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## ENTROPIC LIMITS TO ECONOMIC GROWTH: A REVIEW

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Economic growth is described both as feasible and desirable objective in the standard economic literature. However, the feasibility of continuous economic growth is questionable with the constraints imposed by the physical environment. The second law of thermodynamics forms the theoretical foundation of this. This paper intends to discuss the relevancy of entropic limits to the economic growth, in particular, the implications for current levels and the modes of economic activity.

As described by Georgescu Rogen, economic system is only an open subset of a larger biophysical system with matter and energy crossing the boundary into the economic system in a low entropy state and evolving into a high entropy state. This unidirectional flow differs fundamentally from the view taken by standard economic theory which sees the economy as a closed system balanced by internal market equilibrium. There are two important implications of this analysis. One is that the production process necessarily results in an entropy deficit. Second is that the fundamental distinction is established between the stock of terrestrial resources, analogous to capital and the flow of solar energy, analogous to income indicating the difference between living on income and living on capital.

This analysis has numerous implications on the current levels and modes of various economic activities. Absolute scarcity of entropy flows means the scarcity of environmental sources and sinks. No industrial system could continue indefinitely drawing down terrestrial stocks of low entropy, which encompasses rising costs both environmental and production. Also there are strict limits to what can be achieved through technological progress or resource recycling. Therefore, technologies that are able to produce more welfare out of a given entropic flow would be more important than technologies, which simply increase the volume of throughput.