

**Union of the Baltic Cities
Commission on Environment**

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Manual for Municipal Environmental Auditing (MEA) in the Baltic Cities

**BALTIC MUNICIPAL ENVIRONMENTAL
AUDITING (MEA) PROJECT 1996-1997**

Manual for Municipal Environmental Auditing (MEA) in the Baltic Cities

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This Manual, together with the MEA Workbook, are both available from the UBC's Commission on Environment in either printed form or on diskette.

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Foreword

The Union of the Baltic Cities (UBC) is an organization of 70 cities from the riparian countries of the Baltic Sea, having a total population of more than 15 million.

Within the Baltic Marine Environment Protection Commission (HELCOM), the countries round the Baltic Sea have adopted "The Baltic Sea Joint Comprehensive Environmental Action Program" (JCP). Part of the implementation of the JCP is capacity building, especially in the local capacity to finance and manage projects, environmental monitoring and regulatory systems and project preparation, including environmental assessment.

Together with these elements, the JCP is intended to bring forward environmental audits and feasibility studies as the basis for the realization of single priority projects relating to the environmental hot spots of the cities in question. Generally, the conditions of the cities in which single projects are to be implemented are required to undergo a comprehensive assessment. The assessment concerns local environmental, economic and social conditions in addition to planning methods and models. These are inclusive of strategic and priority-based decisions and the capabilities of local institutions and authorities to handle not only project preparation but relevant implementation and operation as well.

HELCOM set up a special group, the "Project Implementation Task Force" (PITF) for the implementation of the JCP. At the PITF meeting in Brussels, Nov. 1993, the UBC presented the "Baltic Sustainable Cities Programme" as an action plan for implementation of the second element of the JCP: "Institutional Strengthening and Human Resource Development." The proposed action plan was endorsed by the PITF and the UBC was formally nominated as the lead party together with Germany for implementing the second element. The MEA-project represents the concrete output of the same.

Another starting point for the Baltic MEA model is linked to Baltic 21, Agenda 21 for the Baltic Sea Region. The implementation of the MEA supports local Agenda 21 work in Baltic cities.

The aim of the MEA project is to introduce a "Municipal Environmental Auditing Scheme" to the Baltic region. This is done by first producing a manual for MEA procedure as applicable to the Baltic cities, and then both disseminating the results and testing the manual through a demonstration project in Tallinn, Estonia. During the MEA project execution in Tallinn, staff from other Baltic cities are to be trained in seminars and workshops. The project also aims at affording an environmentally sound basis for municipal investment decisions as well as guidance in revealing the critical issues in environmental questions and recognizing the weak points in environmental performance. The UBC shall continue involving cities, municipal departments and the public in MEA procedure.

This manual is based on the experience gathered on the basis of the pilot audit in Tallinn. The cities of Turku and Helsinki, Finland, and Tallinn, Estonia, were the

main cities responsible for carrying out the project and collecting the material for this book.

This manual has been prepared in the MEA Project Office in Turku by Mr Ilppo Vuorinen, Mr Mikko Jokinen and Mr Olli Madekivi with assistance from Ms Antonia Sucksdorff-Selkämä. The preparation has been guided by the project steering group additionally consisting of:

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The project has been financed by the above mentioned cities, the LIFE Programme of the European Union, the Finnish Ministry of the Environment, the Estonian Ministry of Environment and the World Bank Small Grants Programme.

We wish to thank all the individuals and organizations which have contributed their joint efforts to the Baltic Municipal Environmental Audit Project and this main output of the same, and acknowledge their contribution with gratitude.

Union of the Baltic Cities
Commission on the Environment

Carl Nielsen
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Introduction

This manual is based on the methods and principles for the Municipal Environmental Audit (MEA) as worked out by the World Bank as well as the Eco-Management and Audit Scheme (EMAS) which, originating from the work of the EU, has been further developed in conjunction with several projects (HMSO 1993, Storksdieck 1994, Pearce 1995, United Towns Development Agency et al 1996, ISO/DIS 14000-series). Despite a wide variety of audit schemes currently in use, there are some common principles and practices which most of the audit programs share. As a basis to develop this Baltic model, we used the manual and worksheets developed for local government in the UK (HMSO 1993) as well as the textbook on environmental auditing by Greeno et al (1985).

During the initial stage of this project, a manual draft for the MEA in Baltic cities was prepared, which was tested in an MEA process in Tallinn. Also, training meetings were held for participants from UBC cities in Latvia, Lithuania, Russia and Poland. During these sessions, environmental experts from the cities participating were trained to spread the concept and methods of MEA to other cities in the Baltic region, based on concrete experiences gained through the pilot MEA in Tallinn.

Based on the results from the Tallinn exercise, the UBC is to continue initiating MEAs in other Baltic cities, based partly on twinning relations and the network which the UBC has developed between western and eastern cities in the Baltic region.

The MEA Project in Tallinn served as a demonstration project, as it was the first extensive MEA conducted in the Baltic area. One important element in the project was the use of twinning relations between eastern and western cities. It is suggested that the external technical assistance in future MEAs be recruited through the partner cities. This offers the advantages of reduced personnel expenditure on the level of replacement costs for staff from the western city administrations as well as closer cooperation between the experts from eastern and western cities. This colleague-to-colleague basis represents an efficient method of establishing human resource de-

velopment, and strengthens institutional capacities in addition to the creation of strong personal and institutional links between the western and eastern Baltic cities.

How to Use this Manual

Chapter I should be the first one to read, whether or not the reader is familiar with the concept of environmental auditing. This is because the first chapter explains the special features of Baltic Municipal Environmental Auditing by comparing it with already existing auditing schemes and practices. The model for Baltic Municipal Environmental Audits is shortly given in the Chapter I (2.1).

Chapter II provides both step-by-step instructions for conducting environmental reviews and for auditing the environmental performance as a part of MEAs in the Baltic cities. This chapter should be read prior to initiating the audit work, and preferences should be noted as necessary. A special feature of this section is found in the footnotes at page bottom, within which practical experiences and hints have been gathered from the pilot study in Tallinn.

Chapters III and IV may be read selectively, as they treat the state of the environment review and auditing of environmental performance in detail. These chapters are principally intended to support the work of the auditors. In conjunction with the same, the auditors should consult the Checklists and Worksheets as presented in the Workbook.

At the end of this book, a glossary is also provided including the special abbreviations used within the manual.

The Baltic MEA model has been developed mainly for the consideration of a city as a whole, but the concept and method—together with the use of the MEA Workbook—may be adopted for auditing city departments or other units as well.

It should be emphasized that neither this manual nor the entire Baltic MEA model is meant to offer strict and precise regulations for the carrying out of MEA. The aim of the UBC is to merely suggest—by means of this voluntary audit procedure—more ‘open’ guidelines for municipalities with the improvement of their environmental performance in mind.

CHAPTER I DEFINITIONS

Environmental auditing has been developing in unison with several related and parallel concepts generally intended to reduce economic risk and costs in private corporations. The chemical industry was the first to start the systematic minimization of risk in connection with accidental emissions. Consequently, the concepts and methods of *risk analysis* and *risk management* were developed. *Environmental impact assessment* is undertaken in order to predict the environmental effects of a decision, such as the initiation of a new production line. *Life-cycle analysis* has been developed in order to evaluate total environmental stress or the load exerted on the environment by a product over the course of its life. Together these represent an essential part of systematic, predictive and preventative environmental work, which received a push forward as a result of the report by the Brundtland Commission (Brundtland 1987), as this placed the protection of the environment as one of the bases of *sustainable development*.

1 WHAT IS MUNICIPAL ENVIRONMENTAL AUDITING ?

Environmental auditing was first developed on the model of financial auditing in the private sector, but has later been experimented with and applied in local government as well. Formally, it may be seen as an element of the *environmental management systems* developed, e.g., by the EU into the Eco-Management and Audit Scheme (EMAS), which is voluntary for industry. Perhaps the most formal variant of municipal environmental auditing derives from a large Eco-Management and Audit Scheme for local government developed in the UK (HMSO 1993).

The basic form of auditing is **compliance auditing** where performance is audited against legislation, regulations and codes of conduct. While this may be appropriate in the private sector, it is too narrow an approach for cities. The complex set of national legislation and municipal control—together with international environmental recommendations and principles as set by HELCOM, for instance—provide the criteria for Baltic Municipal Environmental Auditing. In this manual, the focus is on

environmental management and the auditing is carried out against self-determined targets based on the implementation of the Baltic Sea Joint Comprehensive Environmental Action Program (JCP) of HELCOM. Municipal environmental auditing may even cover the questions of environmental and occupational health as well as safety management systems.

An unfortunate mix-up of concepts referring to **external and internal audits** has, however, occurred. In one context, they are used to describe the origin of auditors, i.e., whether they come from outside or inside the organization in question (e.g., HMSO 1993). In another connection, this terminology has been utilized to describe two types or stages of the audit, the external review of the environment and the internal review of the organization (Storksdieck 1994, Pearce 1995). We do not wish to increase this confusion: therefore, these terms are not incorporated here at all. **The UBC wish to emphasize the importance of the independence and impartiality of the auditors, the safest way to achieve this being the use of auditors who come from outside the organization being audited. However, it is for the cities themselves to decide in which manner independence and impartiality are to be effectively secured.**

Later, in Chapters III and IV, the audit is divided into two larger areas: the Environmental Review (Chapter III) and the Review of Environmental Performance (Chapter IV).

