, § 3, paragraph 1 to non-commercial areas and names “.... Especially commercial enterprises, as well as the public service sector....” As voluntary participants in a common system for the environmental management and the environmental entrepreneurial audit.

As the term “environmental policy” can lead to misunderstandings on the communal level, the “Landesamt für Umweltschutz” in the Land Baden-Württemberg of Germany suggests to exchange this term with the term “environmental guidelines”. Therefore this term is used in the following.

An essential task of the environmental guidelines is to initiate/enhance a dispute over the importance of environmental protection and over objectives of administrations but also the political level concerning the environment.

This connects to the Local Agenda 21 that asks to promote sustainable developments in the own area of accountability. The Agenda 21 to this: “ as many of the named problems and solutions are to be accounted to the local level, the participation and cooperation of the municipalities is a decisive factor for the accomplishment of the goals set out in the Agenda. Communes establish, administrate and operate the economic, social and ecological infrastructure, monitor the planning process, decide on the municipal environmental policy and municipal environmental regulations and in addition participate in the implementation of national and regional environmental policy. As policy and administration level being closest to the citizens they play a decisive role in informing and mobilising the public and its sensitization for a sustainable, environment friendly development.” By this the eco-audit is an important building block as contribution to a Local Agenda process, with which the municipality takes on a model role. In addition elements and steps of the eco-audit can contribute to structuring and systemizing the Local Agenda process.

The part of the environmental guidelines that states the basic idea of an environment friendly environmental policy in the preamble demonstrates the connection to the decision of the city/municipal councillors assembly: „ the city councillors support the creation and implementation of a Local agenda 21 for the city/municipality....“

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<sup>21</sup> Erweiterungsverordnung (UAG-ErWV) vom 3. Februar 1998

– *Comment on working policy 2:*

EMAS sets strong accents in direction of „Abidance to legal regulations“ by listing questions in annex 1, paragraph B that have to be dealt with by the organisations:

“Organisations have to prove that:

- a) they have investigated all relevant environmental regulations and that they know the effects on their organisation,
- b) they comply with the environmental regulations
- c) they have procedures that enable them to fulfil these demands permanently.”

The effects of the current activities on the local surrounding are judged and monitored and all relevant impact on the environment is generally proved.

– *Comment on working policy 3:*

As complement to the second working policy, that lays emphasis on the development of a judging system the third principle the anticipatory judgement concerning possible environmental impact becomes important, as it is asked for in EMAS: „The environmental impact of each new activity, each new product and each new procedure are judged anticipatorily.”

In Article 2 EMAS under point d) the term „avoidance of essential environmental pollutions“ is defined: „the usage of procedures, behaviours, materials or products that contribute to an avoidance, reduction or control of environmental pollutants, to which also belongs the material utilization, treatment, amendment of operational sequences, control mechanisms an effective resource usage and the substitution of materials.“

– *Comment on working policy 4:*

In article 2 EMAS introduces the term: “continual improvement of the environmental performance“ and defines it as: „a process of annual improvements of the measurable results of the environmental management system, concerning the management measures of the organisation concerning the environmental aspects significant to it on the basis of its environmental policy and its environmental objectives and single goals, whereas these improvements cannot happen in all areas of activity at the same time.”

– *Comment on working policy 5:*

This is based on the environmental information law, that guarantees the free access to all information on the environment at the administrations as well as the

dissemination of this information and fixes the basic preconditions under which such information should be made accessible.

In EMAS, art..1 par 2c) this goal is defined as: „The information of the public and other interested parties on the entrepreneurial environmental protection and an open dialogue with the public and other interested parties. Here, annex 1 elaborates: “Organisations have to be able to lead an open dialogue with the public and interested parties including the local authorities and clients on the environmental impact of their activities, products and services in order to know the concerns of the public and the other interested parties. “

In EMAS, art.2 “interested parties” are defined as: „persons or groups, also administrations that are affected by the environmental performance of the organisation o are influenced by it.”

– *Comment on working policy 6:*

This working policy has increasingly gained importance through EMAS and the new DIN EN ISO 14001 : 2004, as now more weight is being laid on the active inclusion of the labourers, whereas the education of the labourers is explicitly mentioned. This already in art. 1, par 2 d) and more detailed in annex 1, par B, point 4: „... (the labourers (staff) of the organisation are to be included the process of continual improvement of the entrepreneurial environmental protection. For this end one could go back to suitable forms of participation as e.g. the „*suggestions book*“-System (suggestions) or project related group work (environmental committees). The organisations take notice of the guidelines of the commission on ideal procedures in this area. “

**Annex 2:** Necessary procedures and steps for the establishment of an environmental management system (according to validation-checklist - EMAS and DIN ISO EN 14001)

*On point 0 area of application, Frame*

Question on consideration of follow-up certification missing.

