

A Sustainable Environment: Our Obligation to Protect God's Gift

by
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Developing Countries Should Develop the New Technologies

Scientists and engineers are continually trying to develop technologies that will help solve our environmental problems like global warming, fossil fuel depletion, water shortage, and others. Some of the technological innovations, however, can be classified as “destructive innovation”. This means that the new technology may not be acceptable because it would have a negative impact on an existing market or existing technology.

An example of destructive innovation is the development of LED (light emitting diodes) lighting that use a fraction of the energy of incandescent or compact fluorescent lamps (CFL) and last twice as long as CFLs and about twenty to thirty times longer than incandescent lamps. So why have they not been adopted to a greater extent? The current electrical infrastructure was developed for incandescent lamps, and CFL lamps were designed to adapt to that infrastructure. It is not as easy to adapt LED lamps because they require special electronic circuitry. However, they can be used where the incandescent lamp infrastructure doesn't exist, in regions of countries that don't have electricity and thus no lighting. They can use LED lamps powered by batteries charged with inexpensive photovoltaic sources – solar energy.

One of our major energy problems is the consumption of gasoline for automotive transportation. There are several technologies currently ready for commercialization that could be classified as “destructive innovation”. The Rocky Mountain Institute has designed the “Hypercar”, an automobile that achieves over 100 miles per gallon on an internal combustion engine. How does it do it? If you think about the typical car on the road, you have a 4000-pound automobile and a 150-pound driver, so a large engine is needed to move the large automobile. The Hypercar is made from carbon fiber composites rather than steel, making it much lighter while preserving the necessary strength for a car body. Consequently, it can be powered by a much smaller engine. However, the auto assembly plants in the U.S. and other industrialized countries have been designed to build cars with steel bodies. While the U.S. is currently shutting down auto assembly plants due to slower sales, countries like China and India are building new assembly plants. Why not build them for cars similar to the Hypercar?

Another automotive technology waiting for adoption is the hydrogen-powered automobile. You may have seen articles or ads by BMW showing a fully developed automobile that is fueled with hydrogen. According to BMW, it is ready for sale. But there is one problem: where can you fuel the car with hydrogen? Obviously, we need to have our gas stations to add another fuel for this automobile. But why would any gas station do so if there are no cars requiring the hydrogen fuel? And how could BMW sell this automobile when there is no hydrogen fuel available? It's an example of the

“chicken and the egg”. However, countries like China and India will be adding automobile fueling stations to accommodate all the new cars being built in these countries. Why not build hydrogen-fueled cars and provide hydrogen fuel for them?

Other alternative technologies for automobiles include fuel cells and batteries. The fuel cell powered automobile also needs hydrogen as the energy source for the fuel cells. Last month, Honda announced the production of fuel-cell powered cars, but the limited edition will be available only in California where there is a source of hydrogen fuel. Again, China and India are in the proper stage of economic development to provide an infrastructure to provide the necessary energy for these cars. Also, battery driven cars need to have their energy source replenished from time to time. What if the car fueling stations provided fully charged batteries that can replace an existing battery in the car. So instead of pulling into a gas station that offers regular, mid-grade and premium gasoline, the new stations could offer, say, three different kinds of batteries. A battery powered car can pull in, change out the battery and continue its trip. We can't do this here because of the “chicken-and-egg” syndrome, but China and India could.

The biggest complaint by the U.S. Congress relative to carbon emissions is that China and India are on their way to become the biggest emitters. Why not help these countries reduce the carbon emissions by providing the technology that we can't implement in the U.S.? Just look at what Israel and Denmark are doing. Both countries are “rewiring” their infrastructure so that they will have mostly electric cars within ten years. Unfortunately, because these countries are small, their impact on reducing carbon emissions will be minimal.