

Section Life Cycle Management

Editorial: Life Cycle Costing (LCC)

Life Cycle Costing – Paving the Road to Sustainable Development?

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Life Cycle Management (LCM) is a business toolbox involved in product- and firm-based decision-making (Rowledge et al. 1999). It is complementary to existing management structures and sits at the finance-technology-environment interface. The assessments involved in LCM are both quantitative and qualitative, the former often reducible to quantifiable indicators (see e.g., Hunkeler and Biswas 2000), as is the norm in, for example, accounting. LCM, therefore, aims at integrating environmental concerns into industrial and business operations by considering off-site, or supply chain, impacts and costs. LCM seeks to increase the competitiveness of new, and existing, products by examining advantages, and business risks, associated with the environmental and social aspects of a product, throughout its life cycle. Therefore, LCM can be seen as a means of putting sustainable development to work within a firm, given its temporal and financial constraints.

In the aforementioned context cost management plays a crucial role. As an example, one could pose the questions 'What does General Motors make, what does IBM provide?'. The answers invariably involve the provision of products and services, but also (or mainly?) money.

Environmental considerations are often viewed as obstacles to business development, particularly in the very short term. This is where the concept of life cycle costing (LCC) emerges. In the editors' view, one that is, in part, derived from discussions in international working groups relating to LCM, LCC is an essential link for connecting environmental concerns with core business strategies. An example where LCC integrates economics and the environment are the tradable permits that are part of the Kyoto protocol. Other examples include the implementation of Design for Environment (DfE) and Integrated Product Policy (IPP) within companies and along supply chains. Here, synergies between the environmental and economic considerations have to be utilized in order to move towards sustainable development.

There are several definitions of life cycle costing. The definition of Blanchard and Fabrycky (1998) may serve as a common basis: "Life-cycle cost refers to all costs associated with the system as applied to the defined life cycle". This seems consistent with SETAC's definition of life cycle management (Hunkeler et al. 2003). As in life cycle assessment (LCA) the systems approach is the core concept of LCC (see e.g., Rebitzer 2002). It is well known that costs and revenues (Ehrlenspiel 1985) as well as the environmental impacts of products (Keoleian 1996) are determined to a high percentage in the design phase. However, in many instances business practices have sufficiently short perspectives which limit

the time, resources, or experience to consider costs outside of the company's gate, for example regarding usage and disposal of a product. With LCC being a major component of the new LCM section in the Int J LCA (Heinrich and Klöpffer 2002) we, the editors, hope to be able to contribute a little share to the further proliferation and implementation of LCC ideas and practices, together with other ongoing activities as the new SETAC Working Group on life cycle costing (see Rebitzer and Seuring, p. 110–111 in this issue).

LCC challenges business management to incorporate environmental management into manufacturing and sales planning and to interact with academia, governmental organizations, NGOs and local interest groups to achieve business, environmental, and social advantages (as described e.g., in Fussler 1996). In short, LCC may be a means to move the environment from an indirect cost in the environmental health and safety (EHS) units of the actors in the value chain to considerations as a direct, manufacturing, and liability issue, and, under appropriate conditions, an asset.

The editors see LCC, apart from specific definitions and methods, as a broad term, encompassing cost management methods which attempt to integrate costing issues going beyond the traditional cost management and accounting practices (see Table 1) in order to implement more sustainable business practices. The terminology in the field of LCM/LCC, however, is not uniform, with various disciplines using different terms for similar problems or vice versa. For instance, the term life cycle might be referred to as the physical life cycle as in LCA (ISO 14040) or the economic life cycle consisting of the market introduction-, growth-, and market saturation phases, etc. as it is commonly used in product planning (Brankamp 1996). Furthermore, the DfE, LCA, Industrial Ecology (see Ehrenfeld, Editorial, p. 59 in this issue), and Pollution Prevention communities, while having significant common interests, seldom interact in a synergistic way. We see this as an opportunity for the LCM section of this journal, together with the purely Internet-based Gate to EHS¹, to stimulate discussions, exchanges between the disciplines and the creation of new ideas and concepts.

This combination of a classical 'paper journal' with an extended Internet platform (Web edition of the Int J LCA² and the Gate to EHS) is an excellent venue for a multidisciplinary field such as LCM for publishing up-to-date information, cutting edge research results, case studies, and comprehensive

¹ www.scientificjournals.com/ehs/² www.scientificjournals.com/webitions/lca/

background information. Keyword searches by topic and author are possible for both publication forms in one combined database.

Table 1 lists the content we envisage in the area of LCC for the LCM section, though this is doubtless to change and expand in response to user, and author, input.

Table 1: Scope LCC topics

Principle Themes for Peer-Reviewed Publications	Specific Current Topics	Alternative Forms
Indicators	Updates on Intern. Working Groups	Editorials
Input/Output	EU Project Updates	Literature
Methodologies	National Project Updates	Reviews
Activity Based Costing	University/ Laboratory Profiles	Case Studies
Life Cycle Costing	Conference Reports	Commentaries
Total Cost Assessment	Theses	Terminology
Full Cost Accounting (related to external costs)		Internet Links
Relation to other LCM Tools		

We believe that the LCM toolbox, of which LCC is an important part, will be required in new product development, product introduction, supply chain negotiation, environmental product declarations, and cost reduction. A full accounting of the indirect costs which often dominate businesses is good for the bottom line, provides competitive advantages, lowers credit risks, and enhances image. With this vision we would like to invite you to share your expertise, your experiences, but also your views on these topics in this journal.

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Life Cycle Costing: A New SETAC Europe Working Group

Methodology and Application of Life Cycle Costing

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1 Background

Life cycle management (LCM) is a business driven approach including both environmental and economic aspects (Hunkeler et al. 2003). Furthermore, deliberations of the previous SETAC Working Group on LCM, and others, have shown that conventional cost accounting and management has its limits when assessing costs and revenues over the life cycle of a product. Therefore, methods are necessary that can integrate existing financial data and specifically cost information with metrics in life cycle approaches (in the following such methods are summarized under the term life cycle costing – LCC). At present, there is neither scientific nor procedural agreement between the various stakeholders

regarding terminology, methodology, data formats, reporting, etc (James 2002). Therefore, there is a need to develop the methodological background of and application procedures for LCC. In addition, LCA and LCC, when carried out in an integrated manner and from a systems perspective (as in Rebitzer 2002), have a high potential for moving industrial practice towards sustainable development. For further background on the motivation for and potentials of life cycle costing methodology and practice as well as what is encompassed by this concept (see Hunkeler and Rebitzer 2003).

To tackle the aforementioned challenges, a new SETAC Europe Working (WG) on the topic of life cycle costing was launched at the end of 2002.