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《产业生态学报》

2002 年冬, 第 6 卷第 3-4 期, 13-26 页

题目: 论文引用因子对环境领域新兴研究的影响

作者: Henrikke Baumann

关键字: 学术出版, 论文评测, 环境类期刊, 交叉学科研究, 科学引文索引 (SCI), 社会科学引文索引 (SSCI)

摘要: 研究工作的发表是人们认识一项研究事业及其相关研究机构的依据, 同时影响着该项研究能否获得持续的资助。科学引文索引 (SCI) 及社会科学引文索引 (SSCI) 收录了多种学术期刊, 是衡量各种刊物的有效指标。在一项研究的水平往往被认为与发表该研究的期刊的水平挂钩的情况, SCI 和 SSCI 一定程度上成为评判科研水平的标尺。不幸的是 SCI 及 SSCI 对环境类期刊的引用与重视相对不足, 从而削弱了人们对环境研究的重要意义的认识。本文对环境领域的学术期刊作了两项调查。第一项调查说明, 在现有的 7 个子类 352 种重要的环境类学术刊物中, 两个子类, 即环境系统分析类与企业环境影响类刊物根本没有被 SCI 和 SSCI 所收录。第二项调查涉及交叉领域的环境研究论文的发表情况。尽管环境交叉领域的研究期刊为其它研究所引用的频度尚可, 但该类期刊也多被排除在 SCI 和 SSCI 索引之外。原因在于, 在 SCI 及 SSCI 的制定单位——美国科学情报研究所的 (ISI) 期刊资料库中, 真正大量引用环境类研究论文的期刊数量不多。

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Publish and Perish? The Impact of Citation Indexing on the Development of New Fields of Environmental Research

Henrikke Baumann

KEYWORDS:

academic publishing, bibliometry, environmental journals, interdisciplinary research, Science Citation Index (SCI), Social Science Citation Index (SSCI)

SUMMARY:

The publishing of research has implications for the evaluation of research careers, research departments, and funding for research projects. Researchers' academic evaluation relies heavily on the status of the journals in which they publish. The inclusion of one's work in the Science Citation Index (SCI) and the Social Science Citation Index (SSCI) is often used as an indicator of academic quality. This is unfortunate for many environmental researchers, as their journals are not represented in the SCI and SSCI. Two investigations were carried out to determine the reasons for this. The first investigation identified 352 existing environmental academic journals, classified into seven categories (and several subcategories). Of these, two categories were not represented in the SCI or SSCI: environmental systems analysis journals and corporate environmental management journals. The second survey investigated the publishing patterns of interdisciplinary research groups and the characteristics of the journals in which they publish. In spite of acceptable citation levels, interdisciplinary environmental journals are excluded from the SCI and SSCI. A major reason seems to be that citations of their articles are uncounted by the Institute for Scientific Information (ISI), the organization producing the SCI and SSCI, because citations mostly take place in a group of journals completely unrepresented in ISI's database.

《产业生态学报》

2002 年冬, 第 6 卷第 3-4 期, 27-48 页

题目: 关于产业生态学潜在自然哲理的深入探讨

作者: Ralf Isenmann

关键字: 生物学类比, 仿生, 认识论, 康德, 自然系统比拟, 哲学人类学

摘要: 产业生态学是一门颇为看好的研究产业系统与自然生态系统关系的新兴学科。与传统的语必称“自然资源破坏”、“生态承受极限”、“外部性”和“外在环境”的环境领域研究相比, 产业生态学提供了一种不同的视角, 它跳出了人类活动如何破坏或保护自然的争执, 倡导用自然价值规范人类行为, 视自然界为一个有机的作用整体而非一个外在个体; 在产业生态学的理念下, 人类开发利用自然资源的活动也将成为人类自然理想和自然事业的一个组成部分。产业生态学的这些思想往往表现为实践中的通过类比自然生态系统的特性重构人类产业系统。本文从哲学的角度出发, 将自然界作为一个系统的模型加以分析, 阐述了产业生态学的关于自然的理念, 以求推进产业生态学的理论化和规范化。文中基于科学哲学、康德认识论以及哲学人类学的论述深入澄清了产业生态学的概念体系, 并进一步奠定了产业生态学作为一种实现广泛意义上的人类可持续发展的理论的基础。