1.1 The Concept of Municipal Environmental Auditing

This manual is intended to act as a tool for city authorities, in order to help them organize their environmental work in accordance with common and comparable principles. The UBC intends to encourage the cities to build up their environmental management schemes through the provision of this tool.

Environmental management systems in the private sector are currently subject to international standardization (ISO/DIS series 14 000, Anon. 1995). By spring 1997, the standards were already published in Finland and Estonia, for example. Also, the EMAS scheme, already in wide usage, is to be renewed and published by the EU in

1998. In addition to the private sector, activities to organize EMS's are presently more common in the case of public organizations as well.

In practice, MEAs have been rendered in many variants which frequently are not as comprehensive and formal as the scheme referred to above. For example, the cities of Sundsvall (Sweden), Igualada (Spain) and Kirklees (UK) each produced their own personal kind of auditing (Pearce 1995), which indicates that a single "right" way to perform the same does not exist. There may be a distinction between a large environmental audit programme and a smaller individual audit with less coverage; or a larger audit project may consist of several smaller audits as rendered, e.g., in a Norwegian municipal audit project (*Kommunalforlaget* 1996 b). The audit itself may be an open one, meaning that the body that is audited may de-limit the target of audit freely: the same was carried out in Kirklees, Igualada and Sundsvall (Pearce 1995) as well as in several Scandinavian municipal auditing projects (*Kommuneforlaget* 1996 a, 1996 b, Kantola & Ojala 1995, Gunnarsson et al 1996). De-limiting the target also serves to formulate the criteria against which the auditing is completed. It is clear that the boundaries of an audit must be defined sharply, so that the audit programme does not attempt to cover every aspect of everything. This represents a trade-off between audit breadth and depth, breadth in this connection referring to the range of activities included, while depth refers to the amount of detail included within the audit (Greeno et al 1987).

Initially, audits were rendered in private corporations as compliance audits, in which legislation and codes of practice set the criteria (Welford 1995). As this represents too narrow an approach for municipalities, the criteria which should be utilized in municipal audits may be based on both the legal requirements involved and internal policies and accepted practices, e.g., as determined by municipal environmental programmes and/or criteria set by international agreements (such as HELCOM), in conjunction with recommendations made by non-governmental organizations (NGO's).

A "working definition" of MEA is provided by Pearce (1995):

Review and evaluation of the municipality's environmental performance (environmental conditions, policies, plans, projects, practices and compliance with environmental regulations) in a manner that is

- *periodic (recurrent),*
- *systematic (methodical and thorough)*
- *objective (honest and unbiased), and*
- *documented.*

1.2 Baltic MEA:

Introducing the starting point, targets and model

The intention of the UBC is not to restrict the starting points of the Baltic municipalities in selecting the target of auditing. However, a complete model is provided herein, in which all the most significant aspects and possibilities in regard to municipal auditing in the Baltic area are covered. It is noteworthy that a hierarchy of compliance exists, extending from organizational procedures and guidelines to municipal policy and to national legislation, finally culminating in international agreements. The importance of each of these hierarchical levels is different and undergoes change in accordance with the circumstances. The emphasis of the UBC lies in the international aspect of environmental work—the Helsinki Convention for the Protection of the Baltic Sea and the Rio conventions on sustainable development, climate and biodiversity. Therefore the aim is to provide a model including targets and features of international importance which should always be addressed when the Baltic Sea cities undergo auditing.

Within the audit, answers are given to questions specific to a city, such as: How is the city affecting the environment? Is the city performing in an environmentally sound way? These questions are usually answered by "State of the environment reports" which most cities produce regularly. Furthermore, queries are made regarding the environmental performance of the city, such as: How does the control of environmental effects eventually lead to environmental awareness on the part of citizens? Specifically, in respect to investment decisions made in the Baltic cities we are enquiring about their environmental soundness. MEA also attempts to determine whether or not environmental issues are being taken into account when municipalit-

ies plan their investments. Answering the various questions above should help all the organizational levels of a municipality, e.g., the municipal boards, city officials and operating managers. Environmental management representatives need to hear about the problems noted during the audit as well as those observations upon which they are based, so that the problem may be properly corrected. After performing the MEA, a city should realize what its weak points in environmental performance are, in addition to being able to point out the relevant matters requiring change in order to improve the quality of the urban environment.

The industrial auditing scheme applies to a company's sites. For municipalities, the operational unit may be, e.g., a department or city district. There are special questions to ask during the initial stages of MEA, such as which kind of organizational characteristics exist in the city and which must be taken into account when MEA is carried out? How is the city management organized? Are there districts which are more or less autonomically managed or is the management strongly centralized? In other words, what is *the operational unit* to be audited? An operational unit may be the city council as a whole or any department, division, section, defined service function or area of activity (HMSO 1993)—even a city district¹. In a city, there may be several organizational levels dealing with the issue in question: for example, urban districts may deal with energy saving in practice, but the responsibility and control of energy issues in general may be the responsibility of a municipal board.

There is a strong international component when the environmental performance of a large unit such as a city is considered. This comes to the fore when emissions to air and water are under consideration. The approach adopted by the UBC in launching MEAs in the Baltic cities is strongly based on the Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention), signed in 1974.

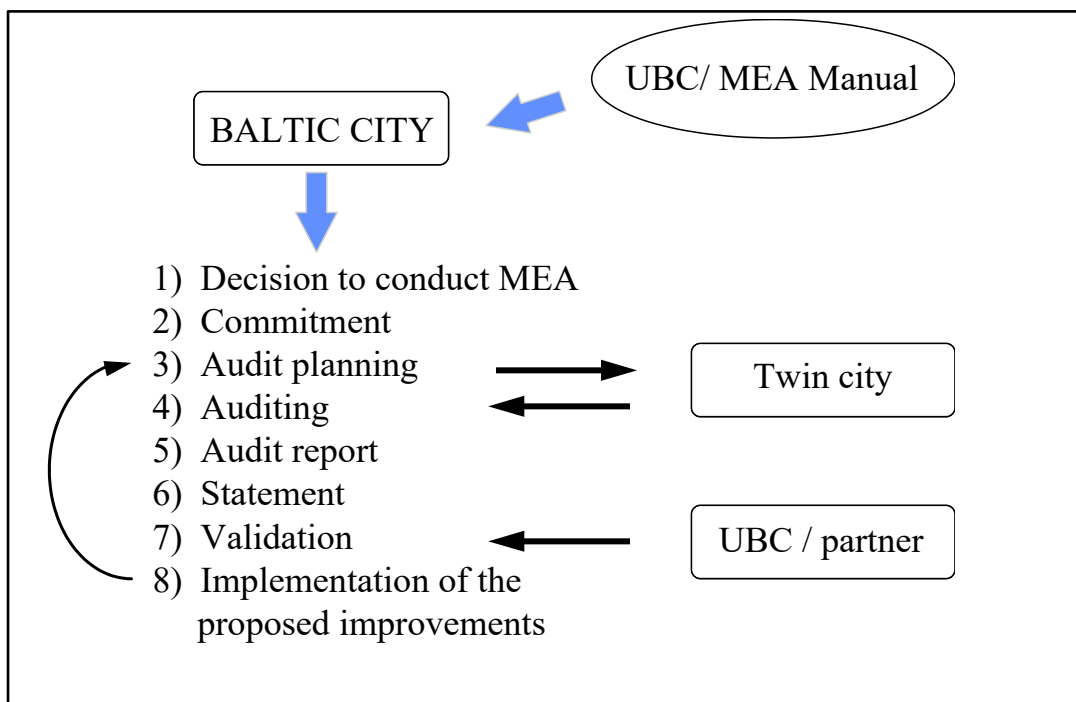
Currently, HELCOM is executing the "Baltic Sea Joint Comprehensive Environmental Action Programme" (JCP). The revised Helsinki Convention was signed in 1992 by eight coastal states (Latvia was an observer). This convention was extended to cover all sea areas, coastal waters and inland waters of the entire catchment

¹In the case of Tallinn, the operational unit was considered on three levels: the city as a whole, the district administration and individual fields of activities.

area of the Baltic Sea. The following new fundamental principles were added: the Polluter Pays Principle, Best Available Technology, Best Environmental Practice and the Precautionary Principle. When the new Baltic Sea Protection Convention is formally set into force, it shall also establish new urban responsibilities.

Targets for the Baltic MEA were chosen on the basis of field work completed in Tallinn as well as the preparatory work carried out by HELCOM in JCP. The most important areas which should be audited—according to the UBC’s MEA model—concern **water and air quality, solid wastes** and the **contamination of soils**, together with **environmental awareness** added to the **environmental performance** of the city, including several services and activities of the municipality and its boards and departments.

There were several other issues, though important, deliberately left out from this model, such as noise and odour.



