

JOURNAL OF
INDUSTRIAL ECOLOGY

中文摘要
《产业生态学报》
第1卷第1期

Chinese Abstracts
Journal of Industrial Ecology
Volume 1, Number 1

翻译
施涵

Translated by
Shi Han

《产业生态学报》

1997年冬, 第1卷第1期, 13-36页

题目: 铅和电动汽车的产业生态学

作者: Robert Socolow, Valerie Thomas

关键字: 汽车技术, 电池, 电动汽车, 产业生态学, 铅, 含铅汽油

摘要: 铅电池有可能成为第一种管理含有害材料从而使其环境达标的产品。产业生态学工具可以用来识别一个理想的铅电池再循环系统必须满足的关键标准: 最大可能地再循环使用后的铅电池, 尽量减少向环境管理体系薄弱的国家出口废旧电池, 尽量减少对住在铅再加工设施附近居民健康的影响, 对从事铅再加工的职工给予最大的保护。一个著名的对电动汽车的风险分析有一些误导, 因为该研究将铅电池和汽油的含铅添加剂同等对待, 并且暗示放弃使用含铅电池。含铅汽油中的铅是耗散性的, 因而铅的排放无法有效控制, 所以环境管理目标应该是淘汰其使用, 而且也这样做了。但在铅电池的充放电过程中, 铅是完全固定的, 显然电池中的铅是可以再循环的。所以对于铅电池的环境管理目标应该定位在铅的清洁再循环。最近的一项发现——铅电池有可能为几种双燃料汽车提供峰值动力——这极大地提高了认识目前和未来铅电池再循环水平的重要性。一个十分接近清洁再循环的管理系统是可能实现的。

Journal of Industrial Ecology

1997, Vol. 1, Issue 1, pp. 13-36

The Industrial Ecology of Lead and Electric Vehicles

Robert Socolow and Valerie Thomas

Keywords:

automotive technology, batteries, electric vehicles, industrial ecology, lead, leaded gasoline

Summary:

The lead battery has the potential to become one of the first examples of a hazardous product managed in an environmentally acceptable fashion. The tools of industrial ecology are helpful in identifying the key criteria that an ideal lead-battery recycling system must meet: maximal recovery of batteries after use, minimal export of used batteries to countries where environmental controls are weak, minimal impact on the health of communities near lead-processing facilities, and maximal worker protection from lead exposure in these facilities. A well-known risk analysis of electric vehicles is misguided, because it treats lead batteries and lead additives in gasoline on the same footing and implies that the lead battery should be abandoned. The use of lead additives in gasoline is a recyclable use, because the lead remains confined during cycles of discharge and recharge. Here, the goal should be clean recycling. The likelihood that the lead battery will provide peaking power for several kinds of hybrid vehicles--a role only recently identified--increases the importance of understanding the levels of performance achieved and achievable in battery recycling. A management system closely approaching clean recycling should be achievable.

《产业生态学报》

1997年冬, 第1卷第1期, 37-49页

题目: 生命周期评价: 从清单分析到影响评价的制约因素

作者: J. W. Owens

关键字: 生命周期清单, 生命周期评价 (LCA), 生命周期影响评价 (LCIA), 产品生命周期评价

摘要: 生命周期评价 (LCA) 是一个对产品从“摇篮到坟墓” (即从资源开采到产品生产和使用, 直至最终处置) 的整个过程开展系统分析的方法。LCA 是一个综合分析工具。清单分析阶段讨论系统在整个生命周期中的能量和物质输入流以及污染排放和废物输出流, 通常是以其质量形式表示。影响评价阶段则综合使用一系列定性和定量方法评估这些输入输出流的潜在环境影响。由于清单分析缺乏空间、时间、剂量—响应关系和阈值等方面的信息, 限制了影响评价的精确性。上述制约的严重程度相当大地受到所分析的环境问题和用来外推清单信息的模型类型的影响。LCA 分析结果对于处理下列两方面的问题特别有限: (1)当地的和/或者短期的生物物理过程, (2)涉及到生物参数的事物, 例如生物多样性、栖息地变化和毒性等。其结果是影响这种分析既不能衡量实际的影响程度, 也无法计算一种环境影响或者风险的可能性。相反, LCA 影响评价结果大多是示意性的环境指标。这些指标在用于指导决策前必须对其精确性和有用性进行具体评价。这大大限制了 LCA 作为综合评估和比较备选方案的基础方法的有效性。总之, LCA 可以系统地发现潜在的环境问题, 然而这些问题的解决则需要使用其他更有针对性的评价方法。

