



Analysis of Material Metabolism of Eco-Economic System in Chongqing Based on the Emergy Theory

PDF (Size: 168KB) PP. 32-40 DOI: 10.4236/lce.2011.21006

Author(s)

Xue-song Gao, Xiao-jiao Luo, Liang-ji Deng, Min Zeng

ABSTRACT

Based on the emergy theory proposed by H. T. Odum, the material metabolism of eco-economic system in Chongqing during 2002 ~ 2007 is analyzed. The results show that 1) the total available emergy in Chongqing is quite abundant and the economy is relatively more developed; the total metabolic output in Chongqing in 2007 was approximately 70% of its total metabolic input and both are increased, with an annual growth of 7.07% and 14.3% respectively; 2) the decreasing trend of most emergy efficiency indexes including system emergy self-sufficiency rate, emergy waste rate and emergy yield rate show that eco-economic system in Chongqing is still a resource consumption one, that the economic development mainly relies on local non-renewable resources, that the pressure of urban development on the environment keeps increasing and that the urban recycling capacity is yet to be improved; 3) the metabolic efficiency and metabolic intensity of the system are both increased, with an annual growth rate of 7.34% and 8.41% respectively; and 4) the environmental impact index of metabolism drops slowly, while the environmental loading ratio is large? fluctuating between 16.8 and 13.7. The prerequisite of achieving sound operation of the metabolic system in Chongqing lies in the regulation and control of the interactive relationship between metabolic fluxes so as to promote the coordinated symbiosis of urban metabolic emergy fluxes.

KEYWORDS

Emergy Theory, Material Metabolism, Metabolic Flux, Metabolic Efficiency, Chongqing Municipality

Cite this paper

X. Gao, X. Luo, L. Deng and M. Zeng, "Analysis of Material Metabolism of Eco-Economic System in Chongqing Based on the Emergy Theory," *Low Carbon Economy*, Vol. 2 No. 1, 2011, pp. 32-40. doi: 10.4236/lce.2011.21006.

References

- [1] R. S. Halla, D. Shauna and A. K. Christopher, " Estimating the Urban Metabolism of Canadian Cities," *Canadian Journal of Civil Engineering*, Vol. 30, No. 2, 2003, pp. 468-483. doi: 10.1139/I02-105
- [2] D. Li, J. R. Liu and R. S. Wang, " Progresses on the Analyzing Methods and Evaluating Indicators of Urban Ecosystems Metabolism," *Ecological Economy*, No. 6, 2008, pp. 35-39.
- [3] Q. F. Ma, X. J. Huang, S. T. Yu, et al., " Review on the Research of Metabolism," *Journal of Natural Resources*, Vol. 22, No. 1, 2007, pp. 141-152.
- [4] H. Haberl, S. Batterbury and E. Moran, " Using and Shaping the Land: A Long-Term Perspective," *Land Use Policy*, Vol. 18, No. 1, 2001, pp.1-8. doi:10.1016/S0264-8377(00)00040-5
- [5] W. Liu, M.T. Ju, Z. Li, et al., " Energy Flow Analysis in Regional (Urban) Environmental and Economic System," *China Population, Resources and Environment*, Vol. 18, No. 5, 2008, pp. 59-63.
- [6] Y. Zhang and Z. F. Yang, " Emergy Analysis of Urban Material Metabolism and Evaluation of Eco-efficiency in Beijing," *Acta Scientiae Circumstantiae*, Vol. 27, No.11, 2007, pp. 182-189.
- [7] J. Zhou, A. G. Qi, D.Y. Yuan, et al., " Emergy Analysis of Eco-economic Systems of Hunan Province,"

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issues Guideline](#)

[LCE Subscription](#)

[Most popular papers in LCE](#)

[About LCE News](#)

[Frequently Asked Questions](#)

[Recommend to Peers](#)

[Recommend to Library](#)

[Contact Us](#)

Downloads: 49,861

Visits: 141,143

Sponsors, Associates, and
Links >>

- [8] H. Liu, Q. Wang, Y. Song, et al., "Evaluating Regional Circular Economy Based on Emergy Theory: A Case Study in Liaoning Province," *Resources Science*, Vol. 30, No. 2, 2008, pp.192-198.
- [9] Chongqing Bureau of Statistics, "Chongqing Statistical Yearbook (2003-2008)," Chinese Statistical Press.
- [10] S. F. Lan, P. Qin and H. F. Lu, "Emergy Analysis of Eco- economic System," Chemical Industry Press, 2002.
- [11] R. Q. Wang and X. M. Rong, "Emergy Analysis of Agro- economic System in Shanxi Province," *Chinese Journal of Applied Ecology*, Vol. 19, No. 10, October 2008, pp. 2259-2264.
- [12] B. Y. Du, M. X. Men, H. Xu, et al., "Comprehensive Evaluation of Environmental Resources and Farmland Ecosystems in Hebei Province Based on Emergy Theory," *Resources Science*, Vol. 30, No. 8, 2008, pp. 1236- 1242.
- [13] H. T. Odum, "Environment Accounting: Emergy and Environment Decision Making," John Wiley and