

JOURNAL OF
INDUSTRIAL ECOLOGY

中文摘要
《产业生态学报》
第2卷第3期

Chinese Abstracts
Journal of Industrial Ecology
Volume 2, Number 3

翻译
施涵

Translated by
Shi Han

《产业生态学报》

1998年冬, 第2卷第3期, 15-50页

题目: 非物质化和物质使用强度的指标: 对未来研究的一个重要回顾和建议

作者: Cutler J. Cleveland, Matthius Ruth

关键字: 非物质化, Divisia 指数, 环境 Kuznets 曲线, 环境定量指标, 使用强度 (IU), 材料效率

摘要: 本文回顾了有关非物质化和使用强度的主要实证研究。非物质化是指在单位经济产出中, 材料用量和/或者废物产生量发生绝对或相对减少的现象。一个常用指标是物质使用强度, 即单位经济产出使用的材料量。我们的讨论集中在七个方面: 材料使用的环境 Kuznets 曲线, 材料使用和长波理论, 材料分解分析, 材料使用的统计、投入产出分析和动态模型, 和国家材料使用分析。我们还分析了物质使用和废物排放的综合衡量指标, 理论假说验证, 材料进口的重要性, 以及诸如生活水平提高和“反弹效应”等抵消非物质化的影响因素。我们研究结果表明, 人类对材料使用内在规律的认识还基本局限在个别材料和特殊行业, 而且主要是金属; 经济正在“轻形化”, 但是这种变化趋势对于整体经济的影响尚不得而知; 没有有力的宏观经济数据表明美国经济增长已经与材料投入完全脱钩; 而且我们对于材料使用变化的净环境效果了解更少。我们审慎地怀疑任何对材料使用的一般结论, 特别是技术发展和替代、信息时代到来将会导致材料使用强度下降和环境影响减少的本能的想法。我们在文章最后建议了一些需要深入研究的问题, 以便回答上述重要问题。

Journal of Industrial Ecology

1998, Vol. 2, Issue 3, pp. 15-50

Indicators of Dematerialization and the Materials Intensity of Use: A Critical Review with Suggestions for Future Research

Cutler J. Cleveland and Matthius Ruth

Keywords:

dematerialization, Divisia index, environmental Kuznets curve, environmental metrics, intensity of use (IU), materials efficiency

Summary:

We review the major empirical analyses of the related concepts of dematerialization and intensity of use. Dematerialization refers to the absolute or relative reduction in the quantity of materials used and/or the quantity of waste generated in the production of a unit of economic output. A common indicator is the intensity of material use, which is the quantity of material used per unit of economic output. Our discussion focuses on seven topics: the environmental Kuznets curve for materials, material use and long wave theory, material decomposition analysis, statistical, input-output and dynamic models of material use, and analyses of national material use. We examine the measurement of aggregate material use and waste emissions, hypothesis testing, the importance of imports, and forces that countervail dematerialization such as rising affluence and the "rebound effect." We conclude that our knowledge of the extent of and mechanisms behind the patterns of material use are limited largely to individual materials or very specific industries, and most of those examples are metals; the economy is getting "lighter," but the aggregate economic significance of that trend, if any, is unknown; there is no compelling macroeconomic evidence that the U.S. economy is "decoupled" from material inputs; and we know even less about the net environmental effects of many changes in materials use. We caution against gross generalizations about material use, particularly the "gut" feeling that technical change, substitution, and a shift to the "information age" inexorably lead to decreased materials intensity and reduced environmental impact. We end with some suggestions for research that may help answer these important questions.