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Further Efforts to Clarify Industrial Ecology's Hidden Philosophy of Nature

Ralf Isenmann

KEYWORDS:

biological analogy, biomimicry, epistemology, Kant, natural ecosystem metaphor, philosophical anthropology

SUMMARY:

As an emerging discipline, industrial ecology represents a promising interdisciplinary field that studies industrial systems and their fundamental linkage with nature. At the root of its scientific profile lies a refreshingly different perspective on nature as a model in comparison with other disciplines' orthodox understanding nature in terms of a "sack of resources," the "biophysical limit," "something outside," "surrounding," or just "environment." In contrast to these phrases, industrial ecology's perspective indicates an important change in the interpretation of nature, from the interest in intervening in or preserving nature toward an orientation by nature, from the comprehension of nature as an object toward understanding nature as a model, and from exploiting natural resources toward learning from nature as, in part, an ideal. This characteristic perspective of industrial ecology is typically stated with an appealing natural ecosystem metaphor and based on an analogy between industrial systems and natural ecosystems. On the basis of initial efforts to conceptualize industrial ecology's underlying assumptions concerning nature, a philosophically focused analysis of nature as a model is presented. Industrial ecology's implicit philosophy of nature is thus uncovered and clarified. Finally, a set of arguments drawing on the philosophy of science and on Kantian epistemology and philosophical anthropology is provided to gain greater conceptual clarity and to contribute to laying a solid foundation for industrial ecology's stimulating role in achieving sustainability at large.

《产业生态学报》

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题目: TRACI: 一种减小和评价环境影响的工具**作者:** Jane C. Bare, Gregory A. Norris, David W. Pennington, Thomas McKone**关键字:** 环境影响建模分析, 生命周期评价(LCA), 生命周期环境影响评价(LCIA), 中点, 考虑地点因素的影响评价, 软件

摘要: 化学品及其环境影响减排与评价工具(TRACI)是一种评价并减少事物环境化学及其它环境影响的工具。本文阐述了其发展历程、研究方法,并对其所包含的各类环境影响指标作了深入分析。美国环保局开发了TRACI这一独立的计算机程序,用于分析人类活动潜在的多方面的环境影响,如臭氧层破坏、全球气候变暖、酸雨、富营养化、大气对流层的臭氧化及烟雾形成、生物毒性、致癌性、癌症外其它健康影响、化石燃料消耗以及土地占用等等。TRACI最初是一种生命周期评价(LCA)的工具,但其适用范围可望得到很大的扩展。在TRACI的开发过程中,开发者仔细分析比较了多种评价方法,并精心区分选择了各种环境影响因素。TRACI尽量选择了一些中等程度的为公众所关注和认定的环境影响指标,在美国选定的指标包括酸雨、化学烟雾、富营养化、土地占用、致癌性、非癌变毒性及其它人类生理健康影响等。一种环境影响作用的强弱往往与事件发生的位置及多种复杂因素相关。考虑到实践中的种种变数,如一个具体地点的有关信息不易获取,TRACI作了一定的处理以适用于各种复杂情况。本文的一个重点是TRACI所采用的分析方法,它被认为是美国现行各种生命周期影响评价(LCIA)方法中最出类拔萃的。文中还通过美国东北地区的一个混凝土生产过程的事例,说明了如何因地制宜、有针对性地使用TRACI这一工具。

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TRACI: The Tool for the Reduction and Assessment of Other Environmental Impacts

Jane C. Bare, Gregory A. Norris, David W. Pennington and Thomas McKone

KEYWORDS:

environmental impact modeling, life-cycle assessment (LCA), life-cycle impact assessment (LCIA), midpoint, site-dependent impact assessment, software

SUMMARY:

