

论文

区域环境-经济系统物质流与能流分析方法及实证研究

刘伟<sup>1</sup>, 鞠美庭<sup>2</sup>, 楚春礼<sup>2</sup>, 邵超峰<sup>2</sup>, 田文鑫<sup>1</sup>

- 1. 成都信息工程学院 资源环境学院, 成都610225;
- 2. 南开大学 环境科学与工程学院, 天津300071

摘要:

物质和能量流动是环境-经济系统正常运行的基本条件,研究原料、能源转化为产品和废弃物的代谢过程及环境影响,对于提高资源生产力,从根本上解决资源环境问题至关重要。参考区域物质流分析和能流分析方法,提出了区域物质流与能流分析的概念和研究框架,并对天津市1998-2007年间的物质流和能量流进行了实证研究。结果显示:2007年天津市物质消耗为 $97.25 \times 10^6$  t,能源消耗为 $47.15 \times 10^6$  tce,年均增长率分别超过10%和8%;外部调入物质约占直接物质输入量的46%,其中煤炭占了约40%,且完全依赖外部调入;资源消耗强度高、产出率较低,导致资源大量消耗、污染物排放总量持续增长,这对区域资源环境产生了较大压力,环境容量总体处于饱和状态。最后针对存在的问题提出了相应措施与建议。

关键词: 环境-经济系统 物质流与能流 天津

Material and Energy Flow Analysis and Empirical Study in Regional Environmental-economic System

LIU Wei<sup>1</sup>, JU Mei-ting<sup>2</sup>, CHU Chun-li<sup>2</sup>, SHAO Chao-feng<sup>2</sup>, TIAN Wen-xin<sup>1</sup>

- 1. College of Resources and Environment, Chengdu University of Information Technology, Chengdu 610225, China;
- 2. College of Environmental Science and Engineering, Nankai University, Tianjin 300071, China

Abstract:

Material and energy flow is necessary to ensure the normal running of economic and environmental system. In order to improve resource productivity and solve environmental problems fundamentally, it is essential to research the metabolism process and environmental impact when we transform raw materials and energy into products and wastes. Based on the methodology of regional material flow analysis, energy flow analysis, ecological footprint and energy analysis, the concept, research framework and analysis indicators of regional material and energy flow analysis were proposed, and then applied to analyse the economic and environmental system of Tianjin during 1998-2007. The analysis results indicated: the total material consumption was 97.25 million t, and the total energy consumption was 47.15 t (coalequivalent) in 2007, with the average annual growth rate of over 10% and 8% respectively; the outside resource input occupied about 46% in direct material input, of which 40% of outside resource input was coal from outside region completely; low resource output ratio and high intensity of resource consumption led to large consumption of resources and continuous increase of total emission of pollutants, which brought great pressure to the regional resource and environmental system, and made the environmental capacity of pollutants in saturated condition on the whole. Finally, the corresponding suggestions were proposed in view of the existing problems.

Keywords: environmental-economic system material and energy flow analysis Tianjin

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通讯作者:

作者简介:

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