《产业生态学报》

1998年冬, 第2卷第3期, 51-72页

题目: 与环境管理实践者的对话: 环境保护的合作途径

作者: Kathryn Harrison

关键字: 33/50, 加速削减或消除有毒物质(ARET), 协议, 合作方法, 政策工具, 自愿协议

摘要: 近年来, 世界各国政府对包括通过谈判制定法规、灵活的实施途径和自愿协议在内的环境保护合作方法表现出不断增长的兴趣。一般认为, 合作方法与传统的“命令与控制”法规相比更加成本有效, 更有利于技术创新, 并更容易促进根本态度的转变。然而, 合作方法定义过于宽泛, 以至不能清楚地表达几种新型政策之间的根本区别, 包括法律强制要求与自愿模式之间的区别, 政府和企业界之间的谈判与邀请更广泛利益群体参与模式之间的区别。本文首先提出一个用以区别各种合作政策工具的框架来分析这些合作方法。其次, 文章从理论和实证两方面重点讨论了其中一类合作方法——自愿协作。令人吃惊的是, 我们对自愿协议的有效性知之甚少。这不仅因为实施这种方法的历史很短, 而且也反映了我们对自愿协议项目评估以及评估的内在困难重视不够。本文最后呼吁对这类新型政策工具的有效性开展更严格的研究, 并将它们与传统的环境法规和经济手段进行比较。

Journal of Industrial Ecology

1998, Vol. 2, Issue 3, pp. 51-72

Talking with the Donkey: Cooperative Approaches to Environmental Protection

Kathryn Harrison

Keywords:

33/50, Accelerated Reduction/Elimination of Toxics (ARET), covenants, cooperative approaches, policy instruments, voluntary agreements

Summary:

In recent years, governments throughout the world have expressed growing interest in cooperative approaches to environmental protection, including negotiated rulemaking, flexible approaches to enforcement, and voluntary codes and agreements. It is often argued that cooperative approaches are more cost effective, more conducive to innovation, and better able to promote fundamental attitudinal change than traditional "command and control" regulation. However, the overly broad term "cooperative approaches" fails to acknowledge fundamental differences among these novel policies, including distinctions between mandatory and voluntary programs and between those that involve bipartite negotiations between government and business and those that invite participation by a broader range of interests. This article analyzes these cooperative approaches first by offering a framework to distinguish among various cooperative policy instruments. Second, the article critically examines theoretical arguments and empirical evidence concerning one class of cooperative approaches, voluntary challenges and agreements. The most striking finding is how little we know about the effectiveness of voluntary approaches. This is a function not only of the quite recent experience with these approaches, but also of more fundamental inattention to program evaluation and obstacles to evaluation inherent in voluntary programs. The article concludes with a call for a more rigorous program of research to examine the effectiveness of the new policy instruments and to compare them with traditional regulation and market-based incentives.

《产业生态学报》

1998年冬, 第2卷第3期, 73-93页

题目: 地球系统工程: 产业生态学在世界工程建设中的作用**作者:** Brad Allenby**关键字:** 碳封存, 地球工程, 全球影响, 管理, 技术和环境

摘要: 工业革命及其伴随的人口数量、技术系统和文化方面的相应变化, 导致了人类活动越来越多地影响目前地球上的大多数自然系统的内在演变。许多基本自然系统, 例如氮循环、碳循环以及重金属的存量和流动, 由于受到人为干扰而变得不可预测和出现问题。为减少人类活动的不良后果, 发展以高度综合的方式对人类与自然系统开展理性工程设计和管理的的能力十分必要。这种“地球系统工程”活动将依靠产业生态学研究和方法提供所需的科学技术基础的关键内容。虽然发展这种地球系统工程与产业生态学能力显然十分必要, 但目前的科技基础、机构制度和伦理体系还不足以支持开展这种活动。因此, 鉴于目前进行地球系统工程还为时尚早, 人类首先应该开始发展相应的支持系统。

Journal of Industrial Ecology

1998, Vol. 2, Issue 3, pp. 73-93

Earth System Engineering: The Role of Industrial Ecology in an Engineered World

Brad Allenby

Keywords:

carbon sequestration, geoengineering, global impacts, stewardship, technology and the environment

Summary:

