

Smart technologies or sustainable technologies?

Introduction

Several of the devices and technologies that we use are not necessarily energy efficient nor are the 'smart technologies' that power them, drawn from 'renewable/sustainable energy sources'. This article takes a look at some of the smart technologies vs sustainable technologies dilemma that faces us today.

The solar energy challenge

The top of the mind recall on renewable energy is solar and this continues to be a key focus despite the fact that the same materials are being used to create mobile phones and computer monitors which has driven up prices of basic materials and kept solar panels relatively unaffordable. 2008 was the first year that sales of silicon solar cells far outstripped those used for microelectronic devices. However, even though Silicon is the most abundant element after oxygen - yet it makes relatively inefficient cells - the more efficient solar cells rely on materials much rarer than silicon.

Some of the innovations that are currently underway are to develop cheaper methods of obtaining silicon such as through micromachining to create bifacial cells one of which is enough to build a 140 watt panel. Other innovations are thin film processing by using flexible substrates. Multi junction solar cells are another innovation made up of wafers of semiconducting materials with similar crystalline structure. Conductive polymers, nano-particles, UV, Infrared and 3D solar cells are all new technologies that are under active test and commercialization.

Fuel cells, biofuels and cars

A lot of technology is built into automobiles these days and fuel cells / hybrids are relatively proven technologies. However, today this technology depends on platinum which if fitted into the 500 million vehicles would exhaust platinum in 15 years! Alternative technologies for the future that are under development include nickel catalyzed fuel cells, carbon nanotubes and even using bacterial enzymes to split water.

The other heated debate is on usage of land mass for biofuels as this impacts the usage of vast tracts of agricultural land that were used to produce food to produce biofuels especially from edible plants. Technologies here are now focusing on fuel derived from inedible plants and material or even extracting bio-fuel from marine algae or seaweed that could reduce dependency on use of land.

Most promising energy sources

A study carried out by Stanford University's atmosphere and energy program lists the following technologies in the order of preference (read sustainable) - Wind, Concentrated solar mirrors (that heat towers of water), geothermal energy, tidal energy, solar panels, wave energy and hydroelectric dams. The key factors here are the reduced greenhouse emissions as well as impact on the ecosystem.

Smart technologies for the future

As per Walter Dzerko, an expert on smart technologies, some of the smart technologies for the future would focus on the following - **smart home fabrication** and reduction of waste in conventional house building; **smart infrastructure sensors** in buildings, vehicles and infrastructure to provide a dynamic sense and respond environment (like a nervous system); **electric vehicles** and smart roads with traffic bumps that produce electricity and road medians that adjust road width to traffic flow; **bio-mimicry** - design systems and products that mirror natural biological models; smart and **emergent traffic congestion management** systems; **modernizing the electrical grid** to accept inputs from alternative energy sources and reduce power loss during distribution using super conductors and nano wires; **energy harvesting** through design of objects that generate their own energy; **smarter internet systems** and environments that are better connected and more user aware etc.

Some smart technologies today

If you want to experience some of these smart technologies - there are many choices that you can try - e.g. **Smarttech's** interactive whiteboards with interactive touch displays and other innovative learning technology products; **Kodak's** smart digital technology to make photography easy and enjoyable with 50% less cost without compromising on quality; **Crossbow Technologies** Smart dust sensors for Precision farming; Netafim's micro sprinklers for medium to low flow irrigation; **TheSmartHospital's** new generation Smart Hospital; **NTE** Spain's precision mechatronics for space and scientific applications etc.

The way forward

Every recessionary cycle wakes us up - the current one is further complicated by energy issues and a lot of the energy issues are to do with the proliferation of the numerous gadgets, devices and automobiles that rule our life today - maybe it is time to make our life simpler and more conventional and perhaps more refreshing? So when you think of new or smart technologies or when you buy the next gadget - think of the larger impact they have on the ecosystem and how renewable is the energy source that runs it!