*On point I-A.2 Environmental policy*

Written predefinition of an environmental policy (environmental guidelines) on highest management level

Proof as record, that the environmental policy was made known to all staff members

*On point I-A.3.1 Environmental aspects*

Implementation of an environmental audit that identifies and evaluates the environmental aspects so that their results are up-to-date.

Here one has to consider:

- Legal and administrative regulations and other regulations the organisation has obliged itself to adhere to
- Capturing and documentation of all environmental aspects that have significant environmental impact and that are to be ranked qualitatively and quantitatively.
- Description of criteria of evaluation of significance of environmental impact
- Investigation of all applied techniques and procedures of the environmental management
- Evaluation of reactions on previous incidents
- Records on how processes and products that have a significant negative impact on the environment can be depicted.

Procedure 1, that allows an audit and judgement of significant environmental aspects of activities, products and services of the enterprise- that monitor it and by which an influence can be expected, under consideration of direct and indirect environmental impact

Individual list for consideration of the following environmental impact in the direct environmental aspects that are controlled by the organisation:

- Emissions into atmosphere (incl. Local phenomena)
- Derivations into water

- Avoidance, material usage, reuse and disposal of solid and other waste, in particular hazardous waste
- Usage and pollution of soils
- Usage of natural resources and raw materials (incl. Energy)
- Local phenomena (noise, commotion, smells, dust, aesthetic detraction etc.)
- Transport (Goods and services as well as labourers)
- Dangers of environmental accidents and of environmental impact, that derive or can derive from incidents, accidents and potential emergency situations that have to be expected
- Impact on bio-diversity

Additional point hazardous materials is suggested

- Consideration of environmental impact in the indirect environmental aspects that however do not have to be controlled in full scale.
- Impact related to products (design, development, packing, transport, usage and reuse/waste disposal)
- Capital investment, credit allocation and insurance services
- New markets
- Selection and composition of services (e.g. transport or restaurant business)
- Administration and planning decisions
- Composition of product offer/supply
- Environmental performance and behaviour of contractors and deliverers

These individual lists should be understood as checklists, with which the listed environmental aspects are considered in the evaluation that are essential for the operation/enterprise. Once the essential impact on the environment has been detected they have to be considered in the management system and have to be taken into account when fixing the environmental goals and individual goals.

- Consideration of environmental impact in relation to procurement
- Examination of extent to which the enterprise can influence these aspects and what measures for a reduction of the impact can be taken
- Endeavour to ensure that suppliers and all persons under contract with the organisation meet the required environmental policy of the enterprise.

- Record of the judgement criteria on importance of the environmental aspects if they are comprehensive, independent, verifiable and reproducible as well as accessible to the public.
- Consideration of the following viewpoints in fixing the assessment criteria for environmental aspects and importance
  - Information on environmental conditions (i.e. possible influencing objects) in order to find out what activities products and services of the organisation have an environmental impact.
  - Available data of the organisation on material and energy use, derivations, waste and emissions in view of the environmental danger linked to them.
  - Viewpoints of interested parties
  - Regulated environmental activities of the enterprise (Permit-rulings)
  - Procurement activities
  - Design, development, production, distribution, customer service, usage, reuse, material usage and disposal of the organisation's products
  - Organisation's activities with considerable environmental cost and positive results for the environment

(Not all of these viewpoints have to be considered, depending on the enterprise)

Consideration of not merely normal entrepreneurial conditions but also conditions when taking on respectively terminating activities as well as emergency situations with which one has to count always has to be taken into account in evaluating the importance of environmental impact. Are past, present and future activities considered?

Record on the status of information.

*On point I-A.3.2 – Legal and lawful demands*

Procedure 2 on investigation and making accessible all demands of legal regulations and other activities and products relevant to environmental demands, to which abidance the enterprise has obliged itself to.

Evidence on the status of information

Evidence that all impact of the legal regulations on the enterprise is known to all affected.

Documented procedure 3 for a permanent securing of the compliance of relevant environmental regulations.

### *On point I-A.3.3 objectives and single objectives*

Blank form for documentation of environmentally relevant objectives and single objectives for all relevant functions/positions and levels

In fixing and evaluating the environmental objectives the following has to be considered:

- The relevant lawful and other demands
- The significant environmental aspects
- The technological options
- The financial, entrepreneurial and operational framework
- Viewpoints of interested circles
- Quantitative and temporary predefinitions wherever possible.
- Evidence that means used for reaching the environmental objectives and single objectives are not declared as environmental objectives.

### *On point I-A.3.4 Environmental programmes*

Blank form for the compilation of the environmental programme under consideration of responsibilities, funds and time frame, wherever possible.

Procedure 4 on creating specific environmental programmes that are concerned with new developments or new, respectively changed activities, products and services.

