

A major theme in Hawken, Lovins and Lovins Natural Capitalism is “radical resource productivity”, or extracting several orders of magnitude in additional services and goods from a given unit input in comparison to conventional fabrication methods. In fact, much of the book is devoted to examples of various forms of this new productivity including right-sized pumping systems (energy), engineered lumber ([wood] fiber), and New Urbanism communities (time, land, capital, transportation, storm-water and sewage infrastructure). The flip-side of the production coin is labor; which is also discussed. Traditionally labor has been scarce and resources abundant, a situation to which the authors attribute the development of current business practices and the form of much of society's infrastructure. However by all reasonable measures the situation has now reversed. With six billion people and counting, humans are by no means scarce whereas the amount of natural resources available, even if not diminishing on the whole--although there are clear indications many are, like arable land--are certainly fewer per person due to the immutable laws of arithmetic.

The authors quote economist Herman Daly

when the limiting factor changes, then behavior that used to be economic becomes uneconomic. Economic logic remains the same, but the pattern of scarcity in the world changes, with the result that behavior must change if it is to remain economic (as cited in Hawken, Lovins and Lovins, pp. 158-159)

to drive home a diffusely stated point, that the rules of the game have indeed changed, and must continue to in order for society to develop into a sustainable venture. That we must cease to send false signals, and falsely interpret those the market produces. Just as fiscal interactions should not be noted in a ledger as absolute values, the sign of social values of (dis)services should be taken into account to avoid “uneconomic growth.” Although a reasonable enough claim upon first inspection it proves to be highly subjective and fraught with political peril. While most would have no problem classifying prisons and similar crime related transactions as detractive from a true measure of national productivity what of: tobacco, potato chips, natural diamonds or bottled water? Many products and services exist because false signals exist in the market, or as the byproduct of such e.g.; bottled water. People generally do not want to buy a disposable plastic bottle of something from a far-off land which should typically be readily available locally, and yet there is a swift trade in bottled water. Bottled water customers can be seen as one of two types: those unable or unwilling to

risk consuming the local water supply, and those seeking a convenient format. In both cases information is being mishandled in the market. Instead of an interest in purchasing melt-water from a Norwegian glacier, the message the consumer really wants to send is a desire for comparable purity and confidence or ease of access in their own water supply.

Properly (re)directing signals in the market is a complicated matter, however Hawkins, Lovins and Lovins note that significant progress could be made by simply removing deprecated subsidies, price supports and other mixed messages in the current system inherited from the bygone era of scarce labor, or which were never needed in the first place e.g.; subsidize water, pay farmers to plant to control erosion, then pay them to destroy the crop to artificially raise prices while buying surplus elsewhere to raise them. When labor was scarce, resources were used as imperfect substitutes; either in the construction of labor saving devices or wasteful processing. Subsidies to enhance production of these primary goods was used to stimulate production of finished commercial goods, by partially offsetting the costs of labor involved in their harvest and production. Resource extraction subsidies persist to this day and the artificially low values promote excessive consumption, to the detriment of the environment, and displace labor. While those with a vested interest in the status quo are obviously reluctant to forego these plums, others, from the staunchest neo-con to the greenest liberal, would gladly see these reforms. Another radical reform proposed is to replace the taxation of income (a good) with taxation of waste (a bad). The former is seen as an additional disincentive to employment as it effectively increases the cost of a desirable good. Likewise, taxing the bad, waste, increases its effective prices and diminishes demand/acceptance.

While these reforms sound good on paper several worrisome aspects come to mind. As the authors point out, a gradual conversion period would be necessary to allow businesses and individuals to acclimatize to the new signals. However it seems the changeover would need to be orchestrated on a large scale, if not worldwide, to avoid arbitrage. If Canada were to switch to a system of, greener, waste-based taxes and the United States to abstain the US would find itself with a new market for raw materials, cheaply produced energy and goods, and potentially labor. That is, in the absence of Canadian tariffs set to the appropriate values so that they serve as surrogates for the native tax system.

However, it is more than likely that any such tariff would be found an unfair trade barrier, whether under NAFTA or by the WTO. Additionally, whether the transition is instantaneous or implemented with the suggested transition period of ten years, the new system risks being highly regressive. If substitute or retrofit technologies do not become available quickly or cheaply enough the poorest consumers will be locked out of the market and forced to purchase or maintain second-hand, older, inefficient technology with a lower initial price tag but the accompanying higher cost of ownership.

A logical consequence of the preceding market reforms is a greater utilization of labor. The authors foresee higher levels of employment, particularly in markets depressed by high taxation as in Europe. The picture painted of people gainfully employed in productive activities ranging from disassembly of used goods (from buildings to photocopiers), sorting and redirecting every last scrap of material, and gathering information to micromanage a vast network of local service distribution systems (storm water retention and sewage treatment), is admittedly very appealing. However, it is not entirely clear that higher employment should in fact result from higher resource costs; other foreseeable outcomes include economic depression or technology substitution, and the consequent idle masses. In particular, difficulties seem to arise when taking into account the potential competitiveness of Asian markets, with both vast labor forces and hefty resource bases, which are already in the process of trouncing western manufacturers.

Fortunately, according to the authors, major market reform is not required in order to promote “radical resource productivity”. It is a seemingly inevitable step in the drive towards competitiveness. Businesses will voluntarily adopt efficient resource strategies because they help the bottom line, much like the lauded Interface Corporation and other examples given. Alas, this does not seem to yet be the case. Two Massachusetts based non-profits, the Chelsea Center for Recycling and Economic Development and WasteCap of Massachusetts, devoted to eliminating *muda* and promoting industrial ecology have ceased operations in the last few years. WasteCap has gone into hibernation due to a lack of interest in its services, and while it is not clear what became of the Chelsea Center it seems unlikely that either let alone both groups should disappear if local businesses (including heavyweights such as

Polaroid, Gillette, and Sun Microsystems) were on the inevitable path of progression to an environmentally sustainable business model.

It is also disappointing to note that Hawken, Lovins and Lovins, in such a well-regarded book, occasionally play with concepts so loosely and suggest possible technology solutions which are not strictly speaking, sustainable. They nonchalantly discuss down-cycling, without satisfactorily characterizing it as wasteful process which converts high-quality technical nutrients into lower quality goods and materials which cannot themselves be readily recycled into a feedstock with the qualities of the original. The authors also make the all too common mistake of discussing stone based or containing technologies as viable options, in this case a composite limestone dust replacement for styrofoam shells. Stone is perhaps the least renewable of all resources available to us, besides radionuclides or helium. Whether or not there are large quantities available--ignoring accessibility, quality, type--we must not treat it as infinite, that is the frame of mind which has brought us to this point in the first place.