The tool for the reduction and assessment of chemical and other environmental impacts (TRACI) is described along with its history, the research and methodologies it incorporates, and the insights it provides within individual impact categories. TRACI, a stand-alone computer program developed by the U.S. Environmental Protection Agency, facilitates the characterization of environmental stressors that have potential effects, including ozone depletion, global warming, acidification, eutrophication, tropospheric ozone (smog) formation, ecotoxicity, human health criteria-related effects, human health cancer effects, human health noncancer effects, fossil fuel depletion, and land-use effects. TRACI was originally designed for use with life-cycle assessment (LCA), but it is expected to find wider application in the future. To develop TRACI, impact categories were selected, available methodologies were reviewed, and categories were prioritized for further research. Impact categories were characterized at the midpoint level for reasons including a higher level of societal consensus concerning the certainties of modeling at this point in the cause-effect chain. Research in the impact categories of acidification, smog formation, eutrophication, land use, human cancer, human noncancer, and human criteria pollutants was conducted to construct methodologies for representing potential effects in the United States. Probabilistic analyses allowed the determination of an appropriate level of sophistication and spatial resolution necessary for impact modeling for each category, yet the tool was designed to accommodate current variation in practice (e.g., site-specific information is often not available). The methodologies underlying TRACI reflect state-of-the-art developments and bestavailable practice for life-cycle impact assessment (LCIA) in the United States and are the focus of this article. TRACI's use and the impact of regionalization are illustrated with the example of concrete production in the northeastern United States.

《产业生态学报》

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题目: 一种减小与评价化学及环境影响的工具 TRACI 及其中有关酸雨、富营养化及臭氧形成三个方面的环境影响的分析方法

作者: Gregory A. Norris

关键字: 酸雨, 富营养化, 生命周期评价(LCA), 生命周期环境影响评价(LCIA), 对流层臭氧

摘要: 环境影响减小与评价工具 TRACI 是美国环保局开发的一套基于生命周期环境影响评价(LCIA)的软件工具。它分析了包括臭氧层破坏、全球气候变暖、酸雨、富营养化、大气对流层的臭氧化及烟雾形成、生物毒性、粉尘、致癌物及非致癌物对人类健康的影响、化石燃料消耗以及土地占用等方面在内的多种环境影响。本文着重描述了 TRACI 如何对酸雨、富营养化及臭氧和烟雾形成这三个方面的环境影响进行具体的设计分析, 所用的方法还特别考虑了环境影响的区域差异及跨区传播问题, 可用于研究北美各地污染源的环境影响。研究表明, 同样的环境影响在不同地理条件下的作用效果可以差到一个数量级以上。

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Impact Characterization in the Tool for the Reduction and Assessment of Chemical and other Environmental Impacts: Methods for Acidification, Eutrophication, and Ozone Formation

Gregory A. Norris

KEYWORDS:

acid rain, eutrophication, life-cycle assessment (LCA), life-cycle impact assessment (LCIA), tropospheric ozone

SUMMARY:

The tool for the reduction and assessment of chemical and other environmental impacts (TRACI) is a set of life-cycle impact assessment (LCIA) characterization methods that has been developed by a series of U.S. Environmental Protection Agency research projects. TRACI facilitates the characterization of stressors that may have potential effects, including ozone depletion, global warming, acidification, eutrophication, tropospheric ozone (smog) formation, eco-toxicity, human particulate effects, human carcinogenic effects, human noncarcinogenic effects, fossil fuel depletion, and land-use effects. This article describes the methodologies developed to address acidification, eutrophication, and smog. Each of these methods offers the ability to take account of differences in expected strength of impact as a function of pollution release location within North America. Specifically, the methods employ regionalized fate and transport modeling. The resulting factors differ regionally by up to more than an order of magnitude.