2 WHY A BALTIC MODEL?

Several precursors of municipal auditing are available (HMSO 1993, Storksdieck 1994, Pearce 1995, United Towns Development Agency et al 1996). They are either

intended for building up a comprehensive Environmental Management System or auditing only some specific area or target in private sector. Even when municipalities have been targets for the audits, none of the existing models were completely suitable for the purposes of the Baltic cities, because in most cases only very limited targets—such as harbour activities—have been audited. The idea of the UBC was to enlarge the approach to cover all the most important environmental effects a Baltic city exerts on its environment and, furthermore, to exploit the potential of the UBCs' working principle of twinning eastern and western cities.

It was also felt necessary to adjust the concept of MEA to the conditions of the countries and cities involved. The special environmental conditions round the Baltic Sea have been thoroughly analyzed in *The Convention on the Protection of the Marine Environment of the Baltic Sea* (Helsinki Convention). The UBC wanted to support the international work being done on the governmental level during the preparatory phases of the JCP to protect the Baltic Environment.

The models worked out for private enterprises proved to be unsuitable, since they fail to take into account the special features found in a city as compared to large enterprises. Cities are large and complex bodies having several activities which utilize a special type of decision-making: the politically elected council. Furthermore, other levels on which decisions are rendered are far more numerous than in any private enterprise. The complexity of a city is further accentuated by the city actually being a mixture of private and public services. Existing models were also seen wanting as they did not satisfactorily take into account the role of city inhabitants and their environmental awareness.

Additionally, the type of approach in Baltic MEA stressing **areal** scoping instead of the organizational one is exceptional. "Areal approach" here means that all the significant sectors within the city region which the city is able to supervise are regarded as audit targets.

Different audit approaches:

Some examples of characteristic differences between Baltic MEA

and the conventional audit used in enterprise:

MEA in the Baltic cities

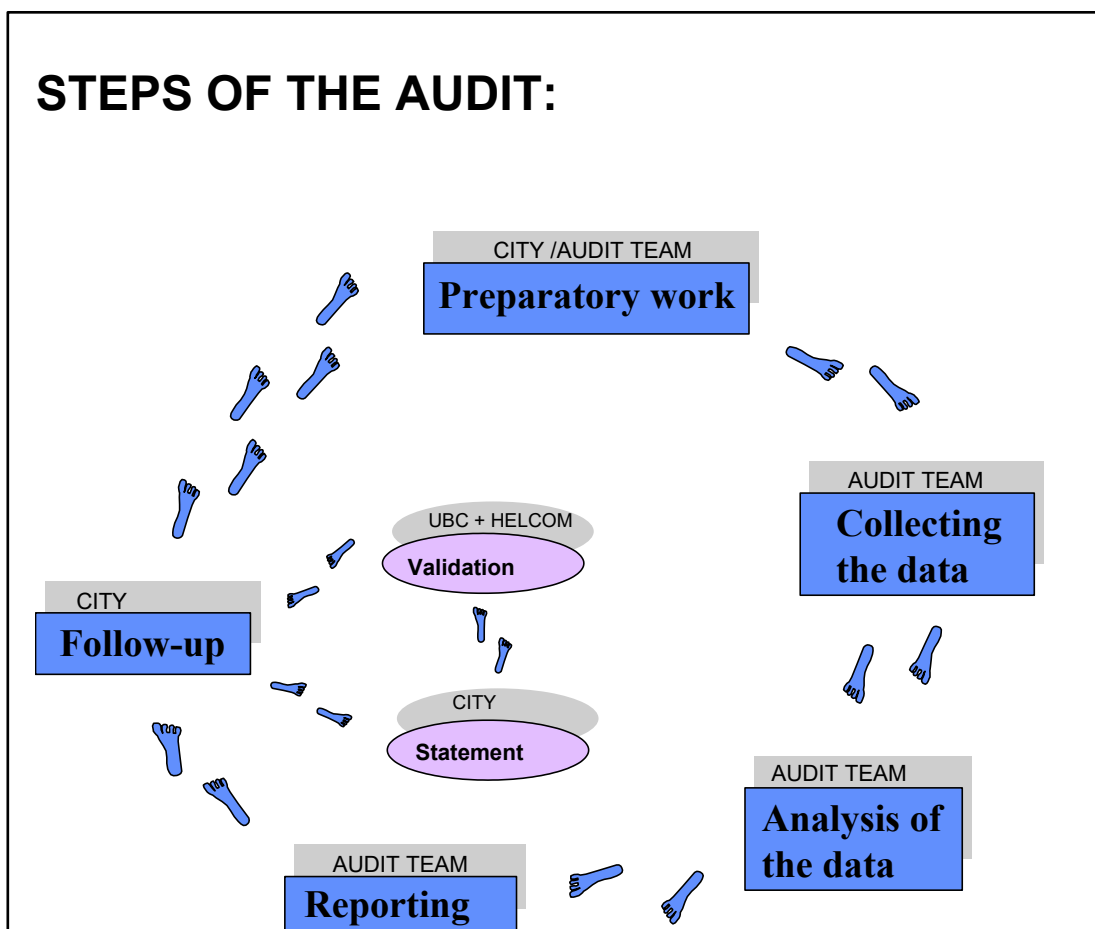
- Audit based on the UBC's model
- Areal approach
- The main purpose is to improve the quality of the environment and the environmental management system of the city
- Significant sectors (audit targets) are based on Baltic Sea environmental conditions
- Environmental aspects also related to city inhabitants' points of view
- The evaluation of environmental performance of the city is based on reviewing the state of the environment
- Target of the audit is wide (administration, management, municipal departments, municipal companies) because there are direct effects of both public enterprises and private companies as well as effects caused by city services
- Helps to set priorities in municipal decision-making
- Several levels of decision-making, a mixture of public and private activity
- Political aspects strongly involved in decision-making
- Good image to show to city inhabitants and financial decision-makers

Audit in enterprise

- Audit based only on existing standards (ISO / EMAS)
- Company/plant-restricted approach
- The aim is also to achieve certification and/or registration
- Targets determined mostly by economic criteria and orders from authorities
- Environmental aspects strongly related to legislative permits
- The environmental management system and the measurable effects (emissions) of the industrial activity represent main topics
- The audit target consists of all the effects resultant when products are purchased
- After certification/registration, the enterprise is allowed to use the quality label in advertising --> financial gain
- Certification is good both for positive image and the value of marketing products
- Uncomplicated system of decision-making (?)
- Economic aspects are strongly involved in decision-making
- Good image to show to clients

CHAPTER II AUDITING IN PRACTICE, AUDITING STEPS

Auditing is often visualized as progressing stepwise. Usually, all the schemes possess the following steps: Preparatory Work, Collecting the Data, Analysis and Conclusions, Reporting the Findings and the Follow-up. It is necessary to point out that although some formalism may be practical, not all the steps are necessary in all different cases; neither are they obliged to follow each other: instead they may be overlapping, especially if time limits the extent of the review.



1 PREPARATORY WORK:

Introducing auditing in a proper manner is crucial

While planning to conduct MEA, the city should contact its Baltic twin city or other city for co-operation in carrying out the audit. MEA is intended to proceed as team work between twin cities or other city partners. Of course, other twinning relations are acceptable as well. For example, the cooperation with another city already audited according to the Baltic MEA model is most recommendable, since the experiences already gathered are of great value in implementing upcoming audits.

In initiating the process, it is important to realize that the involvement and commitment of city leaders are necessary prerequisites of the Baltic MEA. Furthermore, the final results of the audit should be available to all levels of a city's organization and even to the city inhabitants themselves. Therefore publicity already in the initial phases of the auditing is important. Introducing audit methods and principles to city officials in a proper way is crucial in order to achieve commitment and to secure the final success of the audit. The auditors should make every effort to ensure a positive approach and obtain commitment.

As a platform for successful audit, there must be mutual understanding of both the auditees and the auditors about what is going to happen during the audit. To ensure this, the people involved with the audit process should obtain relevant information about the forthcoming audit procedure. Writing a letter of introduction and dispatching the first worksheet of the MEA Workbook (in which the main principles of the audit are described) as well as some other material to make the MEA more familiar prior to the interviews is appropriate. The information material could be sent to the auditee about two weeks before visiting. After sending written information, the auditors must themselves go and speak to the auditees, explaining the backgrounds relevant to the auditing and giving the auditees opportunity to ask questions.

It is essential that the auditors develop, for themselves, a basic understanding of the city's internal environmental, health and safety management systems. There is an unavoidable trade-off between the independence of the auditors themselves and their expertise and understanding of the cities' internal management systems. The audit team member is expected to have thorough knowledge of municipal environmental issues and their management, but on the other hand the auditors should be independent of the management system.

All persons belonging to the audit team must be aware of the ideas of auditing. This is crucial in starting audits in a new environment, such as the Baltic cities. Also, as the meaning of the audit is usually unknown among city officers, a meeting or series of meetings should be arranged for the city boards in order to introduce them to the ideas of auditing. Moreover, official letters to the managers of the boards should be used to introduce the audit. It is even better to meet the authorities personally, as letters and phone calls may not suffice.