### *On point I-A.4.1 organisational structure and responsibilities*

Organisational structure environmental concerns (tasks, responsibilities, permissions according to the legal requirements (as e.g. ordering of contractors) incl. ordering/naming a vice manager (description of his/her tasks, such as reporting to highest management) whose responsibility is the appliance and maintenance of the entire EMS of the enterprise plus the work instructions for record of announcement.

Predefinition of means for implementation and monitoring of the EMS (appropriate staff, technologies and funding)

Inclusion of costs for EMS in the budget.

Predefinition that staff are involved in a process of continual improvement of environmental performance of the organisation (entrepreneurial improvement system, project related group work, environmental committee etc.)

Record of audit and consideration of relevant guidelines of the Commission on ideal procedures.

*On Point I-A.4.2 Training, consciousness and competence*

Documented procedure 5 on investigating the need for training for staff (it is directed by the significance of the environmental aspects and is predefined through regular self auditing) (e.g. as table)

<b>Department/section</b>	<b>Need/requirement</b>	<b>responsible</b>	<b>Date</b>

Records of instructing and training of all staff whose activities has a significant impact on the environment.

Procedure 6 on predefining training contents under consideration of:

- The significance of conformity with environmental policies, the procedures and requirements of the EMS
- The real and potential environmental impact of activities
- The tasks and responsibilities for reaching the conformity with environmental policies and the procedures incl. emergency provision and measures requirement
- Possible consequences of a deviation from the fixed working procedures.
- Predefinition of the instructions to newly employed or change of work position.

*On point I-A.4.3 communication*

Instruction for procedure 7 on steering internal communication

Instruction for procedure 8 for reception, documentation and answering relevant notices of external interested parties.

Documentation of the decision on procedure for external communication on significant environmental aspects.

Documentation of the dialogue with the public and other interested parties on environmental impact of activities, products and services in order to know secured their concerns.

*On point I-A.4.4 documentation of EMS*

Evidence of completeness of documentation concerning all essential elements, that are needed for the implementation and maintenance of the EMS and their reciprocations.

Listing of all procedural and working instructions

#### *On point I-A.4.5 steering of the documents*

Instructions in procedure 9 on steering the documents concerning

- The finding
- The regular evaluation, the necessary modifications and the confirmation of appropriateness of permitted staff (benefits audit)
- The availability at relevant positions in the valid versions
- The taking out of service or securing against unforeseen use in invalid versions
- The maintenance in invalid versions if this e.g. is necessary because of legal regulation or for conservation of knowledge.

under consideration of readability, dating and easy identification a orderly form and a conservation for a fixed period of time.

Instructions in procedure 10 with responsibilities on creation and change of different documents.

#### *On point I-A.4.6 process steering*

Evidence of investigation of those processes and activities that are related to the found significant environmental aspects.

Documented procedure 11 on securing the implementation of environmental policies and the objectives and single objectives related to the environment in situations in which the lack of fixed procedures could lead to a non-compliance to environmental policies and environmental single objectives

Operational and working instructions on fixing the implementation of activities with (potential) environmental impact through staff and externals incl. the predefinition of entrepreneurial regulations.

Procedure 12 on acquisition and communication with contract partners that secure the implementation of environmental requirements of the enterprises through them.

Evidence of records on publishing relevant procedures and demands to deliverers and contractors.

#### *On point I-A.4.7 emergency precautions / -measures*

Procedure 13 to investigate potential accidents and emergency situations (e.g. weak point analyses are to be implemented regularly from which potential emergency situations can be derived- responsible) under consideration of:

The possibilities to prevent and limit environmentally hazardous impact

The regular modification of emergency concepts (following the law for disruptive incidents)

List of training on emergency prevention and measures (e.g. table)

Subject:

Participants	Dates	Responsible	External participants	Result	Conclusions measures

*On point I-A.5.1 Monitoring and Measuring*

Documented procedure 14 on regular monitoring and measuring of the essential environmentally relevant processes (e.g. table)

Processes	Information (to be collected)	Measuring technique and measuring regulations	responsible	Date	Protocol of the measurement

Measuring protocol from date:

threshold value	Target value	Measuring value	Evaluation conformity environmental objectives	with	Process steering according to procedural instructions

Documented procedure 15 on securing that proving measures are calibrated and serviced regularly and systematically under consideration of:

- Predefinition on how the records shall be stored
- Regular modifications to the newest state of environmental regulations, incl. Data on responsibilities and information sources (+ table on documentation of information on current regulations)

(e.g. table)

Measuring means	Calibration value	Measurement value	According to regulation	to	Date	responsible

*On point I-A.5.2 deviations*

Documented procedure 16 on defining responsibility and permission for:

- Treatment of deviations
- Investigation of deviations
- Taking on urgency measures for limiting e.g. caused environmental damages
- Instigation of correction and prevention measures

(following the QM- treatment of errors)

and for securing the following sub-points when found out that demands of EMS are not abided to