A principal result of the Industrial Revolution and concomitant changes in human population levels, technology systems, and culture has been the evolution of a world in which the dynamics of major natural systems are increasingly dominated by human activity. Many resulting anthropogenic perturbations of fundamental natural systems--for example, the nitrogen and carbon cycles and heavy metal stocks and flows--have been both unanticipated and problematic. Reducing such unintended consequences of human activity will require development of the ability to rationally engineer and manage coupled human-natural systems in a highly integrated fashion. Such "earth systems engineering" activity will rely on industrial ecology studies and methodologies to provide critical elements of the required science and technology (S&T) base. Although the need to develop such an earth systems engineering/industrial ecology capability is clear, it is also apparent that the current S&T base, institutional structures, and ethical systems are inadequate to support such activity. Accordingly, it is desirable to begin to develop such support structures while recognizing that premature attempts to engineer fundamental natural systems should be discouraged.

《产业生态学报》

1998年冬, 第2卷第3期, 95-108页

题目: 基于活动的环境清单分配

作者: Julie Ann Stuart, Laura Turbini and Jane Ammons

关键字: 基于活动的成本(ABC), 面向环境的设计(DfE), 电子产品装配, 环境成本会计, 生命周期评价(LCA), 生产规划

摘要: 本文提供了一种帮助产品和过程设计人员根据生产过程的流量输入和输出及其的活动水平, 来测量材料使用和环境排放的通用方法。这个方法将传统会计中基于活动的核算和生命周期清单相结合。我们对四种电子产品和过程设计进行案例分析, 显示了如何针对不同生产操作进行成本和污染排放的分解和分配。这个基于活动的环境分配方法可以与生命周期评价第1阶段的清单分析、面向环境的设计评价方法、环境管理活动以及考虑环境影响的新产品规划模型等方法相结合。

Journal of Industrial Ecology

1998, Vol. 2, Issue 3, pp. 95-108

Activity Based Environmental Inventory Allocation

Julie Ann Stuart, Laura Turbini and Jane Ammons

Keywords:

activity-based costing (ABC), design for environment (DfE), electronics assembly, environmental cost accounting, life-cycle assessment (LCA), production planning

Summary:

This article presents a generic method to assist product and process designers in measuring resource use and environmental discharges based on the relationships between process flow inputs and outputs and their activity levels. It combines activity-based costing from conventional accounting with life-cycle inventories. The method is demonstrated on four electronic assembly product and process designs. The demonstration exhibits the disaggregation and allocation of costs and effluents from various manufacturing operations. This activity-based environmental allocation approach may be integrated with inventory analysis--the first step in full and streamlined life-cycle assessments, design for environment evaluation methods, environmental management activities, and new production planning models that consider environmental impacts.

《产业生态学报》

1998年冬, 第2卷第3期, 109-130页

题目: 清单数据集对于生命周期评价结果的影响: PVC 案例分析

作者: Eric Copius Peereboom, Renz Kleijn, Saul Lemkowitz, Sven Lundie

关键字: 数据库, 数据质量, 生命周期评价(LCA), 聚氯乙烯(PVC), 灵敏度分析, 不确定性

摘要: 本研究比较了欧洲广泛使用的六种 LCA 清单数据集, 并确定导致主要差异的数据组成, 定量分析这些数据集对 PVC 的“从摇篮到坟墓”生命周期评价的影响。现有数据存在很大的差异(10~1100%)。现有数据集中那些与能源有关, 被普遍认为有很大环境影响并容易确定的排放数据差异很小。与过程有关的排放呈现出更大的差异。大气排放数据要比向水体和土壤排放数据多得多, 但大气排放数值的差异却最小。不同的数据集并不总是包括相同的物质。诸如(含氯)烃和金属物质, 记录经常是以一类物质形式存在, 而没有单个物质的数据。导致具体清单数据集存在差异的原因包括: 地区、时间和技术代表性; 物质种类; 物质命名; 使用不同的定义; 系统边界; 以及分配方法。通过灵敏度分析, 这些差异对 LCA 的结果影响很大, 一般在 10~100%之间。研究结果表明, 对数据进行适当、明确的描述和开展灵敏度分析十分重要。研究结果再次表明定期更新的、高质量、公开的 LCA 清单数据库十分必要。改进 LCA 数据的可获得性将提高 LCA 的可信度, 进而促进 LCA 的应用。