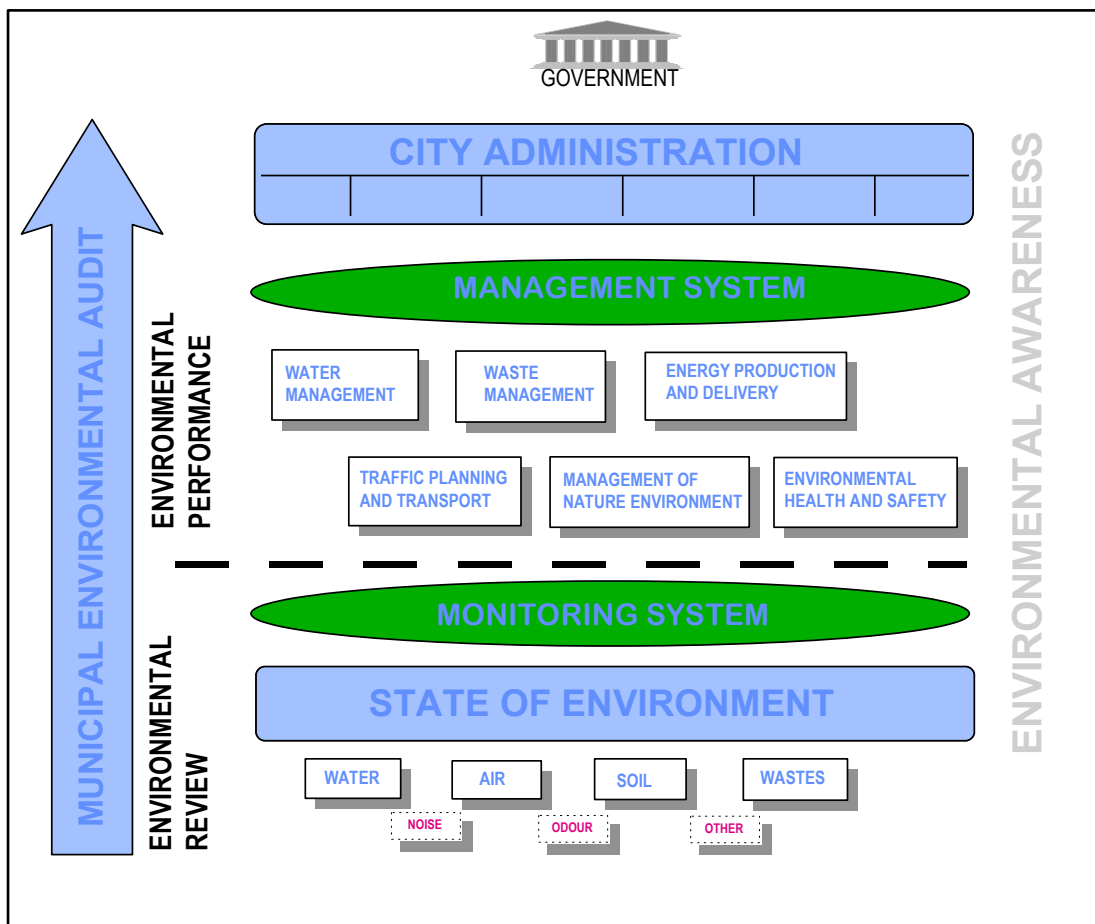
1.1 Targeting the Audit

Environmental auditing usually covers the following fields (partly adapted from Kantola 1995 and Larsson 1995):

- Legislation and other official orders, such as government guidance and council policy
- Environmental effects of production processes and working methods as well as environmental protection systems applied there
- Management and administration activities, including monitoring of the state of the environment and the measuring, registration and control routines included there
- Environmental economy, investment related to environment, planning
- Communication of results to the audience

- In MEA specifically, "non-polluting" environmental performance as well (such as environmental awareness) is considered important

The UBC has pinpointed certain issues and concrete plans to act as main targets for Baltic MEAs. The following division represents a UBC guideline, but when considered appropriate, the municipality may also put more stress on other relevant issues within the city region. The main targets to be audited, according to the division below, are discussed later in Chapter III (Environmental Review) and Chapter IV (Environmental Performance).



What should be audited?

1 ENVIRONMENTAL REVIEW

A) State of the Environment

The main idea is to describe and analyse the current state of the environment by using already existent information. Areas to be focused on are water resources and quality, air quality, solid wastes and the contamination of soils. Other environmental areas, such as noise and odour, could also be evaluated.

B) Monitoring System for the State of the Environment

It is important to evaluate how the monitoring has been organized and done, and whether or not the monitoring and sampling systems are adequate.

In addition, the technical level of the monitoring system should be evaluated as well as the reliability of the information. If the monitoring system includes quality systems, accredited laboratories, etc., they should be reported, too.

2 REVIEW OF ENVIRONMENTAL PERFORMANCE

A) City Administration

Environmental policy of the city and its governmental structures are assessed here. Also the procedures of planning, decision making and reporting should be described. The main components should include environmental policy and environmental programmes, organizational responsibilities and resources plus the procedures and responsibilities required for emergency situations.

B) Management System (including main departments/institutions)

After evaluating the current state of the management system, the need for future development is evaluated on the basis of 1 A) and 1 B). It is important to clarify how management systems and responsibilities are organized (precise duties and re-

sponsibilities, government systems, the municipality, private enterprises) and how communications are functioning (is the information flow adequate and efficient?).

The most important sectors of management in regard to the main departments are considered, such as water, waste, energy production and delivery, traffic planning and transport, the natural environment and environmental health and safety.

The UBC recommends several special plants to be audited: the energy plant, water treatment plant, sewerage treatment plant and waste management institution/land-fill authority/enterprise.

In addition to these plants, relevant offices/departments are also considered environmentally important (for example, the Environmental Protection Office, City Planning Department, Health Protection Department) should be targets of the audit.

C) Environmental Awareness and Publicity

Environmental awareness consists of both the level of knowledge in the government and the environmental awareness of city inhabitants. Describing the awareness level indicates, by means of reports completed up to that juncture, information channels as well as their usability and so on.

Recommendations for development should be given subsequent to the appraisal of the situation as pertaining to the following sectors: environmental information for citizens and politicians, publicity on environmental matters concerning the municipality, and feedback from citizens in addition to the methods of addressing the same.

What is not covered by the MEA model?

The UBC MEA model does not include the auditing of separate enterprises or institutions not owned or supervised by the city.

1.2 Audit Team

Usually, an individual is appointed to act as manager of the audit process. Responsibilities for the manager include budgetary and other resources as available for the audit, liaising with parallel organizations, e.g., with the municipal environmental board, the selection and training of the audit staff, updating the audit program in accordance with preliminary findings in the audit and following the development of the concept of environmental auditing.

The audit team members should be familiar with the laws, regulations and permits as well as municipal policies and procedures applicable to municipal environmental issues. The audit team members should also have an understanding of environmental health and safety control issues. Effluent, emission and waste generating activities in the municipality will be a central theme in the initial stages of the audit; therefore, the auditors should have expertise in functional issues linked with environmental monitoring. Covering various fields as well as answering questions both require environmental specialists from various fields. In the area of the Baltic Sea, the issues dealing with air quality, waste water treatment, waste management, the contamination of soils and biodiversity are all considered particularly important. In addition to these, environmental monitoring is crucial.

Since the auditing group must be reasonably independent from the target of the audit, the use of external auditors is recommended. However, the group must establish confidential relationships with city officers: therefore, the auditors shall need local expertise when contacts are being established (see below). Local expertise is indispensable, since a local expert requires only a day or two to collect the same set of data which an external auditor may need a week for in the absence of valuable guidance!²

² The case study in Tallinn provided us with several minor difficulties which we nevertheless managed to overcome through the use of local experts. Local experts have access to their own (not necessarily official) information networks.

In the case that foreign experts take part in the audit, all should be able to express themselves in the working language, both orally and in writing. There is also a requirement to do all work in two languages, the mother tongue and the working language³.

1.3 Fields of Responsibility

In the audit scheme, a comprehensive report numbering not more than 10 pages including text, graphs, tables and annexes shall be prepared by each specialist, covering his/her own sector and subsequently submitted to the project manager. The reports are then combined by the project manager to form the auditing report.

Specialists are required to specify the trends related to their area of specialization and evaluate the environmental performance of the operational unit as well as provide suggestions for improvements. These reports shall form the core of the final overall report of audit, which will also determine the essential elements of an environmental strategy. The auditors should be able to identify possible hazards which have been earlier considered unimportant but which—in light of current knowledge—could become problematic. The general awareness of environmental techniques and practices as used by other municipalities is important. This can be achieved in MEA by twinning activities between UBC cities. Experience in monitoring, training in auditing and independence are the central characteristics required within the audit team.

Each expert must produce a report in his/her own field. It should not be an ordinary state of the environment report, but rather should include the expert's own evaluation of the situation as well as recommendations for improving the same.

1.4 Scheduling and Timing

³ In the Tallinn study there were, for example, terminology problems. It proved difficult to write the worksheets in Estonian as the concepts and terms used in auditing were not yet generally known. Furthermore, educational problems were encountered in starting the audit in Tallinn, since the city officers were not fully aware of the meaning of auditing. During the project this problem was resolved when an information leaflet was prepared and the necessary Estonian terminology was created and harmonized in cooperation with the Estonian Ministry of the Environment.