- investigation, evaluation of causes and forwarding of information on causes
- creation of an appropriate action plan (correction measures)
- introduction of prevention measures that correlate with the occurred risks
- audit of action plan and prevention measures on efficacy

+ table on documentation of changes and procedures that derive from correction and prevention measures:

*On point I-A.5.3 records*

Procedure 17 on labelling, service and if needed eradication of environment related records under consideration of the following points

- where these records are found
- that the environment related records are legible, identifiable and retraceable to the activity, the product or the service
- how the record can be protected from loss, limitation and damage
- how long the records are to be stored
- that the records are sufficient in order to prove conformity with the requirements of the EMS

*On point I-A.5.4 EMS-Audit/ II internal environmental entrepreneurial audit (EEA)*

(should be completed 6 weeks prior to the audit as the report goes to the auditor)

Procedure 18 on securing that in the regular auditing of the EMS

- the EMS implements the demands (from the Norm as well as own entrepreneurial demands)
- that EMS is orderly implemented and maintained

- the management receives information on the results of the audit
- the actual implementation of procedures by EMS is monitored
- the relevant legal and administrative regulations are actually abided to
- the results of the audit are subjected to a management review by the mayor/director
- the necessary means are available
- all participants of the EEA understand their roles and tasks
- the preparation of the auditors for the EEA are sufficient and the monitoring of the results and conclusions of previous EEA are included
- Talks are held with the staff members
- The audit of entrepreneurial conditions and equipment takes place
- The audit of archives, written procedures and other essential documents with the objective an evaluation of the environmental performance taking place
- The valid norms and regulations are abided to (and how)
- Aimed at goals are reached and the according demands are met (and how)
- The EMS is effective and appropriate
- The understanding of the management system is proved for staff members
- Strengths and weaknesses of the management system are evaluated in the EEA
- That relevant evidence is captured in the EEA
- In the procedure of EEA results of the entrepreneurial audit are taken into account
- conclusions are formulated after the EEA
- there is a report written on findings and conclusions of the EEA in the frame of EEA
- The EEA report is delivered to the highest management
- The EEA report is designed to
- Document the extent of the entrepreneurial audit
- The management is informed on the level of congruity with the environmental policy of the organisation and on progress made in the area of internal environmental protection.

- The management is informed on the efficacy and reliability of regulations for monitoring the environmental impact of the organisation
- If needed to confirm the necessity of corrective measures (structured report)

Programme for the regular auditing of EMS

- With record that the EMS and specifically the procedure for the entrepreneurial audit is oriented to the actual environmental performance with respect to all essential environmental aspects. (e.g. by pursuing suitable indicators)
- With estimation of time and means for the EEA with view on the extent and objectives of the EEA
- By securing in planning and preparation that
  - The necessary means are available (inclusion of position EEA in the operating costs plan)
  - All participants of EEA understand their tasks and roles
- With regulations
  - On the activities and areas that are taken into account in the audit
  - On the objectives of the audit
  - On the to be considered environmental criteria
  - On the necessary data to evaluate the environmental performance
  - On the frequency of audits
  - On the time period captured by the EEA
  - On the methods used for implementing the audit
  - On the responsibilities of implementing the audit
  - On the demands for implementing the audit- competency of auditors, audit planning and records
  - On the responsibilities and demands of the reporting of audit results (e.g. as table)

areas	Activities to be audited	Environmental criteria	Data Record as	Captured time period

- under consideration of the appropriateness with respect to
- the significance for the environment of the activities concerned
- the results of previous audits

- under predefinition of the EEA cycle to a maximum of three years with audit of all activities of the enterprise in this period of time
- under consideration of the following viewpoints in predefining the frequency of audits in planning and implementing the EEA
- Form, extent and complexity of activities (appropriately higher frequency for complex activities)
- Importance of the environmental impact connected to it
- Significance and urgency of problems recorded in previous entrepreneurial audits
- History of environmental problems
- Where appropriate ratified guidelines of the Commission on frequency of the EEA
- Documentation of necessary specialised knowledge and experience of the auditors
- On the local and organisational circumstances of the audited areas
- On the EMS
- On the technical and legal matters of the audited processes
- On the audit technique and reporting (e.g. as table)

Name	Qualification	Education from	Content of education

- chronicle of the preparation of auditors before implementing the EEA (e.g. as list)
- Aufzeichnung über die Vorbereitung der Auditoren auf die Durchführung der UBP (z.B. als Liste:)

List: Preparation of auditors for implementation of an EEA

Auditor:

Experience of the auditor:

Results and conclusions of previous EEA:

Available funds for audit:

Information of all participants:

Area:

Record of:

- Talks with staff
- Audit of the entrepreneurial circumstances and the equipment
- Auditing of archives, written procedures and other essential documents with the objective to evaluate the environmental performance
- Abidance to and the form of abidance to the valid norms and regulations
- Achievement and form of achievement of set goals and fulfilment of respective demands
- The efficacy and suitability of the EMS

Creation of a plan for the development and implementation of corrective measures (as table) with depiction of suitable mechanisms that can ensure that the results of the audit can be pursued further by applying according measures.