Journal of Industrial Ecology

1997, Vol. 1, Issue 1, pp. 37-49

Life-Cycle Assessment: Constraints on Moving from Inventory to Impact Assessment

J. W. Owens

Keywords:

life-cycle inventory, life-cycle assessment, life-cycle impact assessment, LCA, LCIA, product life-cycle assessment

Summary:

Life-cycle assessment (LCA) is a technique for systematically analyzing a product from cradle-to-grave, that is, from resource extraction through manufacture and use to disposal. LCA is a mixed or hybrid analytical system. An inventory phase analyzes system inputs of energy and materials along with outputs of emissions and wastes throughout life cycle, usually as quantitative mass loadings. An impact assessment phase then examines these loadings in light of potential environmental issues using a mixed spectrum of qualitative and quantitative methods. The constraints imposed by inventory's loss of spatial, temporal, dose-response, and threshold information raise concerns about the accuracy of impact assessment. The degree of constraint varies widely according to the environmental issue in question and models used to extrapolate the inventory data. LCA results may have limited value in two areas: (1) local and/or transient biophysical processes and (2) issues involving biological parameters, such as biodiversity, habitat alteration, and toxicity. The end result is that impact assessment does not measure actual effects of impacts, nor does it calculate the likelihood of an effect or risk. Rather, LCA impact assessment results are largely directional environmental indicators. The accuracy and usefulness of indicators need to be assessed individually and in a circumstance-specific manner prior to decision making. This limits LCA's usefulness as the sole basis for comprehensive assessments and the comparisons of alternatives. In conclusion, LCA may identify potential issues from a systemwide perspective, but more-focused assessments using other analytical techniques are often necessary to resolve the issues.

《产业生态学报》

1997年冬, 第1卷第1期, 67-79页

题目: 实践中的产业生态学: 卡伦堡企业合作关系的演变

作者: John Ehrenfeld, Nicholas Gertler

关键字: 生态工业园区, 绿色链接, 产业生态系统, 产业共生, 可持续发展岛, 卡伦堡

摘要: 在邻近的企业之间交换废物、副产品和能量是产业生态学理论的一项重要应用。本文研究了由于企业之间存在众多合作关系而被公认为“产业生态系统”或者“产业共生”的丹麦卡伦堡工业园区。本文介绍并分析了促使企业之间形成相互合作关系的动因, 其推动力主要是独立的经济行为。对照卡伦堡的经验, 文章还分析了其他可能的产业共生形式。卡伦堡生态产业园模式不一定能轻易地推广运用到新建的工业园区。

Journal of Industrial Ecology

1997, Vol. 1, Issue 1, pp. 67-79

Industrial Ecology in Practice: The Evolution of Interdependence at Kalundborg

[John Ehrenfeld](#) and [Nicholas Gertler](#)

Keywords:

[eco-industrial parks](#), [green twinning](#), [industrial ecosystems](#), [industrial symbiosis](#), [islands of sustainability](#), [Kalundborg](#)

Summary:

The exchange of wastes, by-products, and energy among closely situated firms is one of the distinctive features of the applications of industrial ecological principles. This article examines the industrial district at Kalundborg, Denmark, often labeled as an 'industrial ecosystem' or 'industrial symbiosis' because of the many links among the firms. The forces that led to its evolution and to the interdependencies are described and analyzed. Key has been a sequence of independent, economically driven actions. Other potential forms of industrial linkages are critically reviewed in the light of the Kalundborg experience. The evolutionary pattern followed at Kalundborg may not be easily transferable to greenfield developments.

