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Technology in a Sustainable World

One of the primary aims of modern technology and science must be to preserve the health of our environment and society for future generations. We live on a planet with a finite amount of resources, and which is a more or less closed system. We only have what we started with, and we have to live with whatever waste we produce. Our current trajectory as a species is one of exponentially growing population and reckless use of resources and disposal of manufactured goods.. Save the possibility of population relocation, resource mining or waste disposal on other planets, unless we alter our course, we will undoubtedly exceed the carrying capacity of our environment. It is therefore essential that as scientists and engineers, we develop technologies and systems which facilitate sustainable practices for our environment and our society. Such technologies and systems should minimize the extraction of nonrenewable resources, discourage the use of disposable goods and practices which favor profit over foresight such as planned obsolescence, promote the repurposement of previously used goods, and emphasize practices which benefit the health and wellbeing of humans and our ecosystem alike.

These goals are applicable to a wide range of fields, from material science to civil engineering to chemistry. In every discipline, through intentional modification of practices and direction of focus, sustainable causes can be achieved. For example, the development of techniques for concrete production which require less energy input and utilize more easily renewable resources may be a cause which combines all three of the previously mentioned disciplines. The scope of the impact of such a technology, though, extends beyond science and engineering. In order for development to occur, it is necessary for investors to see the value in such a product and support it financially. It is then necessary for businesses to market and distribute the product, and for consumers, whether individual, corporate or governmental, to adopt the product. If any link in this chain of production is missing, then the idea cannot come to fruition and its benefits to society cannot be realized. But with the cooperation of all involved parties, it is possible to develop technologies which make significant contributions to sustainable development.

It is not enough, though, to develop sustainable technologies. In many cases, it is not the creation of technology which is necessary for sustainable advancement, but rather cultural shifts towards more sustainable practices - at least in the foreseeable future. For example, the development of energy efficient public transportation systems, which is very prevalent throughout Europe and Asia, has an incredible potential to benefit to society. It is necessary, though, that the population actually utilize these transportation systems in order for their existence to reduce the carbon footprint of transportation. If everybody drives individual vehicles, as do the overwhelming majority of Americans, then the development of improved transportation infrastructure would have little environmental impact. These cultural shifts can be influenced by governments. For example, by imposing tolls on public roads or increased taxes on purchasing individual vehicles, the population can be economically swayed towards using sustainable technology. Ultimately, though, it is necessary for individuals to make the conscious decision to utilize these technologies.

It is then clear that both aspect to sustainable development are necessary. Adequate technology must be developed. Without recycling facilities, individuals do not have the option to recycle. But it is equally important that individuals make conscious decisions to act in ways which minimize their negative impact on the environment, and support the growth of sustainable technologies which will serve to maintain a planet which can sustain our species for generations to come.