#### *On point I-A.6 Management Review*

Documented procedure 19 for the evaluation of the EMS by the highest management as management review under consideration of the

- audit results
- changing circumstances
- obligation to a continual improvement
- possible necessity to change environmental policy, objectives related to the environment as well as further elements of the EMS
- Comparison of environmental performance of the enterprise with the set demands and objectives.

#### **On Point III Environmental declaration (ED)**

Documented procedure 20 on the creation of an environmental declaration under consideration of the following points:

- Clear and coherent presentation of the environmental information
- Clear and precise description of the enterprise, where appropriate also relations to affiliated groups of enterprises and a summary of its activities, products and services
- Depiction of the environmental policy and a short description of the EMS
- Description of all essential direct and indirect environmental aspects, that lead to significant environmental impact of the organisation, and a declaration of the form of this impact related to environmental aspects

- Description of the environmental goals and single goals in relation to the essential environmental aspects and impact.
- Summary of the available data on the environmental performance, measured by the environmental goals and single goals of the organisation and with respect to their significant impact on the environment.
- Other aspects of the environmental performance, incl. the abidance to legal regulations with respect to their significant environmental impact
- Name and registration number of the auditor and date of the validity declaration
- Creation of the ED (written) (every three years)
- Consideration of guidelines of the commission that were possibly passed

These sub-points can be possibly used as structure for the ED if environmental indicators are used, the following points should be taken into consideration:

- Straight depiction of then environmental performance of the enterprise
- Comprehensible preparation of information that do not give a wrong impression
- Enabling an annual comparison to judge the development of the enterprise
- Enabling a branch related benchmark evaluation
- Enabling of a possible comparison with or in relation to legal regulations
- Obligation of the enterprise to annually update the reporting on the environmental performance as further writing of the ED and capturing a validity declaration through a environmental auditor for all changes in the ED (it should be made sure that possibly passed guidelines of the Commission on frequency and updating are considered)

Procedure 21 on the creation and publication of validated environmental information

- Under consideration that every environmental information has to have been validated by an environmental auditor
- With the obligation that validated environmental information include a reference to the last complete ED they are taken from
- With implementation instruction and ways how the ED can be made accessible to the public

*On point IV Logo*

Documentation on the usage of the EMAS Logo 1 and 2 (to be given as table and formulated as sub-point of procedure 22) in which also complaints because of abusive usage of the EMAS logos and their treatment are recorded.

*Necessary documents for an environmental audit according to annex VII*

Five key elements are to be considered:

- Legal and administrative regulations and other regulations the organisation has obliged itself to
- Capturing of all environmental aspects that have significant environmental impact and that are where appropriate to be ranked qualitatively and quantified. Here an index of the aspects declared to be essential has to be created
- Description of the criteria for evaluating the importance of the environmental impact (environmental indicators)
- Investigation of all used techniques and procedures of the environmental management
- Evaluation of reactions to previous incidents

**Annex 3:** Example of structural points of the report on the first environmental audit

Naming of the auditing organisation and the contract giver

- Naming of the auditing team and representatives of the enterprise
- Mailing list

Environmental audit

- Duration of audit
- Agreed objectives and audit extent
- Agreed criteria for implementation of the environmental audit

Entrepreneurial organisation

- Environmental policy
- Responsibilities
- Contracted
- Staff development
- Organigramme

Location-is-state- summary of the audit

- Description of the location and its surroundings
- Designation of area, data on near surrounding, protection areas, residential areas
- Catalogue of activities/procedures/processes
- Listing of material used, products, waste (e.g. also hazardous waste)
- Listing of immovables and movables
- Data on previous usage

Description of direct environmental aspects (*to be described: existing technology and technological procedures, documentation and internal entrepreneurial sequences, environmental protection performance of contractors and deliverers, entrepreneurial monitoring- in particular the measurement and control as well as evaluation of monitoring measures with respect to:*)

- Emissions into atmosphere (Noise, eruption and smells, see 4.2.5)
- Derivation into waters

- Avoidance material usage re-use and disposal of solid and other waste, especially hazardous waste
- Usage and pollution of soils
- Usage of natural resources and raw materials (incl. Energy)
- Local phenomena (incl. Noise, commotion, smells, dust, aesthetic impairments... )
- Transport (goods, services, commuting)
- Dangers of environmental impact and of accidents (*dangers of environmental accidents and of environmental impact that derive from incidents, accidents and potential emergency situations*)
- impact on bio-diversity

