



## Ranking environmental aspects in environmental management systems: A new method tested on local authorities

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### ARTICLE INFO

#### Article history:

Received 8 May 2009

Accepted 28 October 2009

Available online 2 December 2009

#### Keywords:

ISO 14001

EMAS

Significance

Local authorities

Environmental aspect

Environmental management system

### ABSTRACT

A new method is described to determine and to rank the significance of the environmental aspects of a local authority, as a basis for the implementation of an environmental management system (EMS). The method is especially important as for the requirements of the EU “Environmental Management and Audit Scheme” (EMAS), a standard open to all sectors including public authorities.

The method has been applied to the Municipalities of Faenza (a large town with 54,000 inhabitants) and of the small towns of Riolo Terme, Brisighella, Casola Valsenio (RA, Italy), which obtained or are on the way to get the EMAS certification.

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### 1. Introduction

In 2001, the European Union (EU) extended the Eco-Management and Audit Scheme (EMAS), which was originally intended for companies to evaluate, report and improve their environmental performance, to all economic sectors including public and private services. In particular, local councils at the Municipality level can enter the certification process (Clausen et al., 2002). Since this revision (Regulation EC 761/2001, 2001, updated by Regulation EC 196/2006), nicknamed EMAS-II, many local authorities in Italy and Europe have started to develop environmental management systems, as a tool for making the organization more environmentally proactive and efficient (Emilsson and Hjelm, 2002). Today the public administration sector is one of the fastest growing sectors as regards to EMAS implementation (European Commission – DG Environment website, 2008). A third revision of the EMAS regulation has been agreed by the Council and the European Parliament on April 2, 2009 and will probably be adopted by the end of 2009; it won't carry forwards relevant changes in the evaluation of significance, but it will introduce important novelties in the use of indicators.

The purpose of this paper is to introduce a new method for assessing the significance of environmental aspects, based on principles of transparency and consistency. The proposed method is clear, well defined and reproducible.

It has been defined so that it takes into account both environmental issues and management ones.

This method is particularly recommended for local authorities because it offers a good assortment of choices in the evaluation of the control exerted on the environmental aspects, often share with other public or private institutions. Moreover, the proposed method is structured according to the principles of “expert systems”, which already include a knowledge-base and can therefore be used by people not expert in the specific domain; in this case, the “environmental knowledge” is already embedded in the method itself and therefore is not required from the users.

Although the method has been defined for and tested with local authorities, it could be easily applied in other contexts.

#### 1.1. Environmental management systems

An environmental management system (EMS) includes the environmental dimension within the management structure and is aimed at improving the environmental performance of the organization; it is a method of incorporating environmental care throughout the corporate structure (Perotto et al., 2008). In a continuous process, organizations commit themselves to evaluate their environmental impact and to set targets for improvement.

Various EMS, particularly the EMAS regulation and the ISO14001 scheme (International Standard Organization, ISO 14001, 1996/2004) are based on the plan-do-check-act (PDCA) methodology (Ridolfi et al., 2008; Vazzana et al., 2004; Deming, 1986; Marazza, 2007). The PDCA cycle is known as Deming cycle, from the industry consultant W. Edwards Deming who proposed it for continuous improvement of total quality management (UNC-Chapel Hill, 2003). Through the repetition of the cycle, the EMS is to achieve continuous improvement

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over time, which is a basic concept for all management systems. The PDCA cycle can be summarized as follows:

- P (PLAN): plan activities according to priorities, define policies, goals, targets, rules;
- D (DO): implement the planning under the chosen rules;
- C (CHECK): verify the results;
- A (ACT): review priorities, goals, targets and, in case, policies and rules.

### 1.2. EMS in local authorities

Local authorities present some unique features that have to be considered when structuring an EMS suitable for them (Lozano and Vallés, 2007):

