The Natural Step:
A Compass For Sustainable Development

BACKGROUND

Although environmental concerns have gained public prominence over the last few decades, there is still no consensus on the seriousness or timing of the threats posed. This lack of consensus is due to the fact that there is as yet no common language with which people of differing backgrounds can collaboratively define and thereby solve problems. In addition, most environmental initiatives address downstream effects of pollution, resulting in thousands of regulations and a corresponding backlash against such strictures on the part of the regulated community. The backlash, of course, makes our environmental problems no less real, signaled by continued warnings from scientists across the globe that all natural systems in the world today are in decline, resulting in profound implications for the health and survival of humans and other species.

The Natural Step (TNS) sustain-ability principles are based on the premise that the roots and magnitude of the environmental problems we face today are grounded in a fundamental design flaw in modern society. The flaw: virtually all human activities use natural resources in a linear, "once through" fashion which is antithetical to the cyclical nature of biological systems. In all natural systems, "waste" from one process is used as fuel or "food" for the next process. Conversely, human commerce and society is currently organized on linear principles--inputs in the form of natural resources are systematically turned into products and waste, much of which is so harmful and toxic that it must be sequestered as far from all life forms as possible. Cyclical systems are sustainable. Linear systems, by definition, are not.

The Natural Step (TNS) fosters the use of a scientifically based framework to support two key societal shifts: 1) widespread understanding of the root source of our environmental problems; and, 2) implementation of methods and techniques that seek to redesign the relationship between human society and natural systems, based on that understanding. At its essence, the mission of The Natural Step is to catalyze the transition from our present unsustainable human societies, organized as they are on linear principles, to societies that are attractive, sustainable, and organized on the same cyclical principles upon which natural systems are organized. This shift requires a fundamental change in awareness, values and behavior on the part of a critical mass of the population.

Principle of Matter Conservation)

- Matter and energy tend to disperse. (According to the Second Law of Thermodynamics) This means that eventually, all matter introduced into society (either from the earth's crust, or human made) will be released into natural systems.
- Material quality is characterized by the concentration and structure of matter. We cannot consume energy or matter--but we can and do consume material quality (the degree of order within energy and matter).
- There is only one large scale source of net increase in material quality on Earth, and that is photosynthesis. Green plant cells, with light from the sun, provide the one mechanism to reconstitute disorder (created by human and animal consumption) back into net order.

These basic science principles, and the fact that human and other life cannot tolerate continual degradation of the environment leads to the cyclic principle. "Waste must not systematically accumulate in nature, and there must be at least as much reconstitution of material quality as dissipation of material quality." (Robert, Hawken, Daly, Holmberg; A Compass for Sustainable Development).

While these scientific laws, grounded as they are in the laws of thermodynamics, are not new, the framework that they form together is a remarkable breakthrough in making complex scientific principles easily understood. Perhaps the most remarkable outcome of this work is its demonstration that the implications of what we agree on are more far-reaching than what we disagree on. Four "system conditions" that describe the necessary and sufficient prerequisites for a sustainable society derive directly from this core scientific framework:

1. Substances from the Earth's crust must not systematically increase in nature. This means fossil fuels, metals and other minerals must not be extracted at a faster pace than their slow redeposit and reintegration into the Earth's crust. This means we must systematically decrease our dependence on underground metals, fuels and other minerals, and replace them with renewable sources.
2. Substances produced by society must not systematically increase in nature. This means that substances must not be produced at a faster pace than they can be broken down and integrated into the cycles of nature, or deposited into the earth's crust.
3. The physical basis for the productivity of nature must not be systematically deteriorated. This means we cannot harvest or manipulate ecosystems in such a way that their productive capacity and diversity are diminished.
4. The use of resources must be efficient and just with respect to meeting human needs. Basic human needs must be met with the most resource efficient methods possible, including a just resource distribution. This is necessary to ensure the social stability and cooperation for making the changes in due time.