#### Description of indirect environmental aspects

- product related impact
- (Design, development, packing, transport, usage and re-use/waste disposal)
- capital investment, granting of credit and insurance services
- new markets
- selection and composition of services
- administrative and planning decisions
- composition of product supply
- environmental performance and behaviour of contractor sub-contractors and suppliers

#### planned / actual Comparison and evaluation

- sub-sumption of the location from a legal perspective
- Obligations from legal and administrative regulations
- Special entrepreneurial obligations
- Audit on demanded procedural instructions according to EMAS
  - o for investigation and making accessible all demands from legal regulations and other environmentally relevant demands of activities and products the enterprise has obliged itself to implement
  - o to secure the achievement of relevant environmental regulations

- audit of the internal communication (are all staff members informed on the legal regulations and demands concerning them?)
- Description of the criteria to evaluate the significance of the environmental impact (considering the following viewpoints)
  - o are the evaluation criteria extensive, independently provable, reproducible and publicly accessible
  - o information on environmental conditions (i.e. the possible influencing objects) in order to find out what activities, products and services of the organisation can have an environmental impact
  - o available data of the organisation on material and energy use, derivations, waste and emissions with respect to the environmental damage related to it
  - o locations of interested parties
  - o regulated environmental activities of the organisation (e.g. approval agency)
  - o procurement activities
  - o design, development, production, distribution, customer service, usage, reuse
  - o activities of the organisation with the most considerable environmental costs and positive results for the environment)
  - o inclusion and termination of activities (consideration of rush hours/ peak burdens/inclusion of previous, present and planned activities) and emergency situations
  - o investigation of used techniques and procedures of the environmental management
  - o evaluation of reactions to previous incidents

Audit of processes and products for judging of special direct and indirect environmental impact and their record

- audit on influence of the environmental aspects and on measures to reduce the environmental impact
- location-target-state
- classification of location from a regional spatial planning view
- state of technology (state of the art technology)
- organisation and documented procedural sequences

- environmental protection performances of contractor and suppliers  
summary

**Annex 4:** Example of a cadastre o lows (here for a German communal transport enterprise)

<b>Environmental law- specific to branches (Berlin and other Länder)</b>						
	<b>BLand</b>	<b>Abbreviation</b>	<b>Data bank- key number</b>	<b>Date</b>	<b>Source</b>	
<b>Land Berlin</b>						
<i>General environmental protection</i>						
Construction order	B	BauOBln	658	03.09.1997	GVBl. S.422	
Required documentation-VO	B	BauVorVBln	657	17.11.1998	GVBl. S.343	
Fire securing VO	B	BrandsichV	660	01.09.1999	GVBl. S.508	
Fire brigade law	B	FwG	665	03.05.1984	GVBl. S.764	
Emergency procedures law	B	KatSG	663	11.02.1999	GVBl. S.78	
Environmental protection fee regulation	B	UgebO	648	01.07.1988	GVBl. S.1132	
<i>Immissions protection</i>						
Registration of bio gas instalments, immission Zulassung von Biogasanlagen, Immiss.-rechtl. u. Baugenehm.-Verf.	NRW		684	23.01.2002	MBI. Nr.51 S.1006	
Feuerungs-VO	B	FeuVO	661	20.08.1996	GVBl. S.454	
Verbot des Abtrennens von Feuerwerk	B		735	08.12.2003	AbI. S.5167	
VO über private überwachungsbedürftige Anlagen	B	PrÜbAnVO	688	30.01.2003	GVBl. S.133	
Stellen nach § 26 BImSchG	B		649	01.08.2002	AbI.S.3206	
<i>Protection of waters</i>						
<b>Berliner Wassergesetz</b>	B	BWG	667	03.03.1989	GVBl. S.606	
Abwasserabgabengesetz	B	AbwAGBln	676	12.01.1989	GVBl. S.214	
Landesabwasserbeseitigungs-VO	B	LAbwV	679	24.01.2003	GVBl. S.58	
Akkreditierte Laboratorien nach der Indirekteinleiter-VO	B		652	18.07.2001	AbI. S.3445	
Akkreditierte Laboratorien für Direkteinleiter	B		653	01.06.2001	AbI. S.2111	