The entire period required for the audit is several months. The field work of the specialists could be completed in perhaps two weeks and, in total, each specialist is given about one month to cover his/her target. The audit is divided into several stages, all of which require preparation. It is usually not the activity itself which takes time but the preparation involved. Time is also needed by experts in order to familiarize themselves sufficiently with local conditions⁴. Without proper preparation any activity is at risk, so there is no way to cut the time necessary for preparations linked with the MEA.

Planning also involves persons who have other time requirements: they may be responsible for environmental issues in other municipalities than the one being audited. This is the case when auditing is based on twinning relations. This may considerably retard the work and should be accounted for in regard to schedules. On the other hand, the people involved in this connection will have knowledge and awareness of the environmental work, which helps to guarantee high quality in respect to end results. It is necessary to select the audit team well in advance of the planned audit period in order to secure their availability as well as make replacements possible. An important stage also relates to the training of the audit team if they completely lack—or have only limited—knowledge of audit principles and practice.

Timing represents another question, as one must also take national holiday periods into account if international contacts are to be properly handled: holidays in Central Europe are centred on July-August while in Scandinavia they tend to start from the summer solstice (about 21 June). For this reason, starting the audit in the autumn is recommended. Other questions of timing arise as a result of the municipal elections, as they may cause practical difficulties in the event that a city government is undergoing drastic changes during the audit.

⁴In the case of Tallinn, it was fortunate that environmental experts were on hand, from the cities of Helsinki and Tallinn, who already had been co-operating widely in several projects and otherwise had common interests.

There are two different time scales to be taken into account in the practical planning of the audit: the working hours actually required and the total time over which these hours are spread⁵.

The experts must divide their working effort over a fairly long period of several months, because the auditing progresses in stages. There is usually a pre-audit contact person for the municipality, in respect to which the city government is contacted and informed about the audit. Then the audit itself progresses stepwise, as not all municipal boards or departments can be audited at the same time. Time is also required in going through the answers in the questionnaires. The data which has been published in annual reports may no longer prove to be appropriate due to rapid organizational and processing changes, especially in the Baltic countries. Again, some time is necessary to get the drafted audit report (see page 30) referred by the auditees.

All this must be scheduled beforehand, and it must be ensured that the audit team members will be available when needed. This may require considerable flexibility on the part of their own organizations. Furthermore, when the work is divided into several short periods of intensive working extended over at least some months, it is essential for the auditor team not to forget to make tentative conclusions and adequate field notes all the time when on a field mission. These notes as sketched will be of utmost importance when the auditor—perhaps several months later—renders the final conclusions and recommendations for the audit.

One way to make the time required shorter is to conduct some pre-audit work in the city. By means of training material produced by the UBC, the city can prepare itself in advance for the audit.

2 COLLECTING THE DATA

⁵ The time planned in order to do the auditing in Tallinn was six months, which was intended to include all field work as well as analysis and reporting. In practice, this was extended over seven months as a consequence of the fact that all auditors who were sent into Tallinn required assistance in preparing the meetings and collecting the data, etc. This resulted in a situation whereby the auditors could not work simultaneously, as the number of persons assisting them in Tallinn was limited.

It should be pointed out that auditing is always based on existing data. In this process the data is collected and processed.

Depending on whether the auditors are working with an “Environmental Review“ or an “Environmental Performance,” the lines of progression are somewhat different. These two approaches are treated in detail in Chapters III and IV. In both cases, the collection of background information is initiatory to the work. In some cities, producing the “State of the Environment” already represents a regular—frequently annual—routine. For the Environmental Review, the auditors will have access to yearly reports on the state of the environment, which currently serve as a standard in most municipalities.

The audit of Environmental Performance is one step forward, and this should start on the basis of making contact with the operating units in order to obtain insight into problematic areas already pointed out in the Environmental Review⁶. At this juncture, collection of data is carried out mostly in the form of interviews. This is set into motion by sending written information about the audit, subsequently continued with a phone call and (an) interview visit(s) within which relevant information is gathered.

2.1 Use of Manual and Workbook

The audits use written documents intended to support the manager and the audit team as well as provide information for other participants during the audit. In addition to this MEA manual, in which the background and process of the auditing is described, the MEA Workbook is an essential document having worksheets and checklists for practical audit work.

⁶ In Tallinn, the audit of Environmental Performance was initiated by a scoping review with the city districts and the Environmental Board, and was continued with the next stage: detailed review.

To be used together with this manual, the MEA Workbook offers detailed questionnaires to assist in practical audit implementation. Worksheets are prepared to help the auditor identify both significant effects and those activities which exert influence on the results. Checklists are provided in order to give the auditor a quick method of checking that all important aspects have been dealt with as well as to make a quick overview possible in regard to the audit report.

Most of the worksheets and checklists of the Workbook are intended to be filled by the auditors. However, some of the questionnaires could be inconvenient at least for external auditors to answer; thus they should be filled by internal auditors or even the persons interviewed. The way the Workbook is used depends on, e.g., what the targets for the audit are, what kind of auditors are involved and which separate units are to be audited. The queries as answered represent later valuable information for the phase of audit reporting as well as for the use of city representatives.

After the field missions are completed, each auditor should prepare a preliminary list of findings and make sure that (s)he has asked the appropriate questions from the appropriate people. Some additional information might be needed, which is easier to obtain immediately following the audit interviews.

3 ANALYSIS OF DATA

The essential feature of environmental auditing is the analysis of the data collected, in a manner which shall demonstrate the strengths and weaknesses of the management procedures incorporated. The reliability of environmental monitoring systems should be addressed. To cite an example, control values such as maximum permissible concentrations (MPCs) or other reference values—or WHO guidelines or national permits for instance—should all be utilized whenever available (e.g., Anon. 1994a). Alternatively, control areas should be included in the monitoring. In reporting time-series changes, variation caused by other factors than those which are pollution-related should be analyzed and shown. Statistical treatment of data

may therefore be required. If the environmental management system is found to be unsatisfactory, this should be clearly stated.

After each of the auditors have analyzed their own area of expertise, the audit manager's duty is to make the general analyses of environmental performance as applicable to the city as well as attempt to prioritize the findings as they pertain to various areas.

4 REPORTING

A draft report should be prepared shortly after the audit has been performed. The draft report should be reviewed by the city officials participating in the on-site audit (e.g., Municipal Environmental Office and managers of audited departments, etc.) before a final report is completed. As pointed out by Greeno et al. (1985) there is a point of trade-off. The persons interviewed in the audit are usually department chiefs and municipal environmental staff and they are often eager to hear about the weaknesses found in their activities, but simultaneously they want to minimize the publicizing of any negative aspects of their activities. They are entitled to a fair and factual representation of the environmental compliance relevant to their areas of responsibility. On the other hand, the audit team must make sure that any shortcomings are clearly pointed out in the report. The draft report should be refereed and commented on by municipal officials, and the audit manager should decide as to whether any changes are to be included in the final report.

The report should be given to the body which initialized and ordered the audit and, if not otherwise stated, also to the organization audited. All the findings, suggestions and conclusions from the audit must be mediated to both the governing bodies and management as well as to the public. While publicizing the results of MEA, the authority should consider how the results can be made accessible and familiar to the public, i.e., how the information of the audit and the environmental performance of the city is to be written in the Statement.

The audit report should initiate a process of corrective actions in the case that any deficiencies are found in environmental performance. The municipal responsibility for non-compliance situations should be clear. If this is not the situation, the report

should point it out. The report should be written in clear and concise style inclusive of quantitative statements such as “MPCs were exceeded twice a month in the city center.”

Textbooks on auditing use the term “findings”. These are the essential results of the audit. It is the auditors’ responsibility to report the findings relative to the environmental criteria used and to report them in such a way that the correction process can be initiated. It is important to write the audit conclusions and recommendations in such wise that they include clear prioritization of the improvements suggested, as well as precise guidelines for the authorities in order that they can successfully execute the most urgent corrective actions. It is recommended that this be carried out by reporting the findings separately, in accordance with the concept outlined in the last worksheet of the MEA Workbook.

Another important element of the report is the analysis of municipal policies and environmental management. While there are findings at this level also, they may not be easily described in a quantitative manner as they may concern, e.g., the lack of information/responsibility affecting corrective actions.

It is important to realize that a municipal environmental audit will also produce findings of a technical nature which may be easily corrected by initiatives by, e.g., department heads. Problems may arise when auditors bring up findings of a more general nature, such as gaps in the flow of information inside the municipality or areas where no responsibilities have been defined. In these cases, the required corrective actions will not be automatically initiated. The responsibility for starting the corrections is with the municipal boards or even within the city council. In order to start corrections on this level, some publicity may be needed before attention is adequately raised to make them possible.

The continuation of the audit process is a joint responsibility of the municipal environmental board and the city government. It is good practice to arrange a close-up meeting intended for the municipal authorities, in which the audit findings are both orally reported and mediated to the public. This will provide publicity for both

the auditors and the municipality and aid in ensuring the continuation of the audit process as well as the correction of any shortcomings found within the audit.

In the close-up meeting, attention should be given to the background of the MEA, and the cooperation between the UBC, partners, audit team and city officials. The nature of the findings in general in relation to national legislation, municipal environmental policy and the environmental setup around the Baltic Sea—i.e., the international context—should be discussed. However, the close-up meeting is not meant for discussions on details and corrective actions; rather, it is intended to prepare for follow-up as well as secure the continuation of the process.