《产业生态学报》

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题目: 从制度经济学的角度看自愿工业标准在环境供应链管理中的作用

作者: Christine Meisner Rosen, Sara Beckman, Janet Bercovitz

关键字: 计算机工业, 面向环境的设计 (DfE), 经济学理论, 环境管理系统 (EMS), 供应链绿色化, 半导体工业

摘要: 本文用新制度经济学 (NIE) 的方法分析了自愿工业标准对于计算机工业供应链管理的发展与实施的作用。我们分析了两种自愿标准: 一种是有关半导体加工设备的面向环境的设计 (DfE) 标准, 另一种为环境管理系统在整个计算机工业供应链中的实施应用标准。比较发现, 前一标准 (DfE) 得到了广泛的重视, 并已经体现在产业供求关系的各个环节当中; 而后一种标准推广的失败也不是偶然的。从 NIE 的观点看来, 两种标准都致力于制定一种企业间的操作规范, 建立一条简练有效的环境供应链模式, 并减少加工定制的成本。二者的成败取决于它们在具体的实行过程中是否遵照 NIE 的基本原理和规则。研究表明, 制定并实施自愿工业标准是推进产业供应链的 DfE 的一条重要途径。对产业生态学家来说, NIE 提供了一个有效的分析各种产业标准和制度的理论框架, 对推进企业可持续供应链的实践具有重要意义。

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The Role of Voluntary Industry Standards in Environmental Supply-Chain Management: An Institutional Economics Perspective

Christine Meisner Rosen, Sara Beckman and Janet Bercovitz

KEYWORDS:

computer industry, design for environment (DfE), economic theory, environmental management systems (EMS), greening the supply chain, semiconductor industry

SUMMARY:

Our article uses a new institutional economics (NIE) framework to explore the role of voluntary industry standards in the development and implementation of environmental supplier-management programs in the computer industry. We examine two different voluntary standards, one for the management of design for environment (DfE) in the semiconductor fabrication equipment sector and the other for assessing the implementation and use of environmental management systems throughout the computer industry supply chain. We compare and contrast the two standards to explain why the former was widely adopted and has helped integrate DfE into buyer-supplier relations among adopters, whereas the latter failed to gain acceptance. In line with NIE logic, both standards aimed to lower transaction and customization costs by setting "rules of the game" for interfirm transactions that would help simplify and routinize novel environmental supply-chain programs and activities. Their differential success can be elucidated in terms of how well each met the NIE criteria for remediableness and legitimacy. We conclude that voluntary standards have the potential to play an important role in promoting DfE in industrial supply chains. We further conclude that NIE provides a conceptual framework of great value to industrial ecologists who analyze how industry standards and other institutions help firms move toward more sustainable supply-chain management practices.

《产业生态学报》

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题目: 基于高分子流变学的塑料回收方案研究

作者: Christiana Kuswanti, Guojun Xu, Jianhong Qiao, Julie Ann Stuart, Kurt Koelling, Blaine Lilly

关键字: 高强度聚苯乙烯 (HIPS), 注射成型, 消费后废树脂 (PCR), 产品设计, 压制加工, 流变学

摘要: 新产品制造过程中用到了数以万吨计的塑料, 而废塑料的回收比率却十分有限。许多公司考虑到二次加工树脂和废树脂 (PCRs) 的加工利用需要额外的参数测试, 而在塑料回收问题上举棋不定。尽管高分子材料往往标定了其化合物类型, 如丙烯腈、丁二烯、苯乙烯、聚碳酸酯等等, 但从这些标定出发还不足以推出其成型加工特性。进一步考虑到使用过程中的化合物分解和错误标定等因素, 非塑料的特性不能简单取决于原料塑料的性质。标准的工业高分子数据库中缺乏二次加工树脂和废旧树脂的信息, 这是废塑料回收利用面临的一个主要问题。理想的工业高分子数据库不单应提供原料的选择信息, 还应提供塑料成型加工过程中的仿真数据, 从而减少企业测试成型参数所需的时间。本文在总结各种塑料收集、鉴定和分离过程的基础上, 从高分子流变学出发, 提出了一个塑料回收的方案。为了确定塑料的流变能力, 测量了塑料在不同温度下的粘性与剪切率。通过一系列的废塑料的成型仿真实验, 我们积累了大量信息。利用这些信息可以显著的减少测定废旧树脂注射成型参数的实验次数。本文检验了美国材料测试协会的几种样本材料以及打印机和显示器常用的聚苯乙烯塑料。试验在比较原料树脂和 PCR 树脂的粘性-剪切率曲线的基础上, 通过计算机仿真, 有效地确定了 PCR 的成型参数。文中还比较了流变学方法之外的其它高分子材料回收方法, 并为进一步的研究指明了方向。