《产业生态学报》

1997年冬, 第1卷第1期, 95-116页

题目: 荷兰的氯循环——第1部分: 综述

作者: Rene Kleijn, Arnold Tukker, Ester van der Voet

关键字: 氯, 荷兰的氯平衡, 产业代谢, 物料衡算, 风险评价, 物质流分析

摘要: 在过去的十年中, 环保组织、工业界以及政府部门之间关于氯的危害的争论出现严重分歧。为此, 荷兰环境部资助了一项关于氯的策略研究。本文介绍了该研究第1阶段的成果, 这是一个包括了荷兰99%的含氯碳氢化合物(CHC)的物质流分析。该研究对氯在荷兰社会的流动以及氯向环境的排放提供了一个总体描绘。通过对包括荷兰污染排放登记数据库、生命周期评价数据库、以及工业数据库等所有可能的数据来源检索, 分析计算了荷兰的各种排放、废物流、出口、进口以及社会中氯的流动的清单数据。氯的排放使用了生命周期评价中的特征化方法进行评估。对于有毒氯排放的评价是在荷兰国家公共卫生和环境保护研究所(RIVM)的实际风险评价的基础上进行的。这项研究确定了荷兰氯物流链中需要重点关注的含氯物质, 这六类物质需要采取进一步的管理措施。研究结果表明, 现有的科学知识并不支持环保组织声称的氯链具有全面危险。但是, 研究也指出一些不确定的重要领域必须引起重视, 特别是具有生物富集效应的持久性有毒微污染物的可能排放。

Journal of Industrial Ecology

1997, Vol. 1, Issue 1, pp. 95-116

Chlorine in the Netherlands, Part I, and An Overview

Rene Kleijn, Arnold Tukker and Ester van der Voet

Keywords:

chlorine, chlorine balance in the Netherlands, industrial metabolism, materials accounting, risk assesment, sustance flow analysis

Summary:

Over the last decade debate among environmental pressure groups, industry, and the authorities over the threat posed by chlorine has become extremely polarized. In response, the Dutch minister of the environment commissioned a strategic study on chlorine. The first phase of the study, described in this article, was designed as a substance flow analysis, encompassing some 99% of the flows of chlorinated hydrocarbons (CHC) in the Netherlands. The study provided an overview of flows of CHC through the Dutch anthroposphere and to inventory the leaks to the environment. Emissions, waste-streams, exports, imports, and flows through the anthroposphere were inventoried, drawing on all possible sources including the Dutch emission registration database, life-cycle assessment (LCA) databases, and industrial data. Emissions were evaluated using the characterization step from LCA methodology. Emissions with toxicological effects were also evaluated on the basis of actual risk assessments of the National Institute of Public Health and Environmental Protection (RIVM). This resulted in the establishment of six groups of priority segments in the Dutch chlorine chain, for which additional measures will be prepared. The study showed that the environmental groups' pronouncements about the structural dangers associated with the chlorine chain are not supported by current knowledge. The study, however, also indicates that important areas of uncertainty require attention, especially relating to the possible emissions of persistent bioaccumulating toxic micropollutants.

《产业生态学报》

1997 年冬, 第 1 卷第 1 期, 117-129 页

题目: 走向有机化: 转变 Patagonia 公司的棉花生产线

作者: Yvon Chouinard, Michael S. Brown

关键字: 服装, 产业生态学应用, 绿色供应链, 材料选择, 有机棉花, Patagonia 公司

摘要: 将产业生态学原理纳入一个企业的经营, 意味着要对企业传统运营方式做重大改变。我们在本文中对户外运动服装的生产和销售商 Patagonia 公司决定从 1996 年春季起在纯棉服装中必须使用有机棉的决定作为一个案例分析。我们介绍了公司努力减少环境影响的历史过程, 理解服装总体生命周期影响以及棉花的生命周期影响与我们决策的关系, 以及公司上下为实施这项决策所需要的改变。虽然有机棉产品的初期销售达到甚至超过了我们的预期, 但是大多数消费者继续购买我们的产品是因为传统的原因: 品质、适宜度、款式和品牌。我们努力加强消费者对他们购买决策的环境意义的认识, 并促使其他主要服装生产商也作相应的改变。我们的经验表明, 首先, 消费者和生产商需要了解产业生态学原理; 其次, 环境改进应该融入到生产经营的方方面面(例如市场营销)。这项决策的一个意外好处是我们对服装生命周期的认识不断加深, 这提高了我们开发新产品的能力, 以满足新的市场需要。不过, 为进一步降低我们的产品和生产活动造成的环境影响, 我们还需要做很多事情。