- Local authorities have a considerable number of different duties: schools, waste disposal, road maintenance, law enforcement, planning, fire brigade, procurement, leisure and many more. The indirect aspects often prevail over the direct ones, and their assessment is a complex and tedious matter, which may call for intense considerations and professional help from consultants and universities (Ridolfi et al., 2008; European Commission – DG Environment website, 2008; Lozano and Vallés, 2007). It is not always easy to classify an aspect as direct or indirect, for there are many cases of shared responsibility.
- Local authorities act over a whole territory, not only on their own premises; they have an important institutional role on environmental communication, and have the possibility to address the companies located in the area towards some sustainability commitment (Casale, 2005).
- The stakeholders are not limited to clients, providers or neighbours, but include the whole community living in the territory administered by the authority. Moreover, while the clients of a company can change their providers if they are not satisfied with the product, the people living in a Municipality can choose, by voting, the ruling party, but have little other possibilities, apart from moving somewhere else, if they are not satisfied with the administration.
- While a local authority can attain continuous improvement of its environmental performance just as a private company, there are some differences as to the obtainable benefits, which usually are long-term and spread out to the whole community in terms of economical, environmental and social consequences.
- The motivations for developing an EMS in a local administration often imply the desire to set an example for other organizations and to have a positive outcome in the territory (Clausen et al., 2002).
- Concerning Municipalities, a large majority have a small number of inhabitants (in Italy, 72% have less than 5000 inhab. (ISTAT, 2001)). It can be easily inferred that these Municipalities also have a small number of employees (probably under 10 people). This very likely implies a lack in environmental professionals and in scientific skills.

As remarked in the Introduction, the public administration sector is one of the fastest growing sectors as regards to EMAS application. The above considerations, together with this growing trend and the high number of local authorities in Europe suggest that a method for assessing environmental significance specifically tailored on the needs of Municipalities could be very useful and be broadly diffused.

### 1.3. Environmental aspects

A very important step in order to implement an EMS is the setting of priorities in order to plan the improvement activities. Therefore, the

organization has to identify its environmental aspects and assess their significance through the environmental management system.

Article 3.1 of Annex I-A of the EMAS regulation states that: “The organization shall establish, implement and maintain a procedure(s)

- a) to identify the environmental aspects of its activities, products and services within the defined scope of the environmental management system that it can control and those that it can influence taking into account planned or new developments, or new or modified activities, products and services, and
- b) to determine those aspects that have or can have significant impact(s) on the environment (i.e. significant environmental aspects).

The organization shall document this information and keep it up to date.”

It is therefore crucial to define criteria, thresholds and categories in order to provide a reference scale for the significance.

According to the EMAS-II regulation, an *environmental aspect* is an element of an organization's activities, products or services that can interact with the environment. A specific activity ‘a’, managed by the organization, can generate one or more environmental aspects ‘e’ (e.g. emissions, wastes, energy or matter consumption), generating in turn one or more impacts ‘i’ in the environmental domains (atmosphere, biosphere, hydrosphere and lithosphere):

$$a_i \rightarrow e_{ij} \rightarrow i_{ijk}$$

where the indices refers to the activity (i), the environmental aspect (j), and the impact (k).

As an example, the heating of the buildings of the organization (activity) generates fuel consumption and emissions into the atmosphere (aspects), which affect public health and the standing stock of natural resources (impacts).

The EMAS-II regulation distinguishes between direct and indirect environmental aspects. The former are defined as those over which the organization has management control; the latter as aspects over which it may not have full management control or that involve other parties.

Both kinds should be evaluated in normal, start-up, shut-down and emergency conditions. The Annex VI of the Regulation lists some examples of direct and indirect aspects. Direct aspects may include emissions to air, releases to water, avoidance, recycling, reuse, transportation and disposal of solid and other wastes, particularly hazardous wastes, use and contamination of land, use of natural resources and raw materials (including energy), local issues (noise, vibration, odour, dust, visual appearance, etc.), transport issues (both for goods and services and for employees), risks of environmental accidents and impacts arising, or likely to arise, as consequences of incidents, accidents and potential emergency situations.

Indirect aspects may include product-related issues (design, development, packaging, transportation, use and waste recovery/disposal), capital investments, granting loans and insurance services, new markets, choice and composition of services (e.g. transport or the catering trade), administrative and planning decisions, product range compositions, the environmental performance and practices of contractors, subcontractors and suppliers.

If the organization willing to implement an EMS is a public administration, the distinction between direct and indirect aspects may not be easy to assess (EURO-EMAS, 2001). This problem, and a proposed solution, will be discussed in this paper.

### 1.4. Significance

Annex VI of the EMAS-II Regulation states that “An organization shall consider all environmental aspects of its activities, products and services and decide, on the basis of criteria taking into account the

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