Intensity Factor

Back in 1987 the U.N. World Commission on Environment and Development observed that “sustainable development requires a change in the content of growth to make it less material and energy-intensive and more equitable in its impact.” Since that time the “intensity factor” has become a popular measure and sustainability indicator.

The “intensity factor” is normally defined as a ratio of the amount of a particular material or energy input compared to the output obtained for a particular economic activity. The intensity factor can be expressed in a number of ways and at different levels of aggregation in an economy. For example, the amount of steel (pounds) per auto produced is one form of resource intensity. The amount of energy consumption per home (KWhr or BTUs) or gasoline consumption per vehicle mile traveled are other examples of energy intensity.

In addition, intensity factors are determined for whole industries (auto industry, glass industry, etc.) or whole sectors of the economy (manufacturing sector, agricultural sector, commercial sector, etc.) in terms of the dollars of energy consumed compared to the total dollars of output. At the highest level of aggregation, the intensity factor may be determined and tracked for an entire economy; for example, dollars of energy consumed or BTUs of energy consumed per trillion dollars of gross domestic product. It should be noted that many variables contribute to determining the intensity factor – particular technologies, use of recycled materials, size of homes and vehicles – to name just a few. When corporations talk about sustainability, they are mostly concerned with the intensity factor, which is an important opportunity for them to lower costs through more efficient use of natural resources and reducing wastes. When a manufacturing industry is being analyzed, the intensity factor in terms of changes in the amount of resource or energy input per unit of output is an important indicator; the World Business Council on Sustainable Development has defined the term “ecoefficiency “ to reflect this.

For entire economies, intensity factors may decline over time due to shifts in the composition of economic activity; for example a shift from a manufacturing economy to a service economy to (now) an information economy. Conversely, in the case of developing countries, intensity factors are increasing during the shift from peasant agricultural economies towards manufacturing economies.

Ultimately, from the viewpoint of becoming more sustainable, it is important that intensity factors decrease over time in a society and that the economic inputs reduce the consumption of nonrenewable resources and energy through waste minimization, increased energy efficiency and increased use of recycled materials and renewable energy.

Intensity Factors: Up Close and Personal

For individuals concerned with sustainability, reducing the intensity factor can also be a means of reducing costs, but it also can be a means of promoting environmental and social aspects of sustainability. In some cases, actions taken to reduce the intensity factor can benefit all three; for example, insulating a home to reduce energy consumption.

Given the number of consumer choices and decisions in today’s society, there are countless opportunities to reduce intensity factors consistent with one’s own lifestyle preferences. The general consumer decisions, which affect the intensity factor and hence the amount of resource consumption,

relate to number, size, composition, efficiency and durability. Here are some questions which can help stimulate thinking about reducing the intensity factor through lifestyle choices:

Number: How many vehicles does my household really need? How many houses? (Can I rent out a house to another person… or rent someone else's house?) How many electronic gadgets do I really need? How many shoes, dresses and suits? How many tools? How many appliances?

Size: How big a house do I really need? How big a vehicle? What size television and other appliances?

Composition: Can I purchase some goods in good used condition? Can I purchase some products or supplies made from recycled materials? Can I purchase a home featuring construction from natural materials and renewable resources (e.g. stone and wood instead of steel, brick and concrete)

Efficiency: Do I have a transportation alternative to driving? Can I afford a more efficient vehicle (which also saves money in the long run)? How can I make my home more efficient for lighting, electrical consumption/use of appliances, heating, cooling and water consumption?

Durability: Do I have a choice to purchase a product which is more durable and built to last?