5 AUDIT FOLLOW-UP

5.1 Statement

The reporting phase of the audit is expected to be followed by another document, the Statement produced by the city management (*or other body that ordered the audit*). This document should briefly include the basis and principles of the audit as well as its main findings. However, the main purpose of the Statement is to provide the public with information on the current environmental performance of the municipality, not to mention updated details for the city leaders in order to ensure their commitment to the development of environmental management.

5.2 Validation

The last phase of each audit implemented in accordance with the Baltic MEA model is termed "validation." In this phase, the quality of the audit and correspondence to the Baltic MEA concept is evaluated. Within the validation process, the auditing process is evaluated by an external environmental organization to check whether it has complied to the requirements of the Baltic MEA model and whether the audit adequately covers the relevant environmental issues.

The validation process is carried out by an expert team nominated by the UBC with assistance from HELCOM. Technically it is the environmental Statement which is

validated, but also the entire audit and its relevancy should be evaluated. The validation process is not focused on the consideration of any details connected with the audit work, but it is expected that it shall verify that the audits are carried out in Baltic cities in accordance with the same principles. Furthermore, the validation also ensures that the Statement is produced at the end of each audit.

It is expedient that the Statement be **validated before publishing**, so that possible corrections can be done.

The final role of the validation process as part of the MEA model shall be determined in the future. The UBC will organize the needed support and equipment for validation, which can be considered only as a voluntary but recommended process for the cities.

5.3 Audit Cycle

The nature of auditing is repetitive, which means that unfavourable findings are followed in the subsequent audits until they are eliminated. Length of the time before the next audit round is completed depends on circumstances. A one-year cycle is too short for most cases. For municipalities, a period of about 3-5 years may be reasonable. Follow-up represents an essential part of the audit and is not connected to the cycle of repetitive audits. Some areas can be conveniently audited while producing the yearly “State of the Environment Reports,” which most municipalities produce regularly. This is the case with environmental parameters, which are monitored systematically and for which MPC’s or other criteria are readily available. On the other hand, findings of a more general nature such as “gaps of information” or “no responsibility defined” will require a longer time period for handling, and consequently they do not have to be audited yearly.

If the reporting is properly done, it should lead to corrective actions. Another part of the follow-up procedure should be the communication of the audit findings to

city inhabitants and, by making the problems public, to secure that they will also be followed independent to the municipal management.

The audit will produce documents, data and other records which should be filed and used in the subsequent follow-up and later audits. It is extremely important that all documents filed and kept should be dated and signed correctly. Otherwise they are useless, since during the audit several versions of reports are completed and it must be possible to return to the documents perhaps even several years later and track which version is the final one.

CHAPTER III ENVIRONMENTAL REVIEW

The Environmental Review Report is to have the following sections: 1) the current state of the environment and its monitoring, 2) analysis of the most important sectors causing stress to the environment, and 3) an evaluation of the situation as well as recommendations for future activities.

Traditionally, environmental issues are characterized by a few main sectors such as air and water pollution, solid waste, energy, traffic and so on. This is convenient to follow in the MEA scheme as well. The relative importance of sectors varies from city to city; however, the general importance of water and air quality is evident in the Baltic area as seen in the listing of environmental hotspots in the area (HELCOM 1993). The following is intended as a rough guideline, showing which activities and sectors should at least be considered in the MEA.

In the Baltic MEA, the UBC has found the following items to be the most significant targets when reviewing the state of the environment:

- Water quality (including water resources as well as pollution to the sea and to other water courses)
- Air quality (including emissions to air)
- Contamination of soils
- Solid wastes (including waste formation)

In addition to these matters, it is up to the city to also scope other issues regarded as relevant to the city in question.

Specifically, attention must be paid to the environmental monitoring system and the adequacy of the same. The auditors are not to merely report and analyse the state of the environment based on existing data but should also analyze the methods of monitoring used as well as their reliability.

Although this kind of reviewing concentrates mostly on negative findings, it is important to also point out positive matters as they appear so that they may be observed and followed in the future.

1 WATER QUALITY:

Emissions to water, consumption and protection

Water protection legislation and law enforcement, as well as other regulation, implementation and enforcement, should be described in the environmental review.

The sources of pollution—both point and non-point source—as well as their effects on the environment should be evaluated. The ecological and hygienic state of water as well as its monitoring and concentrations of indicators should be reported. Evaluation of water treatment practice should be a central part of the review. Existing plans to solve the problems of water pollution and sanitation facilities should also be described.

Concerning the industrial water pollution load, the review should map and categorize sources (different types of industry) as well as volumes. Special attention should be paid to emissions consisting of dangerous substances. The effects and possible problems caused by industrial waste water to municipal water purification systems should be documented. An evaluation of practice and the reliability of monitoring in respect to industrial pollution should be included within the report.

Concerning the diffuse water pollution load, the review should consider river water pollution (in addition to the share of pollution originating outside municipalities), changes in river runoff as well as in the use of fertilizers in agriculture, farming and aquaculture. Conclusions together with a general evaluation, with suggestions and preferences for improvement, should be included within the report.

Water consumption for both drinking and industrial purposes should be analysed as well as possible prevention strategies relative to the over-exploitation of ground and surface water.

2 AIR QUALITY:

Emissions, pollution and protection

Information should be gathered on all issues concerning emissions and air pollution caused by major pollutants from various sources (e.g., traffic, industry, power plants and heating centres, private heating, waste incineration, etc.), ambient concentrations of pollutants, existing purification and monitoring systems, emission control, policy and regulation implementation / enforcement plus the effect of urban air pollution on human health. The effect of air pollution on populations living within the municipality should be assessed and the critical issues involved in abating air pollution should be determined. Information should be provided on how to reverse the negative effects of such problems on ecological and human health.

The review should be based on meteorologically and climatically relevant background matter, in addition to data concerning possible inversions or currents. Air protection legislation, air pollution control and law enforcement should be reported. The review should list the greatest air pollution sources. The role of heating in regard to apartments should be clarified. The coverage of the air quality monitoring system should be described and evaluated.

Concerning emissions from industry, attention should be given to industrial plants as well. Evaluation and proposals for action should be offered.

Concerning energy producers, production-type emissions and the raw material for production should be described. The nature of emissions and the role of district heating should also be characterized. A description of energy production (fuels, production methods, electricity and district heating) is needed as well as that of energy production efficiency and energy-saving. The report should also include evaluation and recommendations for actions.

In addressing traffic emissions, attention should be given to the role of traffic in emissions of NO_x, the number and type (gasoline, diesel, electricity) of cars during the last few years, the role of catalytic converters and availability of unleaded fuel, traffic forecasts, problem areas and harbor/ship exhausts. Suggestions for immediate actions and longer term recommendations should be provided within the report.

In monitoring air quality related concentrations in the air, there should be a description of not only the number of measuring stations, but their positions as well, in addition to that concerning the collection and filing of data. Levels of MPC's, reporting and quality standards should all be addressed. Evaluation, immediate actions and longer term recommendations are to be included within the report.

One emission-type target also relevant to air is noise which shall not, however, be discussed here further.

3 CONTAMINATION OF SOILS

One of the targets of increased environmental interest recently is soil contamination. Typical suspected places are dumpsites, chemical industry plants and gasoline stations as well as other places where oil products have been handled or are currently being handled. Especially in the Baltic countries, the abandoned military areas are worthy of consideration. Other contaminated places typical to some Baltic cities are harbour areas, and harbour sediments should also be given attention.

Most soil pollution is a consequence of either accidental or continuous leakage of pollutants. When studying and analyzing soil contamination, it is crucial to find out the reason for pollution in order to limit further pollution. However, it is quite common that the activity which has caused the pollution no longer exists.

Soil contamination surveys should include analyses of oil and lead concentrations as well as other heavy metals and other relevant parameters. The auditor should consider the collected data values to reference/directive values and evaluate if any degree of risks caused by possible excess exists. Both the areas of residency and industry should be studied. In addition to soils, some groundwater contamination analyses could be expedient at the same time, as the quality of the groundwater is often a relevant indicator of soil contamination.

Attention should also be paid to national legislation and standards as well as permitted concentration levels. Since national legislation could still be under development, international reference values should also be utilized.

If notable soil contamination is identified, the auditor should attempt to categorize the contaminated areas into those that require immediate action and those regarded as less hazardous for human health or for the environment.

Responsibilities concerning the mapping and treatment of contaminated soils should be explained. The adequacy of the monitoring system is another question to be evaluated. If there are any clean-up programmes, they should be described as well.

4 SOLID WASTES

The production of waste derived from various household and commercial sources—municipal solid waste, hospital waste, industrial waste, hazardous waste (oil, used batteries) and radioactive waste—should be described.

Use of resources and materials, the consumption of unrenovable, slowly renewable nature resources and the utilization of hazardous materials (PVC, freons, PCB, heavy metals) should be included in this chapter whenever the same are connected with waste formation. The possibility of leakage from landfills to waters should also be analyzed.

