



R&D—Some Priority Areas for India

I.R. Sharma

Blog: <http://drishtikona.com>

Scientists will also face challenges in restoring a clean environment by replacing fossil fuels with renewable energy from the sun, wind and nuclear systems. According the former president, Abdul Kalam, some of the future tasks for the scientists and technocrat are:

- Evolution of a Unified Field Theory, which may be the ultimate of physics, by revealing how the universe is born and how we are born;
- Evolution of an alternate habitat for mankind by the scientific community of today and tomorrow;
- Evolution of an Earth-Moon-Mars complex to bring to the earth new material like Helium-3 for the generation of solar power;
- Evolution of a clean atmosphere by replacing fossil fuel with cost-effective renewable energy systems, leading to energy independence;
- Exploring the human body, particularly gene characterization through the proteomics project for developing gene-based drugs;
- Enhancing the foodgrain output from the present nearly 230 million tonnes to 380 million tonnes with reduced land, water and number of people working in farms through the use of technology;
- In the area of communication, a big revolution is setting in. High-bandwidth mobile wireless is in the offing. This will result in mobile phones becoming a convergent system for multimedia applications for meeting the needs of communication in office, home and on the move.
- Rural development through the provision of urban amenities in rural areas (science and technology as the focus);

Generation of nuclear energy through Thorium-based reactors.

I think India must take up the innovations as a means to be competitive globally. There must be clear-cut emphasis of a large number of researchers to help out with designing and developing products that some entrepreneurs can easily manufacture and sell to billions of the consumers of the world. If India is to be in competition with China, it must think in that way. Even with \$1 or Re 1 as margin for some unique product that is essential for each household, one can imagine the business with billion or more who would buy it in the world. Can India's innovators and or entrepreneurs take such challenge?

Some priorities may be:

Biodegradable plastics or finding a eco-friendly substitute to do away with the plastic bags popularly used that is damaging the environment and causing damage to many living beings too.

Anything to enhance the efficiency of the renewable energy: very large scale solar thermal to steam as the answer to coal fired plants for generating electricity, and storage to keep providing electricity at night.

To cut down energy requirement in appliances used by the households, be it computers, water purifiers, air conditioners, heaters, or microwave ovens or electric ovens.

Improving fuel efficiency of all the engine driven mechanical prime movers used, be it diesel pumps, tractors, cars, commercial vehicles, a lawn mower, or diesel generators used for domestic or industrial requirement including railway engines.

There can be many areas for innovations. For instance, rural women get exposed to hazardous toxic emissions and smoke from burning biomass like wood, crop waste and



animal dung during cooking. As reported, Envirofit International, a US-based non-profit organization, has introduced a range of clean burning biomass cook stoves that reduce toxic emissions by as much as 80%, while using 50% less fuel and reducing cooking cycle time by 40%. The stoves are now being made available in more than 700 villages in Karnataka and 300 villages in Tamil Nadu. Should it not be considered a great innovation?

As Thoman Friedman says in his new book, the country that can innovate the most in the areas for clean energy can lead the world. With a total of \$148.4bn investment in clean energy companies and projects worldwide during 2007, it is but very true. Indian innovators do have this opportunity to establish their leadership globally, if they can come out with breakthroughs.

Another area for innovation is the waste elimination or reduction in every thing that we produce and consume. Innovators are to make a breakthrough with some nanotechnologies that can produce parts from reconfigurable atomic parts that can be easily recycled or transformed to some other products if so wished.

The list of the products that received 'Popular Mechanics' Breakthrough Awards are the examples of what are being wished by the consumers and the society at large. Thousands of Indian researchers working in colleges, workshops, and laboratories will have to emulate such an innovative instincts and interests.

- The M-Spector Digital Inspection Camera, from Milwaukee Tools, is designed to give people trying to do home repairs a way to see behind walls without cutting holes first. It costs \$259.
- The Livescribe Pulse Smartpen allows its owner to take notes on special paper while simultaneously recording audio. By tapping on a specific section of notes on the paper, users can get a playback of that section of audio. It can also perform simple

language translation as well as other functions.

- Potenco's PCG1 power generator allows anyone to power up small devices like mobile phones with their hands. Pulling on the unit's cord for two minutes provides 40 minutes of power-up.
- Intel's Atom processor with a low-power chip that is designed to give high-performance capabilities to mobile devices and light laptop computers.
- The Craftsman Nextec Multi-saw gives buyers a combination jigsaw and reciprocating saw. A 12-volt lithium-ion battery that can drive the unit to cut in a variety of places difficult to reach by any single tool, powers it.
- Microsoft's Photosynth, free software from Microsoft that allows users to create a browsable 3D model based on a series of related photographs. The software stitches the pictures together, creating the model based on overlapping elements of the images.
- Amazon's Kindle, the e-book reader from the famous online bookseller, the Kindle allows users to read books, newspapers and other documents on a thin, light digital device. It is sparking innovation in e-readers.
- Infiniti's Around View monitor, designed to give drivers a 360-degree view around their cars while parking. The system features a series of ultra-wide-angle high-resolution cameras that produced images that are aggregated to give the driver a top view of the car and the area around it.
- The Caroma Profile dual flush toilet that pipes gray water from a bathroom's sink into the toilet's tank, cutting down on water wastage.

Two of the individual awards have gone for real useful works of innovation for the deprived class.



Amy Smith, a senior lecturer at MIT won the Breakthrough Leadership Award for research into water purification and both boosting the quality of medical care and reducing daily work burdens of rural women. According to Popular Mechanics, “she is leading a movement to tackle complex problems with simple technology.” I wish more and more professors in engineering and management institutions devoted significant time on research and development that helps the majority of the people in society to improve their quality of living. Water purification is certainly one such item. An affordable appliance must be available in every household in India that provides safe water.

Rudy Roy, Ben Sexon, Daniel Oliver, and Charles Pyott, the co-winners of the Next Generation award are the graduates of Caltech and the Art Center College of Design. The four have made names for themselves with a technique that makes wheelchairs for

residents of third world countries out of inexpensive bicycles. One major benefit of their innovation is that the wheelchairs can be repaired in any bike shop, unlike normal chairs. I end this story with two simple mechanical household implements that I find in Anand’s house. One is the toilet cleaning brush and the other a picker for Bart’s shit. I find them innovative and useful for every household. Hundreds and thousands of simple mechanical and electrical appliances and other products are being developed and sold all over the world that makes good business. For winning the game of global competition, Indian in thousands, may be millions, must be entrepreneurs and innovators. Indians will have to be manufacturers. India must manufacture and not go for importing everything from China-the global factory, as US is doing. If China can do, India can also do with the advantage of similar huge domestic market. And the education at all levels must help Indians to go that way.

