Life Cycle Management (Subject Editor: Gerald Rebitzer)


Elisabeth Hochschorner1,2* and Göran Finnveden1,3

1 Environmental Strategies Research – fms, Dept. of Infrastructure, Royal Institute of Technology (KTH), 100 44 Stockholm, Sweden
2 Industrial Ecology, Dept. of Chemical Engineering, Royal Institute of Technology (KTH), 100 44 Stockholm, Sweden
3 Swedish Defence Research Agency, Stockholm, Sweden

* Corresponding author (elisabeth.hochschorner@infra.kth.se)

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Abstract

Goal, Scope and Background. Procurement in public and non-public organisations has the potential to influence product development towards more environmentally friendly products. This article focuses on public procurement with procurement in Swedish defence as a special case. In 2003, public procurement in Sweden was 28% of the GDP. In the Swedish defence sector the amount was 2% of the GDP. The total emissions from the sector were of the same order of magnitude as from waste treatment (2% of Sweden's emissions). According to an appropriation letter from the Ministry of Defence in 1998, the Swedish Armed Forces (SAF) and the Swedish Defence Materiel Administration (FMV) are required to take environmental issues into consideration during the entire process of acquiring defence materiel. Environmental aspects are considered today, but without a life-cycle perspective.

The aims of this article are to recommend suitable tools for taking environmental concerns into account, considering a product's life-cycle, in the procurement process for defence materiel in Sweden; to make suggestions for how these tools could be used in the acquisition process; and to evaluate these suggestions through interviews with actors in the acquisition process. The procurement process does not include aspects specific to Swedish defence, and it is therefore likely to be comparable to processes in other countries.

Methods. The method involved a study of current literature and interviews with various actors in the acquisition process. The life cycle methods considered were Quantitative Life Cycle Assessments, a simplified LCA-method called the MECO method and Life Cycle Costing (LCC).

Results and Discussion. Methodology recommendations for quantitative LCA and simplified LCA are presented in the article, as well as suggestions on how to integrate LCA methods in the acquisition process. We identified four areas for use for LCA in the acquisition process: to learn about environmental aspects of the product; to fulfill requirements from customers; to set environmental requirements and to choose between alternatives. Therefore, tools such as LCAs are useful in several steps in the acquisition process.

Conclusion. From the interviews, it became clear that the actors in the acquisition process think that environmental aspects should be included early in the process. The actors are interested in using LCA methods, but there is a need for an initiative from one or several of them if the method is to be used regularly in the process. Environmental and acquisition issues are handled with very little interaction in the controlling and ordering organisation. An integration of environmental and acquisition parts in these organisations is probably needed in order to integrate environmental aspects in general and life-cycle thinking in particular. Other difficulties identified are costs and time constraints.

Recommendation and Perspective. In order to include the most significant aspects when procuring materiel, it is important to consider the whole life-cycle of the products. Our major recommendation is that the defence sector should work systematically through different product groups. For each product group, quantitative, traditional LCAs or simplified LCAs (in this case modified MECOs) should be performed for reference products within each product group. The results should be an identification of critical aspects in the life-cycles of the products. The studies will also form a database that can be used when making new LCAs. This knowledge should then be used when writing specifications of what to procure and setting criteria for procurement. The reports should be publicly available to allow reviews and discussions of results. To make the work more cost-effective, international co-operation should be sought. In addition, LCAs can also be performed as an integrated part of the acquisition process in specific cases.

Keywords: Acquisition; defence materiel; integrated product policy; life cycle costing (LCC); life cycle management (LCM); MECO-method (simplified LCA-method); public procurement

Introduction

Most products in society generate environmental impacts in all phases of their life-cycle, as they consume raw materials and energy, release emissions and produce waste. In some countries there is a statutory responsibility for producers to prevent environmental impacts from certain products. Nevertheless their customers, e.g. the procuring organisation, can be a considerable driving force for more environmentally friendly products through their choice of and requirements for products. By requiring that products meet certain environmental criteria the procuring organisation has the opportunity to influence products so that they are more environmentally friendly. However, a number of obstacles make it difficult for procurement to happen in a way that exerts environmentally friendly influences. For example, environmental requirements in public procurement are not always stipulated (Swedish EPA 2005, Jonsson 2004) or formulated in a sufficient way (Faith-Ell 2005, Jonsson 2004). The pos-
sibility of taking environmental issues into consideration when procuring materiel can be limited by lack of reliable information about the environmental characteristics of the product or service (OECD 2000). Different types of tools can contribute some knowledge and thereby facilitate the choice of environmentally preferable products, e.g. eco-labels, guidelines, checklists and tools for environmental assessment. When stipulating environmental requirements it is important to have a life-cycle perspective, in order not to miss essential aspects in the life of products (e.g. COM 2001a, 2003). Therefore, it is important that the supporting tool also has a life-cycle perspective. It is stated in COM (2003) that Life Cycle Assessments (LCAs) are important support tools since they are the best (currently available) frameworks for assessing environmental impacts from products.