## Environmental law- specific to branches (Berlin and other Länder)

	BLand	Abbreviation	Data bank- key number	Date	Source
<b>Land Berlin</b>					
Emissionserklärungs-VO für Abwässer	B	EmissErklärV- Abw Bln	677	17.04.2002	GVBl. S. 135
Allgemeine Bedingungen für die Entwässerung in Berlin	B	ABE	756	20.12.1999	Abi. S.5155
Indirektleinleiter-VO	B	VGS	670	14.03.1989	GVBl. S.561
Kommunalabwasser-VO	B	KomAbwVOBln	672	19.05.1996	GVBl. S.226
Oberflächenwasser-VO	B		671	04.02.1997	GVBl. S.40
VO über Anlagen wassergefährdender Stoffe und über Fachbetriebe	B	VaWS	668	06.03.1995	GVBl. S.67
AV zur VO wassergefährdender Stoffe	B	AV-VaWS	669	30.11.1995	Abi.1996 S.149
<b>Waste</b>					
<b>Kreislaufwirtschafts- und Abfallgesetz</b>					
Baubfallentsorgungsanlagen	B	KrW-/AbfGBln	659	21.07.1999	GVBl. S.413
Gebühren der SBB mbH (Sonderabfallgebührenordnung)			650	08.01.1997	Abi. S.289
Vereinbarung über die unschädliche Beseitigung von Haus- u. Kleintieren	B		651	20.11.2003	Abi. S.4992
	B		691	20.01.2003	Abi. S.286
Entgelte für die Tierkörperbeseitigung			720	25.07.2003	GVBl. S.295 (ber.S.311)
Zuordnung von Abfällen zu den Abfallarten eines Spiegeleintrages	B		687	25.03.2003	Abi. S. 1085
<b>Environmental protection</b>					
<b>Naturschutzgesetz</b>					
Baumschutzverordnung	B	NatSchGBln	666	28.10.2003	GVBl. S.554
Berliner Jagdgesetz	B	BaumSchV	760	11.01.1982	GVBl. S.250
VO zum Schutz von Naturdenkmalen	B	LjagdG Bln	692	09.10.2003	AbL. S.654
	B		655	02.03.1993	GVBl. S. 155

## Environmental law- specific to branches (Berlin and other Länder)

	BLand	Abbreviation	Data bank- key number	Date	Source
<b>Land Berlin</b>					
Landeswaldgesetz	B	LWaldG	759	30.01.1979	GVBl. S.177
<i>Soil protection</i>					
<b>Bodenschutzgesetz</b>	B	BlnBodSchG	662	10.10.1995	GVBl. S.646
Friedhofsgesetz	B		656	01.11.1995	GVBl. S.707
<i>Environmental hygiene</i>					
Ausführungsvorschrift zur Durchführung der TrinkwV Berlin	B	AVTrinkwV	682	10.12.2002	ABl.B.S.4968
Badeverordnung für Berliner Gewässer	B	BadeV	654	14.07.1964	GVBl. S.753
Badegewässerqualitäts-VO	B	BaGeQuaV	673	02.07.1998	GVBl. S.222
Oberflächenwasser-VO	B		671	04.02.1997	GVBl. S.40
Qualitätszielprogramm-VO	B	QuaZProgV	674	23.05.2001	GVBl. S.156
<i>Hazardous materials</i>					
Gefahrenbeherrschungsgesetz	B	GefG	664	24.11.2000	GVBl. S.494
GGVSE-Durchführungsrichtlinien	B		737	27.10.2003	Abi. S.4819
<i>Territorial order</i>					
Ausführungsvorschriften über großflächige Einzelhandelseinrichtungen	B		718	06.08.2001	Abi. S.4140
Vo über den LEPl.: Flughafenstandortentwicklung	B		729	28.10.2003	GVBl. S. 521
Landesentwicklungsprogramm und Landesplanungsvertrag	B	LEProgr	719	16.11.2003	GVBl. 2004 S.1
Landesentwicklungsprogramm und Landesplanungsvertrag	B	LEProgr	719	16.11.2003	GVBl. 2004 S.1

**Annex 5:** Example of a safety data sheet according to 91/155/EC (in an abridged version)

**Safety Data sheet**  
According to 91/155 EC  
**Disinfectant (QRR010932)**

**1. IDENTIFICATION OF SUBSTANCE**

Product details	
Trade name	Disinfectant
Article number	QRR010932
Manufacturer/ Supplier	
Mechatronica Instruments B.V.	Tel: +31 (0) 229 2911 29
P.O. Box 225	Fax: +31 (0) 229 2415 34
1629 AE HOORN	
The Netherlands	

**2. COMPOSITION/ DATA ON COMPONENTS**

Chemical characterization	
CAS No. /Designation:	7732-18-5 water, distilled, conductivity or of similar purity
EBECS Number:	231-791-2
Dangerous components:	
CAS No. /Designation:	7681-52-5 sodium hypochlorite (NaOCl), Solution 15% Cl <sub>akt</sub> .
	 C; R 31-34 ≤ 2,5 %.
CAS No. /Designation:	1310-73-2 sodium hydroxide (NaOH).
	 C; R35 ≤ 2,5 %.
EBECS Number:	215-185-5.

**3. HAZARDS IDENTIFICATION**

Hazard designation:	 Xi Irritant.
Information pertaining to particular dangers for man and environment:	R 36/38 Irritating to eyes and skin.