Journal of Industrial Ecology

1998, Vol. 2, Issue 3, pp. 109-130

The Influence of Inventory Data Sets on Life Cycle Assessment Results: A Case Study on PVC

Eric Copius Peereboom, Renz Kleijn, Saul Lemkowitz and Sven Lundie

Keywords:

databases, data quality, life-cycle assessment (LCA), polyvinyl chloride (PVC), sensitivity analysis, uncertainty

Summary:

This study compared six widely used European life-cycle assessment (LCA) inventory data sets, identified those data elements that introduce major differences, and quantitatively determined the influence of these data elements for a cradle-to-gate LCA of polyvinyl chloride(PVC). Large differences in data (10-1100%) were found. Data on substances with recognized high environmental impact and easily determined emissions and environmental impacts, like those related to energy, show the least differences. Process-specific emissions show larger differences. Substantially more substances emitted to air than to water or soil are reported, and differences between the values are less. Furthermore, various inventory data sets do not always cover the same substances. Often, individual substances, such as specific (chlorinated) hydrocarbons and metals, are collectively categorized rather than individually reported. Specific data elements of the inventory causing many differences were geographical, temporal, and technological representativeness; categorization of substances; naming of substance categories; use of different category definitions; system boundaries; and allocation method. The influence of these differences on LCA results, determined through sensitivity analysis, was significant, typically 10-100%. Results emphasize the importance of appropriate and explicitly described data sets and the necessity of sensitivity analyses. Results also show the need for a regularly updated and openly available database with high quality data. The availability of such a database would improve the reliability of LCA and thereby stimulate its application.

《产业生态学报》

1998 年冬, 第 2 卷第 3 期, 131-147 页

题目: 材料流核算在 Kambium 家具生产车间开展 EMAS 过程中的应用

作者: Christa Leidtke, Holger Rohn, Michael Kuhndt and Regina Nickel

关键字: 生态管理和审计方法(EMAS), 生态设计, 环境管理系统(EMS), 材料流分析(MFA), 单位服务物质投入(MIPS), 中小企业(SMEs)

摘要: 欧盟委员会制定了 EMAS 计划来促进企业环境管理和环境审核及其制度化。本文总结了一家中型家具企业根据 EMAS 要求开展环境审核的过程。材料流核算被用来评价和分析该企业产品和活动相应的从“门到门”和“从摇篮到坟墓”的环境影响。为提高资源效率, 还提出了一个能够帮助该公司根据自身情况开展物流管理、产品管理和产品生态设计, 来改进环境表现的资源管理策略。

Journal of Industrial Ecology

1998, Vol. 2, Issue 3, pp. 131-147

Applying Material Flow Accounting: Eco-Auditing and Resource Management at the Kambium Furniture Workshop

Christa Leidtke, Holger Rohn, Michael Kuhndt and Regina Nickel

Keywords:

Eco Management and Auditing Scheme (EMAS), ecodesign, environmental management system (EMS), material flow analysis (MFA), material input per service unit (MIPS), small- and medium-sized enterprises (SMEs)

Summary:

The European Commission has established the Eco Management and Auditing Scheme (EMAS) to promote and institutionalize corporate environmental management and environmental audits. This article summarizes a study primarily concerned with the execution of an ecoaudit in a medium-sized furniture enterprise according to the rules of EMAS. Material flow accounting was used to assess and analyze the "gate-to-gate" and "cradle-to-grave" environmental impacts related to the firm's products and activities. A resource management strategy was developed that permits the determination of methods for firm-specific material flow management, product management, and ecological product design to improve environmental performance as seen from the vantage point of resource efficiency.