Another subject to be measured or described relates to the amount of waste per capita and year (kg) related to residential style (small houses vs. multi-storied buildings). Additionally, the share of private production and public service activities in the production of the total amount of waste as compared to individual citizens should be analyzed. Moreover, the composition of solid wastes—non-recyclable wastes (e.g., plastics, light bulbs), recyclable materials (paper, cardboard, glass, plastics, metals), hazardous wastes and compostable wastes—as well as the organization of waste treatment should be described.

CHAPTER IV REVIEW OF ENVIRONMENTAL PERFORMANCE

1 INSTITUTIONS AND OVERALL MANAGEMENT

One of the starting points of MEA is to introduce an environmental auditing system especially adapted to the Baltic cities. This is, of course, an oversimplification of the situation, since in many cities there already exists some kind of environmental auditing, usually in the form of regular reviews and reports. Thus, all existing auditing and review systems should be characterized and understood, e.g., all Environmental Impact Assessment (EIA) procedures already utilized by the cities should be described (it is worthy of note that, through MEA, the evaluation of EIA's is also possible). Only when this is done can the conclusions related to MEA truly improve the environmental management systems of cities.

Issues concerning the administrative structure of institutions, relevant from the environmental point of view, should be examined. Existing legislative / regulatory issues and areas for improvement should be presented. Existing management efforts to improve the local environment and their effectiveness should be explained. Propositions should be presented on ways to improve the overall institutional capacity of each municipality. Areas of municipal and national jurisdiction, with opportunities and experiences in local/national and intra-municipal collaboration and cooperation, should be included within the review.

The reviewer should also consider how “Best Available Technology, Best Environmental Practice, Polluter Pays and Precautionary Principles” are taken into consideration. An important question concerns who is making decisions and prioritizing environmental problems. The outcome may vary according to the position and responsibilities of the decision-maker. In reportage, charts and box-diagrams are useful in the description of money flows and management relationships existent between institutional organizations.

The administrative structure of the city should be understood and form the basis of the audit. The auditors should have a clear picture of which bodies comprise the municipality and how they are set up⁷.

One important part of the administration is the system of sharing responsibilities for environmental protection. The auditor should analyse the consciousness of the City Boards/Departments in regard to their own responsibilities and if there are any environmentally significant sectors having unclear responsibilities. In addition to this, recommendations to improve co-ordination between agencies with different and sometimes overlapping responsibilities should be made⁸.

2 ENVIRONMENTAL POLICIES AND PROGRAMMES

The basis of environmental management systems are environmental programmes, which should be established in all operational units having significant effects on the environment. The programmes should be based on the general environmental policy of the city. The division of labor and responsibilities between the city and national government should be explained.

⁷ In Tallinn, the City Council is a representative body elected by voters amongst the city inhabitants and the City Government is the executive body formed by the City Council. Additionally, the city is divided into eight urban districts, each of which has its own elected District Council and representation in the City Council. Furthermore, the City Council elects the Mayor, who in turn nominates the Heads of the City Districts. The administrative structure further contains the City Office and City Government Boards. The City District Administrations provide urban services (education, communications, energy, social services, etc.) by means of municipal establishments and municipal enterprises. Establishments do not create revenues and are thus dependent on the city budget, while enterprises are intended to be self-financing and contribute to the budget.

⁸ In Tallinn, the City Government is responsible for all fields of activities except environment and health, which belong to the National Board of Health Protection. The main city boards sharing City Government responsibilities are: the Environmental Board (environment and planning, nature protection, state of water bodies and beaches, use of resources and materials, green areas, water management, contamination of soils, air quality and waste management), the City Planning Board (environment and planning), the City Transport Board (transport, air quality and noise) and the Municipal Services Board (transport and waste management). In addition to these, Tallinn Botanical Garden is partly responsible for nature protection and green areas, Tallinn Waterworks and Sewerage ME for water management, and Tallinna Soojus Ltd. together with Eesti Energia for energy management. Environmental awareness and staff training belong to all the above-mentioned interests.

Furthermore, the environmental strategy of the city may determine the institutions and persons dealing with the management as well as the carrying out and reporting of environmental activities (cf. below for environmental committees)⁹.

3 MANAGEMENT OF MUNICIPAL BOARDS AND DEPARTMENTS

Another starting point should be the services provided by the city through the activities of boards, which in turn oversee and provide resources for the operational units. The activities of and reportage from the operational unit to the overseeing committee should be described and analysed. Usually the cities provide the inhabitants with a variety of services, e.g., cultural, social and environmental issues are taken care of by their own boards and energy, construction, communications activities have their own respective departments.

Among the most important city services from the environmental point of view are water management, waste management, energy production and delivery, traffic planning and transportation, management of biodiversity and green areas and environmental health and safety, which are discussed in the following chapters.

⁹ For example, in Tallinn the environmental policy is referred to as “The Environmental Concept of the General Plan of the City of Tallinn.” Within this concept, environmental protection acts as one of the priorities of development, at the same level of importance as the economy. Environmental protection and improvement represent urgent needs and direct obligations. The environmental concept is closely linked with the economy, construction (including architecture and planning), municipal services and transport concepts. This concept supports, e.g., the following targets by the year 2010:

- environmental protection is to be at top level,
- ecological and health issues are to be considered as main questions in city planning and other activities,
- Tallinn shall be a "green" city,
- use of natural resources is to be optimized,
- the understanding that Tallinn occupies part of the common ecospace of the Baltic Cities with Europe dominating,
- the state of water bodies, ground water, air and soil shall improve and the ecological balance shall be close to that which is natural,
 - the principles of sustainable development and "polluter pays" shall be considered in directing the development of the urban economy.

3.1 Water

Information should be gathered on all issues concerning present and future water resources such as: water supply, sewage, sanitation services, industrial effluent and pollution control, concentration of pollutants, water quality monitoring and evaluation of coverage, as well as the publishing and availability of reports affecting public and water pollution policy. Both qualitative and quantitative aspects of water management in regard to the city should be analysed. The water distribution network as well as related activities should be analysed whenever they have significant environmental effects.

Populations and their relevant water situations should be studied and the critical issues involved in the management of water resources determined. Overview of the watershed area should be included within the report whenever it exerts an impact on water quality or treatment. The definition of municipal boundaries including marine areas, with a description of the oceanographic, geographical and geological features of importance should be considered. An overview of water extraction, distribution and purification, as well as sewerage collection and treatment including sludge treatment, should be provided. The reviewer should also study the coverage and condition of drainage systems (e.g., functioning during storm waters), collection leakage and the distribution network in addition to the outlet system, inclusive of pipelines and recipients.

Attention should also be given to the water-charge system as well as the water pollution fees. Safety aspects, e.g, those involved with the transfer of water, need to be taken under review (security against traffic accidents, etc.)

3.2 Waste

Information on waste management should be collected in regard to waste generation, collection, transport, treatment and disposal. Urban policies on minimizing

wastes, recycling and composting as well as regulation, implementation and enforcement should be outlined. The expenditure involved in waste management—including disposal charges and compensation payments for environmental pollution—should be studied. The critical issues to be determined as to pollution prevention and information should be collected on how to reduce the ecological and human health risks associated with inadequate waste management policies.

Evaluation of the waste treatment organization and suggestions for improvements should also be given attention. Another important aspect is the management of hazardous waste. In addition to this, issues to be considered include municipal legislation and the responsibilities of reportage as well as the organization of solid waste treatment: control, collection and transport, storing and treatment (private enterprises or municipal responsibilities).

3.3 Energy Production and Delivery

The energy production and network should be analysed when they produce significant environmental effects through action of the operational unit producing the service.

A description of energy production and consumption is essential, including heating systems, industry and traffic (diesel and gasoline consumption of cars). Special attention should be given to the sustainable use of raw materials and resources as well as energy-saving systems. Loss of energy through leakage and aged plants, not to mention transport systems, should all receive attention. Oil derivatives leaked to water and ground should be characterized.

Total yearly energy consumption (kWh) is to be estimated and a breakdown should be performed in respect to the shares of heating, cooling and electricity in small houses and industry. Shares of energy consumption according to types of energy—such as oil, gas, district heating, gasoline, diesel and ethanol (in transport)—should also be included within the report. Also, energy consumption per mileage

(km), weight (kg), area (m³) or per organizational unit (volume, outcome, activity) are good indicators. The share of renewable energy in total consumption should also be assessed. The role of radioactive fuels could represent a special problem.

3.4 Traffic Planning and Transport

Traffic is a topic which should be given attention in several connections: at minimum, it is connected with air quality, energy consumption, noise, city planning, environmental health and the contamination of soils. The main issues to be studied when analyzing traffic management are the public and private transport in the city and the facilities related to the transportation of products on wheels, by train and water as well as by air. Safety and risks in regard to transport and storage also represent traffic-related questions.

Municipal (and other) transport services have, in addition to direct influence, indirect effects as well which stem from municipal planning in respect to land use, traffic routes, etc. Harbours, storage and the use of risky materials should be given special attention in the coastal cities. Furthermore, airports represent a special instance of traffic nodes which deserve attention.

