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Assessment of environmental aspects and determination of environmental targets within environmental management systems (EMS) – development of a procedure for Volkswagen

Marko Gernuks [a,*], Jens Buchgeister [b], Liselotte Schebek [b]

[a] Volkswagen AG, Letter box 011/1774, 38436 Wolfsburg, Germany
[b] Forschungszentrum Karlsruhe, Hermann-von-Helmholtz-Platz1, 76344 Eggenstein-Leopoldshafen, Germany

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Abstract

Since the revision of EMAS (EMAS II), a central role within this EU-regulated environmental management system has been assigned to the assessment of significant environmental aspects as the basis for identification of an organisation's environmental targets. However, EMAS only provides some general guidelines on the assessment of environmental aspects. To comply with the requirements of EMAS II, Volkswagen AG initiated the development of a comprehensive systematic approach which is now to be applied throughout Volkswagen's production sites. This article describes the elements of this approach. A methodological section discusses issues concerning the scientific assessment of environmental aspects, taking into account reproducibility, scientific acceptance and geographical representativeness of existing methods as well as time consumption and understandability for decision-makers. In addition, practical procedures to define environmental targets were worked out during two audits of Volkswagen's production sites, focusing on collaborative workshops with environmental experts, process experts and decision-makers to identify production-integrated improvements and enhance environmental sensitivity throughout the company.

Keywords: Environmental management system; EMAS; Environmental aspects; Environmental targets; Assessment methods

1. Introduction

1.1. Problem description

Eco-Management and Audit Scheme (EMAS) is the EU framework for an environmental management system (EMS), in which organisations can participate voluntarily [1]. In 2001, EMAS was revised (EMAS II) and since that time it has incorporated all requirements of the international standard ISO 14001 for environmental management systems. A main difference of EMAS in comparison to ISO 14001 is the environmental statement, which must be published annually [2].

Continuous improvement of the environmental performance may be considered the central objective of EMAS. Previously, organisations had been unclear as to which aspects should be improved [3]. Since the EMAS revision, a central role within the EMS has been assigned to the environmental aspects of an organisation [4]. According to EMAS, "[…] a significant environmental aspect is an aspect that causes a significant environmental impact […]". The revised EMAS guidelines outline that the significant environmental aspects should be the basis for the organisation's environmental targets. This approach ensures that organisations focus on their actual impacts on the environment when they determine environmental targets [1], enabling efficient improvement of their environmental performance (ecological success) to be achieved [5].

However, EMAS does not provide a method of assessing the environmental aspects with regard to their environmental

* Corresponding author. Tel.: +49 5361 972800; fax: +49 5361 9 57 72800.
E-mail address: marko.gernuks@volkswagen.de (M. Gernuks).

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impact, but only some general guidelines: "[…] It is the responsibility of the organisation to define criteria for assessing the significance of the environmental aspects. These criteria […] shall be comprehensive, capable of independent checking and reproducible […]". According to EMAS, these criteria may include issues such as data about material and energy flows, views of interested parties or information about the condition of the environment.

Given the specified focus on environmental impact and the broad freedom of action to define criteria, it may be expected that organisations face a considerable problem, as their environmental managers are usually not experts in environmental impact assessments, but focus on legal compliance and the organisations' internal processes. This is supported by Zobel and Burman [6], who found that only few organisations consider environmental impacts in the context of environmental management systems. From our discussions with EMAS reviewers we noticed that organisations most often use their own criteria in a qualitative manner to assess environmental aspects, whereby the significance of environmental impacts is not considered.

Moreover, it appears difficult for companies to relate the process of determining environmental targets to the significant environmental aspects [7]. No systematic approach to defining environmental targets on the basis of the significant environmental aspects is provided by EMAS.

1.2. Starting point at Volkswagen

In 1995, Volkswagen's production site in Emden/Germany was the first automotive plant in Europe to have its environmental management system validated in compliance with EMAS. Volkswagen's Eco Audit Team had been founded within the department of environmental planning two years earlier, in 1993. According to the profile of this department, the Eco Audit Team focuses on environmental topics affecting the production sites. The team designed concepts for the implementation of environmental management systems (EMS) according to EMAS at Volkswagen's production sites.

The EMS of Volkswagen is documented in a specific manual for each production site. Environmental issues that affect the Volkswagen brand as a whole are outlined in a further environmental manual for the Volkswagen brand. In addition, a separate environmental management system according to ISO 14001 exists at Volkswagen's research and development department, dealing with product-related environmental issues.

Currently, the Eco Audit Team supports Volkswagen's production sites in performing environmental audits and preparing environmental statements as well as in realising new demands within the framework of EMAS.

In 2001, Volkswagen's Eco Audit Team initiated a research project to accomplish the aforementioned requirements of EMAS II. During this project, one of us accompanied Volkswagen's Eco Audit Team, developing the elements of a comprehensive approach as well as evaluating the procedure during the course of two audits at Volkswagen's production sites.

1.3. Aim of the project

The overall aim was to develop a systematic, verifiable and reproducible approach to comply with the revised EMAS scheme. This approach was to comprise the assessment of environmental impacts to identify significant environmental aspects, as well as the definition of environmental targets for the company's production sites. In accordance with Volkswagen's Eco Audit Team's area of responsibility, the focus was to lie on production-related environmental aspects and environmental targets. The approach was to meet practical limitations of time and cost efforts in order to be introduced as standard throughout all Volkswagen's production sites.

When assessing environmental impacts, different requirements must be considered compared to the task of defining environmental targets.

With regard to environmental impacts, the approach must be based on current scientific knowledge of environmental problems in order to be reliable and accepted. Assessment of environmental impacts and the resulting identification of significant environmental aspects should be carried out in a quantitative manner as far as possible. Quantitative evaluations have good reproducibility and verifiability and are appropriate for setting priorities in the following step of determining environmental targets. As a consequence, the part of the procedure that addresses significant environmental aspects should focus on scientific models for the quantitative assessment of environmental impacts. To reach this objective, we decided to evaluate a variety of existing methods for quantitative environmental impact assessment with regard to their appropriateness for assessing environmental aspects within the framework of EMAS.

In determination of environmental targets, on the other hand, the main requirement is the connection to the internal technical know-how of Volkswagen's production sites. It thus appears essential to integrate decision-makers and technical experts into the process of determining environmental targets. In addition to identification of environmental targets for one period of EMAS, a further benefit may be expected from the involvement of employees, generating increased sensitivity to environmental problems within the whole company. The main objective of the part of the procedure that addresses environmental targets, therefore, is the integration of relevant departments and their technical experts. To meet this objective, as part of the methodological development one of us joined Volkswagen's Eco Audit Team and took part in the internal environmental audits. This enabled both the needs of the Eco Audit Team and the demands of the Volkswagen production sites' employees involved to be taken into consideration.

2. Assessment of environmental aspects

2.1. Selection of environmental aspects

Based on the EMAS guidelines, an organisation first has to identify environmental aspects which can be controlled or