

Minimum Technical Requirements for Sustainability

(excerpts from: Prugh, Thomas, and Herman Daly, *The Local Politics of Global Sustainability*, Washington, D.C. : Island Press, 2000)

Global ecosystem does 3 things human economy cannot do without:

- Provides resources
- Performs ecological services
 - Photosynthesis
 - Atmospheric gas regulation
 - Climate and water regulation
 - Soil formation
 - Pest control
 - One serious attempt to monetize global ecosystem services estimates their value at \$33 trillion/year—roughly twice total output of all the world’s national economies
- Absorbs wastes

Running a sustainable economy comes down to 3 simple rules:

- Don’t use up all the resources
- Don’t undermine the delivery of ecological services
- Don’t overwhelm the waste absorption capacity

Conventional Economics (Neoclassical)

- Central assumption:
 - Workings of economy are fundamentally captured by the circular flow of exchange value:
 - Firms produce goods which are bought and consumed by HHs
 - HHs supply labor by which firms produce goods
 - Transactions take place in markets
- Because system is considered self-contained...no reason it cannot grow indefinitely
- Resources considered almost infinitely substitutable for one another
- Factors of production treated as strongly substitutable

Ecological Economics

- Land (relatively unimportant in Neoclassical economics—just another form of capital), the global ecosystem, is the economy’s home and workshop; economy nests within and is utterly dependent upon it
- Ecosystem is:
 - Limited in size
 - Not growing
 - Not receiving any new flows of materials (except energy from sun)
- Because economic production is conversion of natural world to manufactured world, economy can grow only at the expense of the global ecosystem
 - Since no subsystem can outgrow its host, the economy cannot grow larger than the global ecosystem
- Since global ecosystem is finite...economic growth cannot continue indefinitely
- Resources flow into economy from enfolding ecosystem...are transformed by labor and capital (using energy)...then pass out of the economy and back into ecosystem as wastes (termed “economic throughput”)
 - Many important transactions take place largely outside of markets (costly health effects of smog, for example)
- Factors of production not substitutes, but complements (substitutable to a certain extent)
- All forms of capital necessary for production...but beyond certain critical limits, substituting one form for another reduces output

What actually do consumers consume?

- Earth has already added considerable value to its resource provision

- Wood, for example, already possesses structural and aesthetic qualities that make it useful for certain purposes
- Whatever value is added to make a useful product is an addition to this resource inherent value
- When the thing made wears out, or is junked, or burnt (as in the case of fuel)...replacing them will require more economic production *and* more work by nature.
- Economy, therefore, is not a closed circular flow, but a constant one-way flow of high quality (low entropy) matter/energy turned into low quality (high entropy) matter/energy (wastes)
- Laws of thermodynamics say that total quantity of matter/energy is the same before and after, but the value or usefulness of the stuff has declined sharply
- What consumers actually consume is the value in the stuff...that is, the value of both natural and manmade capital

Converting natural capital adds value of one kind...but subtracts value of another kind

- Value added to felled tree converting it to lumber...value subtracted because tree's contribution to forest ecosystem services is lost
- Measures of economic output (GNP) typically ignore loss of value from cutting the tree