**Annex 6:** Example of a supplier request through procurement

## Supplier's request on environmental protection

**Data on supplier**

Name: \_\_\_\_\_

Environment contact person: \_\_\_\_\_

P.O. Box: \_\_\_\_\_

Street: \_\_\_\_\_

Zip code, city/town : \_\_\_\_\_

**1 Please answer the following questions:**

	Yes	No
Does your enterprise have a validated or rather certified Environmental management system (EMS)...	<input type="checkbox"/>	<input type="checkbox"/>
... according to EG-ECO-audit regulation (EMAS)?	<input type="checkbox"/>	<input type="checkbox"/>
... according to DIN EN ISO 14001? <b>(Please send back voucher copy!!)</b>	<input type="checkbox"/>	<input type="checkbox"/>

**2 Only if question 1 was answered with „No“:**

	Yes	No
Are you planning to establish a standardised EMS?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, until when: _____		
Does your enterprise have an environmental management system that is oriented to the above mentioned standardised EMS?	<input type="checkbox"/>	<input type="checkbox"/>
Are objectives defined in your enterprise to improve environmental protection and is their accomplishment documented?	<input type="checkbox"/>	<input type="checkbox"/>
Is environmental protection organized in the enterprise?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, please attach an organigramme!		
Do you demand environmental protection of your suppliers? How have you checked your suppliers? (where appropriate annex)	<input type="checkbox"/>	<input type="checkbox"/>
Do you have instalments and facilities that require permissions? (please name in annex)	<input type="checkbox"/>	<input type="checkbox"/>
Is your enterprise insured against self-inflicted environmental damages?	<input type="checkbox"/>	<input type="checkbox"/>
OPTIONAL QUESTION: were there any malfunctions in the last 5 years through which hazardous materials/emissions were set free into the air, canalisation, surface water or soil?		
Surname, Name: _____		
Organisational unit: _____		
Date: _____	Place: _____	
<b>Thank You !</b>		

**Annex 7:** Example of a sequence table during an environmental certification

Position	Tasks/Activities	Responsible Person	OK?
1	Order of the environmental management representative Definition of tasks- and areas of responsibility and their <ul style="list-style-type: none"> <li>• Written predefinition</li> </ul>	Management	<input checked="" type="checkbox"/>
2	First registration of problems relevant to the environment <ul style="list-style-type: none"> <li>• Registration of environmental processes</li> <li>• Evaluation of environmental processes</li> <li>• Predefinition/evaluation of the danger potential</li> <li>• Predefinition what data is to be documented in the future</li> <li>• Collect data basis for the environmental objectives</li> </ul>	Environmental management representative (EMR)/ all interested personal	<input checked="" type="checkbox"/>
3	Predefinition of Environmental policy and environmental goals <ul style="list-style-type: none"> <li>• Publish/hang this information</li> </ul>	Management	<input checked="" type="checkbox"/>
4	Staff training <ul style="list-style-type: none"> <li>• On the basis of information from the workshops.</li> <li>• On the basis of the information of other participants</li> </ul>	EMR / all employees	<input checked="" type="checkbox"/>
5	<ul style="list-style-type: none"> <li>• <i>management-review</i> (QM plus UM). Please consider for the environmental area: What happened in 2004?</li> <li>• What problems arose while collecting the data?</li> <li>• Are all necessary instruction available?</li> <li>• Are all employees informed?</li> <li>• What environmental problems are already solved, which ones are yet to be solved?</li> <li>• Do the objectives and the policy lead to an improvement of the environment?</li> </ul>	management	<input checked="" type="checkbox"/>

6	<p>Internal environmental audit</p> <p>Are all laws abided to?</p> <ul style="list-style-type: none"> <li>• Have all hazardous materials been registered?</li> <li>• Have all processes been evaluated?</li> <li>• Are the environmental objectives measurable?</li> <li>• Have all environmental problems been captured?</li> </ul>	EMR / all audited employees	<input checked="" type="checkbox"/>
7	<p>Read and internalize environmental norms/standards</p> <ul style="list-style-type: none"> <li>• Private study of the Standard 14001.</li> <li>• If something is not understood, write down the question</li> <li>• Ask other communal enterprises participating in the EMS or the environmental team/ the consultant</li> </ul>	EMR	<input checked="" type="checkbox"/>
8	<p>Implement voluntary pre-audit</p> <ul style="list-style-type: none"> <li>• By other participants or</li> <li>• By external /environmental) auditors</li> </ul>	management	<input checked="" type="checkbox"/>
9	<p>Supplier/customer/staff surveys</p> <ul style="list-style-type: none"> <li>• On the basis of newest information (complaints</li> <li>• On the basis of wishes of other enterprises</li> </ul>		<input checked="" type="checkbox"/>
10	<p>Implement environmental certification</p> <ul style="list-style-type: none"> <li>• signing of contract with the certifying organisation</li> <li>• Appointment with auditor/ certifying organisation</li> <li>• review audit plan first</li> </ul> <p>(The presence of all staff is to be secured)</p>	management	<input checked="" type="checkbox"/>