Use of LCA-based approaches in procurement is limited today (Baumann and Tillman 2004) and there are few publications on LCA and procurement, and even fewer on LCA and public procurement. The current scientific literature on environmental procurement mostly covers marketing, such as environmental labelling (e.g. Baldo et al. 2002), or use of environmental management systems (Chen 2005). The present paper contributes new aspects to the current scientific literature, since the focus is the use of Life Cycle Assessments in public procurement, with procurement in Swedish defence as a special case. The considered procurement process does not include aspects specific to Swedish defence, and therefore it is likely to be comparable to processes in other countries. In 2003, public procurement in Sweden was 28% of the GDP (SCB 2004). In the Swedish defence sector the amount was 2% of the GDP (Finnveden et al. 2002). The total emissions (direct and indirect emissions) from the sector were of the same order of magnitude as from waste treatment (2% of Sweden's emissions) (Finnveden et al. 2002, Finnveden et al. 2005). This illustrates that military procurement deserves to be taken as seriously as an environmental impact as waste treatment.

Today the environmental demands on all activities in society are increasing; the defence sector is not an exception. In Sweden, environmental demands on the defence sector, for example, are given in the sectoral responsibility and appropriation letters from the Government. There is a rising need to evaluate and to limit the effects that defence activities and materiels used in defence have on the environment. Defence materiel covers a wide range of different products, such as plants, animals, food, refrigerators, office supplies, computers, medicine, tools, engines, GPS, ammunition, furniture, clothes, chemicals, vehicles, aeroplanes, ships, boats, and tanks. The materiel includes both products developed especially for defence purposes (e.g. ammunition, tanks) and products used in other sectors (e.g. computers, tools). For the first type of product, the actual production process is sometimes a part of the acquisition process and is carried out in dialogue with the defence authorities and the industry. Working with environmental issues of defence materiel sometimes provokes reactions. However, it can be noted that for some products, e.g. ammunition, only about 5% of these products are actually used during practice in Sweden (Hägvall, pers. comm.). The remaining 95% are sent for destruction after storage. According to an appropriation letter from the Ministry of Defence in 1998, the Swedish Armed Forces (SAF) and the Swedish Defence Materiel Administration (FMV) are required to take environmental considerations into account during the whole process of acquiring defence materiel (SAF 2001). Environmental aspects are considered today, but without a life-cycle perspective. The importance of taking environmental issues with a life-cycle perspective into consideration, however, has been stressed by both SAF and FMV.

This article presents a part of a larger project. The overall aim of the project is to make suggestions on how to give consideration to environmental matters with a life-cycle perspective in the acquisition process of defence materiel in Sweden. Various parts of the project have been to: review and analyse simplified tools for taking environmental considerations into account (Byggeth and Hochschorner 2005); compare and evaluate methods for simplified Life Cycle Assessment (Hochschorner and Finnveden 2003a); and to make an LCA study of a military materiel (Hochschorner et al. 2005). The work presented here considers the last three parts of the project: to recommend suitable tools for environmentally preferable procurement of defence materiel in Sweden; to make suggestions for how these tools could be used in the acquisition process; and to evaluate these suggestions through dialogue with actors in the acquisition process.

Terminology. In the literature the terms acquisition, procurement and purchasing are used. The term 'acquisition process' is used here to describe the process of acquiring defence materiel. This process includes a phase called 'procurement'. 'Procurement' is used to describe the phase in the acquisition process where the materiel is bought (where 'materiel' is materiels, services and equipment) and also as a more general term than acquisition. In order to distinguish between the different terms, the term purchasing is omitted here.

1 Study Method

The method consisted of literature studies and interviews with different actors in the acquisition process. Literature studies included literature on public procurement, procurement in defence, and literature on strategies for integrating environmental considerations into procurement. Based on a study of the literature, a preliminary suggestion on how to integrate environmental considerations with a life-cycle perspective in the Swedish defence was made (Hochschorner and Finnveden 2003b). Interviews were carried out with personnel from environmental and/or procurement units at the Ministry of Defence, SAF, FMV and three defence industries, in order to evaluate our preliminary suggestions and to better understand their roles in the acquisition process. The interview questions are included in Hochschorner and Finnveden (2004). The interviews led us to our final proposals, presented in this article. For the final suggestions, experiences from the LCA study on a military product were also used in the process. The LCA study was done on a pre-fragmented high explosive shell grenade, using both a traditional quantitative LCA and a simplified LCA. The results are presented in Hochschorner et al. (2005).