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An Engineering Approach to Plastic Recycling Based on Rheological Characterization

Christiana Kuswanti, Guojun Xu, Jianhong Qiao, Julie Ann Stuart, Kurt Koelling and Blaine Lilly

KEYWORDS:

high-impact polystyrene (HIPS), injection molding, postconsumer resin (PCR), product design, regrind, rheology

SUMMARY:

Millions of kilograms of virgin plastics are used annually to manufacture new products, yet only a small percentage of this material is recovered for reuse in new plastic products. Many companies hesitate to use regrind and postconsumer resins (PCRs) because of the extensive testing required to identify plausible uses and processing parameters. Although used polymers may be labeled by general type, such as acrylonitrile butadiene styrene or polycarbonate, such labels do not provide adequate information to determine molding parameters. Because used polymers may be degraded or mislabeled, it is important to characterize the used polymer rather than track the original virgin polymer properties. Another major challenge to plastics recycling is that standard industry polymer databases do not contain information about regrind resins or PCRs. Such polymer databases not only provide selection assistance, but also are used with mold-filling simulations to reduce the experimental time to determine molding parameters. First, we summarize the current plastics collection, identification, and separation processes. Then, we present an engineering approach for plastics recycling, based on rheological characterization. To characterize the plastic rheology, we measure the viscosity versus shear rate at various temperatures. In our proposed approach, we introduce a sequence of steps to obtain used-plastic input data for mold-filling simulations. Our goal is to reduce the amount of experimental testing needed to determine injection-molding parameters for regrind resins or PCRs. We test our method by molding American Society of Testing and Materials test specimens and a thinwall application with high-impact polystyrene from recycled printer and monitor housings. Our tests demonstrate that matching the viscosity versus shear rate curves of PCR and a virgin resin provides a proxy resin for input to mold-filling simulation software to determine PCR molding parameters. We compare our new approach with other approaches to polymer recycling and discuss directions for future research.

《产业生态学报》

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题目: 生命周期评价的新进展: 生命周期清单扩展到上游生产层面的微分收敛问题

作者: Manfred Lenzen, Graham Treloar

关键字: 错位, 混合型投入产出生命周期评价方法 (IOLCA), 投入产出 (IO) 分析, 生命周期清单 (LCI), 结构路径分析, 缺失错误

摘要: 本文研究了三个实例: 研发新汽车与修理现有汽车的投资对比、悉尼和墨尔本间的交通模式选择以及利用何种可再生资源发电。对于这三个实例中分别涉及的劳动力、土地利用和温室气体排放问题, 文中采用基于投入产出的生命周期评价方法作了分析。研究表明随着生命周期清单 (LCI) 范围的扩大, 把上游生产线的原料投入考虑进来, 可能对评价结果产生影响, 甚至造成评价结果排序的错位。在传统的基于过程的生命周期评价中, 生产层面的问题往往得不到重视, 这实际上在生命周期清单中造成了部分信息的缺失; 由于上游高阶层面被排除在外, 错位问题往往不会出现。本文分别用传统的过程型 LCA 和投入产出 LCA 方法对研究实例中的不同方案作了评价, 并得到了截然不同的评价结果。为了避免由于微分收敛不同而造成的评价结果错位问题, 有必要研究一种新的混合型的投入产出 LCA 方法。

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Differential Convergence of Life-Cycle Inventories toward Upstream Production Layers: Implications for Life-Cycle Assessment

Manfred Lenzen and Graham Treloar

KEYWORDS:

crossover, hybrid input-output life-cycle assessment (IOLCA), input-output (IO) analysis, life-cycle inventory (LCI), structural path analysis, truncation error

SUMMARY:

We present an input-output analysis of the life-cycle labor, land, and greenhouse gas (GHG) requirements of alternative options for three case studies: investing money in a new vehicle versus in repairs of an existing vehicle (labor), passenger transport modes for a trip between Sydney and Melbourne (land use), and renewable electricity generation (GHG emissions). These case studies were chosen to demonstrate the possibility of rank crossovers in life-cycle inventory (LCI) results as system boundaries are expanded and upstream production inputs are taken into account. They demonstrate that differential convergence can cause crossovers in the ranking of inventories for alternative functional units occurring at second- and higher-order upstream production layers. These production layers are often excluded in conventional process-type life-cycle assessment (LCA) by the delineation of a finite system boundary, leading to a systematic truncation error within the LCI. The exclusion of higher-order upstream inputs can be responsible for ranking crossovers going unnoticed. In this case, an incomplete conventional process-type LCA of two alternative options can result in preferences and recommendations to decision makers that are different from preferences and recommendations concluded from a complete hybrid input-output-based assessment. Therefore, the need to avoid misleading effects on the ranking of alternative functional units due to differential convergence supports the practice of hybrid input-output-based LCA techniques.

《产业生态学报》

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题目: 利用系统集成模型研究中国山西省炼焦产业链选址与运输过程的污染与成本问题

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关键字: 空气污染, 炼焦, 决策支持工具, 集成模拟, 供应链管理, 运输成本模型

摘要: 本文通过一个系统集成模型研究了在中国山西省炼焦产品运输过程中的成本与污染问题。模型在炼焦厂产量和路网地理信息的基础上, 统筹计算, 以实现炼焦成本和运输费用的最小化, 并通过一个联网的图形界面形象化的输出经济成本、氮氧化物排放以及交通流量分布数据。建模过程中既利用了作者在山西省实地调查得来的一手数据, 也参考了其它二手资料。模型的模块化和可扩展性设计使之能够处理其它研究对象的数据。模型还充分考虑到了炼焦企业的集合经营、铁路系统的改造以及技术变化等等种种变数并分析了各种可能的情景。研究表明, 扩大铁路沿线附近炼厂的产量, 关闭交通不便的炼厂, 可以很好的节约花销减少污染。此外, 充分考虑交通费用而不是简单的盯住生产成本能够更有效地降低总成本。因此, 决策者在调整省内炼焦产业布局时, 必须重视产品的运输问题。总的来说, 增大单厂产量比增强铁路运力更合算。另外汽车运输的问题也很重要, 减少运货卡车的污染往往能够大幅的降低炼焦产业链的空气污染。

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Pollution and Cost in the Coke-Making Supply Chain in Shanxi Province, China: Applying an Integrated System Model to Siting and Transportation Trade-Offs

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KEYWORDS:

air pollution, coke making, decision support tools, integrated simulation, supply chain management, transportation cost modeling

SUMMARY:

An integrated system trade-off model has been developed to assess costs and pollution associated with transportation in the coke-making supply chain in Shanxi Province, China. A transportation-flow, cost-minimization solver is combined with models for calculating coke-making plant costs, estimating transportation costs from a geographic information system road and rail database, and aggregating coke-making capacity among plants. Model outputs of economic cost, nitrogen oxides (NO_x) emissions, and transport distributions are visualized using an Internet-based graphic user interface. Data for the model were collected on survey trips to Shanxi Province as well as from secondary references and proxies. The modularity and extensibility of the system trade-off model facilitate introduction of new data sets in order to examine various planning scenarios. Scenarios of coke-making plant aggregation, rail infrastructure improvement, and technology transfer were evaluated using the model. Costs and pollution emissions can be reduced by enlarging coke-making plants near the rail stations and closing down other plants. Preferential minimization of transportation costs gives a lower total cost than simply minimizing plant costs. Therefore, policy makers should consider transportation costs when planning the reallocation of coke-making capacity in Shanxi Province. Increasing rail-transport capacity is less effective than aggregating plant capacity. On the other hand, transfer of low-pollution truck technology results in a large emission reduction, however, reflecting the importance of truck transportation in the Shanxi Province coke-making industry.

