

## Every Story Has an End: Recycling

We've looked at end user goods and some of the intermediate processes in making them – including end of life recycling in specific cases. Before we sum up, we need to deal with one thing that is getting a great deal of emphasis – the “cradle to cradle” concept. As we saw in Interface carpets, building goods that last a long time, and then can be recycled back into themselves at the end of life is very important. On occasion, so-called “down cycling” can be just as important. For example old newspapers can be made into more old newspapers or into insulation. Newspaper to newspaper is true cradle to cradle, a discarded good being recycled back into itself. But it also takes a lot of energy and water to recycle a newspaper back itself. Water and energy used in de-inking can approach<sup>i</sup> that of making a newspaper from virgin pulp. On the other hand old newspapers can also be made into insulation. Some people disapprove of this on the grounds that this uses up the best long fibers most suitable for reuse in newspaper manufacture. But long newspaper fibers can still be recycled only a limited number of times. Fibers recycled into newspapers could in theory be used up within days, certainly in practice within weeks or a few months at most. Cellulose insulation, on the other hand, lasts up to fifty years – and saves energy every day of those fifty years. This is a lot more productive use for those long fibers.

Some people have made a whole principle of this – turning the waste from one industry into the raw material of another. In one preliminary study done in the greater Durham, North Carolina research triangle area, nearly half of the sites investigated had potential local partners to provide raw materials or to consume waste as raw material<sup>167</sup>. About half of those actually set up relationships. There was also a famous spontaneous “industrial ecology” that arose in Kalundborg<sup>168</sup>, Denmark as a simple economy measure.

So long as its value is not overstated, this makes sense. We do need to “close the loop” so that a great deal less of material extracted is discarded than now. But, as in the case of newspaper recycling, it is no cure-all. Recycling – whether via reuse, “cradle to cradle” or industrial ecology will not by itself result in anything like a factor four reduction, let alone a factor ten or twenty savings. But combined with all the other principles it can be the final step to lead to a factor four reduction in material intensity.

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<sup>i</sup> Some source claim recycling newspaper into newspaper requires more energy and water than using virgin fibers. I suspect that depends on the recycling process used.

That is – provide consumer goods and services that last longer, that are easier to repair, substituting material and processes with lower ecological footprints for material and processes with larger ones to provide the same consumer services. Then do the same thing at the factory level – use less ecologically intensive goods and processes to produce the longer lasting consumer goods that provide consumer service through less intensive materials and processes. Reduce pollution from such production. And then recycle the greatly reduced waste from this. You can see that a factor four reduction is fairly straightforward technically and economically –even at current market prices, though not so easy to achieve politically. A great many things (such as buildings) can be provided at a factor five reduction even at the end user level alone. Some, such as transportation, don't quite reach that great a level, probably end user goods and services average out to factor four or close to it. When you add in the much more modest (but still significant) reductions possible via pollution prevention, and savings from recycling, you definitely end up with over a factor four reduction.

Does it pass the sanity test that this results in cutting industrial energy consumption by a bit more than half? We increase lifespans, reduce intensity of materials that constitute those goods, and the intensity of processes used to manufacture them; it makes sense that we would end up reducing energy use by a little over half as a byproduct - before we save a single quad of industrial energy through conventional energy efficiency techniques.

## End Notes

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<sup>167</sup> Judy Kincaid, *Industrial Ecosystem Development Project Report*. May 1999. *Triangle J Council of Governments*, 23/Sep/2005 <<ftp://ftp.tjcog.org/pub/solidwst/ieprept.pdf>>.

<sup>168</sup> *The Kalundborg Centre for Industrial Symbiosis*, Kalundborg Municipality; Asnæs Power Station; The Statoil Refinery; BPB Gyproc A/S; Soilrem A/S; Novo Nordisk A/S; Novozymes A/S; Noveren I/S; Industrial Development Council - Kalundborg Region, 14/Aug/2004 <<http://www.symbiosis.dk/>>.