from the flows of energy and materials. Hierarchies of increasing complexity and spatial influence result from successive energy transformations that develop energy chains where there are many low energy components, and fewer and fewer higher energy components. Networks of cities, parks and wildlife reserves, and urban land uses within cities need to follow a hierarchical distribution. There is an optimum distribution of components for any given landscape that should be recognized at all levels of planning and design. The question of one large park vs. many small parks, or one large city vs. many small cities within a landscape begs the answer that they should be distributed hierarchically in a size class distribution that results in having decreasing numbers in each successively larger size class category.

Isolation decreases overall system performance. The biosphere's hierarchy is composed of chains of energy flow of increasing complexity from many small units to fewer and fewer larger units. Each is connected, both within levels to components of like kind and between levels. When components are isolated, less total performance is achieved since exchanges between components are no longer possible. In landscapes dominated by humanity, developed lands often break linkages and the wild landscape becomes a series of isolated refugia having no means of exchange from one to the other. In all landscapes, the processes of convergence and divergence operate simultaneously through linkages between and among levels as a whole rather than isolated incidents, thus instead of thinking of the built environment as the figure and wildlands as the ground, the reverse is more appropriate. In this way landscape fragmentation is minimized.

Energy, space, and time are linked so that things having large spatial effect also have longer time constants and greater energy. It has long been known that wildland reserves designed to ensure survival of large animals must be large in size. It takes a large area to absorb and process sufficient solar energy to support these animals. Large cities must have larger support regions than smaller cities. Regional shopping centers or parks cannot exist without sufficient populations for their support. The appropriate size of any unit in the landscape is dictated by the available support region. In like manner, things with long time constants (turnover times) have large spatial effects and have greater influence. High energy components tend to be less frequent, have longer turnover times, and have larger spatial influence.

Production and consumption must be coupled in a symbiotic relationship of consuming actions and recycle. There can be no consumption without production. Good regional patterns of human uses (consumption) and productive process must be linked with recycle pathways where the "wastes" from consumption are fed back and stimulate increasing production. To do otherwise, decreases total performance; but more importantly it is not sustainable. This leads to good waste management from cities where sewage is recycled in wetlands and agriculture and solid wastes are recycled and reused.

All landscapes have a unique energy signature; design within it or be prepared to fight it. An energy signature is the particular combination of energy sources that "drive" and organize a landscape. In the humid tropics, rainfall, sunlight, and winds predominate; while in a coastal location, waves and tides are also important. Where rainfall is high and topography steep, landscapes are organized in dendritic patterns of river flows. In all cases, good fit recognizes the signature and its resulting landscape organization and designs within the landscape constraints. The dominant energies of wind waves and tides in coastal locations, for example, are such that prominent long lived ecological systems having great accumulations of biomass are not possible. These locations require a different strategy, cheap structure that can be easily moved and replaced. The structures of humanity in coastal locations should follow the same design initiatives.

The best landscape restoration is that which amplifies normal successional patterns. Throughout developed regions of the globe, we are being called upon to restore previously altered landscapes to some productive capacity, often at great expense. Natural succession is the normal pattern of landscape restoration, that follows some event that seriously alters landscape organization. Gaps caused by tree falls, landslides, and tornadoes are common in many forested ecosystems and are quickly repaired because they are relatively small and adequate seed source is readily available. Yet hurricanes, major wild fires, and volcanos are not so common and are large in spatial scale. They require much longer periods of time