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题目: 互联网、电视和报纸等不同新闻传播方式的环境影响分析

作者: Inge Reichart, Roland Hischier

关键字: 电力结构, 信息通信技术 (ICT), 互联网, 生命周期评价 (LCA), 报纸, 电视

摘要: 本文对比研究了互联网与电视和报纸与电视等不同媒体, 分析了不同信息传播途径下单条新闻以及每日新闻总量背后所包含的环境影响。互联网和电视这两种电子传媒的主要环境影响与电耗及发电过程有关。除媒体产品的生产和使用过程的能耗之外, 相关基础设施的能耗也不能忽视, 如电话网的使用、互联网的数据传输的能耗等等; 另外在线电子信息的大量打印也是一个值得关注的问题。报纸等印刷类媒体的能耗同样很大, 但主要发生在制浆与造纸过程。尽管电视的画面越来越大, 但相比报纸, 电视和互联网的环境影响还是要低得多。

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The Environmental Impact of Getting the News: A Comparison of On-Line, Television, and Newspaper Information Delivery

Inge Reichart and Roland Hischier

KEYWORDS:

electricity mix, information and communications, technology (ICT), Internet, life-cycle assessment (LCA), newspaper, television

SUMMARY:

The environmental impact associated with reading an on-line and a printed newspaper is analyzed and compared with respective parts of a television (TV) broadcast. Two reference units were chosen for comparison to account for differences between media in presentation and consumption (reading or watching a news item) and consumption of the daily news as a whole. The environmental impact is assessed using life-cycle assessment (LCA). Key drivers of the environmental impact for both electronic delivery systems are energy consumption and power generation. Not only do the manufacturing of the products and their use have an environmental impact, but so does the use of the necessary infrastructure, that is, energy consumption of the telephone network or data transfer via Internet. Printing of on-line information also turned out to be important. In the case of the printed newspapers, energy consumption is again important, here for the manufacturing of pulp and paper. Complete printed newspapers (the form in which they are typically purchased) have a very high environmental burden relative to watching the TV news or reading on-line news, even if the propensity to extend TV viewing is taken into consideration.

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题目: 物质流分析方法在丹麦的应用经验

作者: Erik Hansen, Carsten Lassen

关键字: 铝, 溴化阻燃剂 (BFRs), 重金属, 铅, 物料流分析 (MFA), 废物管理

摘要: 丹麦环保局应用物质流分析法 (SFA) 鉴定环境和废物中的有害化合物已有二十多年的历史, 在一个统一标准下至少进行了 35 次以上的物质流分析。本文通过几个实例讨论了丹麦物质流分析在方法论和实用过程中的几个关键因素。通过对铅的 SFA 分析探询了关于有毒金属铅的环境法规的变化, 在镉的 SFA 分析基础上探讨了有害物质的使用和释放过程的环境监控措施, 还研究了固体废物焚烧和污泥处理过程中的几种有害金属的来源。除了许多关于有害物质的 SFA 分析之外, 有关铝的全国 SFA 研究则把着眼点放在自然资源的利用角度上。而溴化阻燃剂的案例则引出了在经济全球化的背景下如何进行国家尺度上的 SFA 分析的方法论问题。

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Experience with the Use of Substance Flow Analysis in Denmark

Erik Hansen and Carsten Lassen

KEYWORDS:

aluminum, brominated flame retardants (BFRs), heavy metals, lead, materials flow analysis (MFA), waste management

SUMMARY:

Substance flow analysis (SFA) has been used by the Danish Environmental Protection Agency for more than two decades to identify sources of hazardous substance releases to the environment and to waste streams. More than 35 SFAs have been undertaken using a unified methodology. This article discusses key elements of the methodology and application of the results of the SFAs in Denmark, illustrated by examples. The use of repeated SFAs in the evolution of substance regulation is demonstrated for lead. A cadmium SFA illustrates the use of SFAs to monitor changes in consumption and release of a hazardous substance. Estimates of sources are presented for a number of toxic and resource-intensive metals in solid waste incineration and sewage treatment. Most of the SFAs concern hazardous substances, but aluminum represents a case in which the resource perspective is an important element in a national SFA. The Danish SFA on brominated flame retardants illustrates some methodological problems with conducting national SFAs in a global economy in which the substances are mainly imported in finished products.