

THERMOECONOMICS: BEYOND THE SECOND LAW

Peter A. Corning

Institute for the Study of Complex Systems, Seattle WA, USA

ABSTRACT

“Thermoeconomics” represents a paradigm shift in our understanding of the role of energy in living systems, and in evolution. It is based on the proposition that the role of energy in biological evolution can best be defined and understood not in terms of the Second Law of Thermodynamics but in terms of such economic criteria as “productivity”, “efficiency”, and especially the costs and benefits (or “profitability”) of the various mechanisms for capturing and utilizing available energy to build biomass and do work. Thus, thermoeconomics is fully consistent with Darwinian evolutionary theory. Economic criteria provide a better account of the advances (and recessions) in bioenergetic technologies in evolution than does any formulation derived from the Second Law.

Keywords: economics, evolution, second law, bioenergetics, entropy