

研究论文

城市环境经济能值综合和可持续性分析

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摘要 澳门资源缺乏,人口高度密集,其生命支持系统几乎完全依赖进口。近年,澳门经历了经济的繁荣和社会的发展,澳门如何能克服其自身的缺点而生存? 试图应用H.T.Odum创立的能值(Emergy)分析理论和方法,从城市生态系统的理论出发,对澳门的能值流进行系统分析研究,通过一系列能值指标,评价澳门城市生态系统自然环境和经济社会可持续发展的状况,为澳门制定发展策略和产业调整提供科学指导依据。2003年澳门城市生态系统应用能值为 220×10^{20} sej(Solar emjoules, 太阳能焦耳, 缩写为sej), 输入的购买能值有 216×10^{20} sej, 出口能值为 140×10^{20} sej。旅游博彩业为澳门带来52.1亿美元的收益,折算能值收益为 86.5×10^{20} sej, 而游客只消费能值 32.6×10^{20} sej的商品和服务,旅游博彩业巨大的能值净收益为 53.9×10^{20} sej, 旅游博彩业的贡献冲击比率为2.65。研究还发现,以相同的货币进行商品交换,中国大陆与澳门的能值交换比率是1.8倍。澳门旅游博彩业的能值剩余和澳门与中国大陆的能值交换优势,是维持澳门生态经济系统的关键因素。最后对澳门的可持续发展状况进行了讨论

关键词 [能值](#) [能值指标](#) [城市生态系统](#); [澳门](#)

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The emergy synthesis and sustainability analysis of city's environment and economy

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Abstract Macao is a population-dense consumes society which is lacking in nature resources and almost all of her life support goods and raw materials depend on import. In the recent years, Macao has experienced an economic boom, as well as social development. How can Macao survive herself against these shortcomings? This paper attempts to incorporate emergy flow analysis to investigate the urban development sustainability of Macao's environment and economy in 2003. The research has revealed that the total used emergy was 220×10^{20} sej (Solar emjoules), and the imported emergy of Macao was 216×10^{20} sej, while the exported emergy was about 147×10^{20} sej in 2003. The gambling and tourism industries (refer to tourism) are the main profit earning industry of Macao, and they have captured D\$ 5.21 billion in 2003, with the emdollars emergy 86.5×10^{20} sej, while at the same time tourists only consumed 32.6×10^{20} sej, the emergy surplus of tourism was 53.9×10^{20} sej, the contribution impact ratio of tourism was 2.65 times. Macao also benefit from the exchange with Mainland China since they have different Emergy/ D\$ ratio when using the same currency to compare, the emergy exchange ratio was 1.8 times. These two kinds of emergy surpluses are the most important sources for sustainable development of the Macao urban ecosystem. Finally the sustainability of Macao has been discussed.

Key words [emergy](#) [emergy indices](#) [city ecosystem](#) [macao](#)

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