3.5 Natural Environment

The ecological value of the natural environment of a city can be determined both by the number of plant and animal species found and by the functional value of the area in question. Main issues to be studied are the size and number of green districts, areas under special protection or preservation and the overall status of the protection activities. The main ecosystems vulnerable to the effects of urban growth are forests, mountains, rivers as well as coastal and marine ecosystems. Especially among the cities of the Baltic Sea coast, it is appropriate to analyze the condition of the coastal ecosystem and coastline itself, including beaches.

3.5.1 Green Areas

Information should be gathered on the effects of local urban development, tourism, industrial development and agriculture on green and nature protection areas. Identifying the critical issues involved, as well as the immediate actions which should be taken in order to avoid damage, should be considered.

Special attention should be given to parks, recreation areas and protective forests and trees as well as to the restoration of areas in use, such as gravel pits, etc. Analyses of the need for re-definition of the activities of land-use could be expedient as well.

3.5.2 Biodiversity

Biodiversity, including the various sectors of monitoring carried out by the city, should be analyzed as an emerging concept of international nature protection activity. The strategies of both identification and the protection of threatened habitats should be analyzed as well as specific measures taken to support habitat maintenance.

3.6 Environmental Health and Safety

Human health issues, such as occupational health, noise and the quality of drinking water and food may belong to health care organizations and not to environmental office. Therefore they are usually not included in traditional “state of the environment” reports, especially if no problems are encountered.

If health questions are chosen to be audit targets, biopollutants, pollen and allergens should be awarded special attention. Health indicators as developed by WHO should be incorporated to address such issues.

Other matters perhaps more relevant to the state of the Baltic Sea are environmental risks and hazards that could also have significant effects on the health of local citizens.

For preventing hazards, especially those linked with industrial activities and the storage of potentially dangerous materials, the enterprise or industry in question itself has to have plans for both preventing accidents and for practical rescue operations in case of hazard outbreak. However, the need normally exists for rescue operations in general terms as arranged by the city authorities, especially against the risk of traffic and transportation accidents.

For preventing and limiting environmentally hazardous accidents, there should be plans and programmes as established by the municipality. It is important to recognize both the most vulnerable areas and, for example, the traffic routes with high transport frequency. If possible, the areas of groundwater and surface water used for drinking purpose, for example, should not be made subject to heavy transport of hazardous and toxic materials.

Environmental risk evaluation, analysis and management are questions that also require consideration on the municipal level. Management must be aware of the perception of risks as well as define what represents sufficiently safe and acceptable risk in regard to the environment. This must be done with intent in order to clarify all the weak points of the urban environment which require prioritization in the planning of protection-related and preventative activities prior to possible hazard-related accident.

In the MEA model, it is not the purpose to include any kind of risk analysis, but it is nevertheless necessary to find and list the areas and issues that could pose a threat to the city environment and people resident within the area.

4 ENVIRONMENTAL AWARENESS

Environmental awareness, in a manner of speaking, indicates the environmental performance of the city. Environmental awareness can be divided into two categories in this context: the *awareness of the city administration* (adequate knowledge of

environmental matters so that decisions are made with sufficient consideration of environmental aspects) and the *awareness of city inhabitants*. Roughly generalized, one could say that a high level of awareness on the part of the city administration indicates a good foundation for environmentally sound decisions. On the other hand, pronounced activity by citizens could be a sign of current environmental problems.

4.1 Municipal Administration

Municipal purchasing, general regulations and recommendations in, e.g., the traffic department, are important aspects and should be given special attention. “We should, in our daily work, include environmental aspects in the decision-making and activities where we can have an influence. Many of us can in, our professions, make a positive impact in the environment” (Larsson 1995). Not only production development but also other planning should be infiltrated with life-cycle-sustainability attitudes. This may concern new processing techniques, location selection for new plants or buildings or the choice of transportation. It should also concern, e.g., the purchase of new interiors in offices and magazines and new equipment such as computers, copiers, heaters and ventilation as well as paper and light bulbs. Increasing environmental awareness is of assistance in the realization of an ecologically sustainable way of life. The target is to enhance environmental awareness in personal choices, attitudes and the decisions of both the citizenry and officers and organizations, and in that way influence the development of a city. Politicians, officers, employees of corporations and citizens alike should be conscious of the status of environmental morale in their city.

4.2 City Inhabitants

Awareness on the part of inhabitants is linked with the possibilities of obtaining information on the environment. The field of environmental education is divided into four interacting fields of activity: training, education, guidance and information.

Kindergartens represent important targets in addition to schools (all levels) and adult education. The reviewer should ascertain whether or not the city has organized environmental education in the city.

It is recommended that the availability of environmental data concerning the city area and the environmental awareness of inhabitants be measured (e.g., by poll-related research) during the audit process.

Glossary

Audit

Review or investigation to check whether the (environmental) issues are properly taken care of as compared to pre-determined criteria.

Audit criteria

Policies, practices, procedures or requirements against which the auditor compares collected audit data (evidence).

Audit findings

The essential results of the audit. Audit findings should be reported in relation to environmental criteria and used in such a manner that the correction process can be initiated.

Audit of environmental performance

Part of the MEA process by which the adequacy of the city's environmental management system is measured and assessed.

Audit team

Group of auditors to perform a given audit; the audit team may also include technical experts and auditor(s)-in-training.

Auditee

Organization, unit or person to be audited.

Auditor

Person qualified to perform environmental audits. It is expedient that the auditors are independent of the activities being audited.

Best Available Technology

The latest stage of development of processes, facilities or methods of operation which indicate the practical suitability of a particular measure for limiting discharges.

Best Environmental Practise

Application of the most appropriate combination of measures to control and minimize pollution caused by discharges.

Checklists

Tool for the auditor in Baltic MEA in order to facilitate the state of monitoring. The checklists, found in the MEA Workbook, also provide a quick way to check that all important aspects have been dealt with and to complete an overview for the audit report.

Commitment

Vital condition of carrying out an audit and of implementing improvements based to the audit findings. For ensuring better environmental performance, the commitment and leadership of the city top management are crucial.

Continual improvement

Process of improving the environmental performance in line with the organization's environmental policy.

Direct effects - service effects

Direct effects (energy consumption, water consumption, emissions to air, solid wastes, etc.) are caused or influenced directly by the city and they are easily measurable. Service effects are less easily measurable 'indirect' environmental effects and they are always results of an activity or service the city provides.

Environmental Audit

A management tool comprising a systematic, documented, periodic and objective evaluation of the performance of the organization, management system and equipment, designed to protect the environment.

Environmental effect

Any effect on the environment, whether adverse or beneficial, resulting directly or indirectly from the activities, products or services of the organization or unit in question.

Environmental Management System

Part of the overall management system which includes the organizational structure, responsibilities, practices, procedures, processes and resources for determining and implementing environmental policy.

Environmental Performance

The ability of a city to take care of environmental issues.

Environmental Policy

A written statement of the municipality's overall aims and principles of action with respect to the environment.

Environmental Programme

A description of the objectives and activities of the municipality designed to ensure greater protection of the environment within the city area.

Environmental Review

An initial comprehensive analysis of the environmental issues, impacts and performance of a city. It is the first section, as worked out in the MEA process by which the state of the environment as well as the environmental effects within the city area are reviewed and documented.

Environmental Statement

A public document that the Eco-management and Audit Scheme requires the local authority to produce to report on the environmental performance of the operational unit. In the MEA model, this statement is expected to be published as a result of each audit.

MPC

Maximum permissible concentration of an environmental pollutant.

Operational unit

The city as a whole or any department, division, section, defined service function or area of activity (such as economic development services or personnel). In the MEA model, that which is usually dealt with relates to issues concerning the whole city, and operational units are considered as departments or areal sections of the city.

Polluter Pays Principle

The cost of preventing and repairing environmental damage should be borne by the polluter.

Precautionary Principle

Principle of taking preventative measures when there is reason to assume that discharged substances or introduced energy—directly or indirectly—may create hazards to human health or to the surrounding environment, even when there is no conclusive evidence of a causal relationship between inputs and their effects.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Validation

The stage of the audit process in which the activities of the operational unit are checked by an external person or organization to ensure that they meet the requirements of the scheme. In the Baltic MEA model, validation is completed by the validation committee set up by the UBC together with HELCOM.

Worksheets

Tool for the auditor in order to identify existing environmental management systems and to evaluate environmental performance. Found in the MEA Workbook.

ABBREVIATIONS

BAT	<i>Best Available Technology</i>
BEP	<i>Best Environmental Practise</i>
EIA	<i>Environmental Impact Assessment</i>
EMAS	<i>Eco Management and Audit Scheme</i>
EMS	<i>Environmental Management System</i>
HELCOM	<i>Baltic Marine Environment Protection Commission - Helsinki Commission</i>
ISO	<i>International Organization for Standardization</i>
JCP	<i>The Baltic Sea Joint Comprehensive Environmental Action Programme (by HELCOM)</i>
MPC	<i>Maximum Permissible Concentration</i>
NGO	<i>Non-Governmental Organization</i>
PITF	<i>Programme Implementation Task Force (by HELCOM)</i>
PP	<i>Precautionary Principle</i>
PPP	<i>Polluter Pays Principle</i>
UBC	<i>Union of the Baltic Cities</i>
WHO	<i>World Health Organization</i>

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