Turning Banana Trees into Paper

Factor 10

There are two obvious ways to tackle our energy crisis. The first and most obvious one is to create more of it, in sustainable ways, for example wind and solar. The second, and often cheaper approach, is to reduce consumption, by using our existing supplies more efficiently, or – as Amory Lovins puts it – generate "Negawatts"

However, in order to meet the challenges we face, both in terms of greenhouse gas emissions, and the coming decline in availability of oil, we really need to see not a 10% change, but a factor 10 – i.e. using one tenth of what we use now.

Changes of this magnitude come from thinking outside the box, from radically rethinking entire industrial processes. One approach to this is called BioMimicry, looking to nature for solutions. Why, for example, can spiders produce thread from protein and water at room temperature, while our industrial processes need noxious chemicals and high temperatures to do the same thing?

In nature, "Waste is Food" and anything output by one creature is used by another, by looking at our waste products we can start seeing the opportunities.

Papyrus Australia is working on a radical rethinking of paper production. Paper is currently one of our more polluting industries, and one of Australia's biggest power consumers. To make a tonne of paper, we start by cutting down a precious natural resource – our forests, these trees have been endowed with amazing strength and resilience, but the first step in making paper is to use large quantities of energy (10GigaJoules), and about 55 tonnes of water, and noxious chemicals, to beat most of the structure out of the tree and dissolve the lignin that holds the fibers together. Then we take more chemicals, and more energy to put back the structure needed for paper.

Banana Ply Paper

Papyrus Australia, takes a radically different perspective on paper, looking back to the time when paper was first made in Egypt, from the papyrus reed, which grows abundantly in the Nile delta.

First we start with a renewable resource, (yes, we know trees COULD be harvested renewably, but there is little likelihood of that!). Banana trees have been chosen because the banana tree only lasts for a year before it is cut down. Some of the trees are left to compost, but much of it is waste that has to be disposed of anyway. In addition banana trees, have fibers that run the whole length of the tree, rather than just a millimetre or so in trees.

Then – instead of beating it into a pulp, we carefully veneer (slice) a thin layer, spiralling in towards the middle. We take two or more of these layers, and laminate them at right angles, so that we get fibers – and therefore strength – in both directions. Then the paper is cured with pressure and heat to make a paper or cardboard.

Depending on choices made during the slicing and curing, a variety of results can be obtained. The paper can be manufactured directly into products such as boxes, bags or

boards or it can be coated in the same way as wood-chip based paper to make office stationary.
This process uses about 1% of the energy of a typical pulping process.
Banana paper has several physical advantages, including being water repellant and greaseproof, and having superior strength even when fully wet. This naturally leads to its early uses being those where strength and integrity are a requirement. The process can be cost competitive with wood-pulp.

Building a Sustainable Business

There are many opportunities to re-engineer our fundamental processes to achieve at least a factor of ten improvement, and there are many other good ideas lying around in Australia's universities, and elsewhere.
Our company – Natural Innovation – was formed by three of us to take brilliant ideas in the realm of sustainability, and turn them into businesses. Papyrus Australia is our first project together.
Unfortunately the investment community in Australia is very poor at investing in early stage technology companies, so many ideas just sit around gathering dust. It looks like we will have to take this concept to the US to raise the money. In the US there are many innovators who made their money in the internet revolution, and now see the need to invest it in a better planet.
Once we have raised the money, our intention is to build a demonstration plant, hopefully somewhere in the Northern Rivers and then a full-size plant somewhere where enough bananas are grown. In the long run, most plants will be based in the less developed countries where 98% of the world's bananas are grown.
For more information or if you'd like to be kept informed of developments, contact Mitra – 02-6684-8096 or mitra@mitra.biz