Journal of Industrial Ecology

1997, Vol. 1, Issue 1, pp. 117-129

Going Organic: Converting Patagonia's Cotton Product Line

Yvon Chouinard and Michael S. Brown

Keywords:

apparel, applications of industrial ecology, greening the supply chain, materials selection, organic cotton, Patagonia

Summary:

The integration of industrial ecology principles into a business may mean significant changes in its customary activities. In this article, we present a case study of a decision by Patagonia, a manufacturer and distributor of clothing and gear for outdoor sports, to use only organically grown cotton for our cotton products as of spring 1996. We describe the history of our efforts to reduce our environmental impacts, the relationship between understanding the life-cycle impacts of garments in general and cotton in particular on our decision, and the changes required throughout the company to implement the decision. Although initial sales of the organic cotton products have met or exceeded expectations, most customers continue to buy our products for traditional reasons: quality, fit, styling, and brand. We struggle to change consumer perceptions about the environmental significance of their purchases and influence major apparel manufacturers to make a similar switch. Our experience suggests, first, that consumers and industry need to understand the principles of industrial ecology and, second, that environmental improvements must be integrated into all aspects of operations (e.g., marketing). An unexpected benefit of the decision was an increase in our knowledge about the garment life cycle, which in turn improves our ability to develop new fabrics when off-the-shelf products do not meet our needs. Much remains to be done, however, to reduce impacts associated with other aspects of our products and corporate activities.

《产业生态学报》

1997年冬, 第1卷第1期, 131-140页

题目: 摩托罗拉公司在面向环境的设计领域的最新进展

作者: William F. Hoffman III

关键字: 简化生命周期评价, 产业生态学应用, 面向环境的设计, 电子产品, 摩托罗拉公司, 产品设计

摘要: 摩托罗拉公司是一个应用面向环境的设计(DfE)来满足消费者环境需求的大型电子产品生产商。在把环境因素纳入到产品设计的过程中, 摩托罗拉公司遇到了新的挑战, 为此必须开发新的设计框架, 采用新的分析工具。本文分析了这些挑战, 以及迄今为止摩托罗拉所做的努力。通过分析摩托罗拉的产品设计过程, 我们认识到产品设计过程明显分成不同的阶段: 概念开发、详细设计和原型生产。在产品设计早期阶段具有很大的灵活性, 但只有很少可用来开展环境评价的详细信息。为使信息可得性满足环境评估的需求, 摩托罗拉在实施DfE过程中采用了多种不同层次的工具: 在概念开发阶段使用基于矩阵的简化生命周期评价; 在详细设计阶段使用部分基于多变量价值理论的评价系统; 在原型生产阶段使用综合生命周期评价。

Journal of Industrial Ecology

1997, Vol. 1, Issue 1, pp. 131-140

Recent Advances in Design for Environment at Motorola

William F. Hoffman III

Keywords:

streamlined life-cycle assessment, applications of industrial ecology, design for environment, electronics, Motorola, product design

Summary:

Motorola is a large electronics company that uses design for environment (DfE) to address our customers' environmental needs. In working to integrate environmental considerations into product design, Motorola has encountered new challenges in product design, and as a result has had to develop new frameworks and employ new analytical tools. This article describes those challenges and Motorola's efforts to date. The examination of how products are designed in Motorola led to the realization that there are distinct phases in design: concept development, detail design, and prototype manufacture. In the earlier phases where the greatest flexibility for product reconfiguration exists, there is the least amount of detailed information available for use in making environmental assessments. In an effort to match the data availability to the environmental assessment needs, Motorola developed a tiered approach to DfE using a matrix-based abridged life-cycle assessment (LCA) in the concept development state, a scoring system based in part on multiattribute value theory in the detail design stage, and potentially full-scale life-cycle assessment in the prototype manufacturing stage.