

The Ecology of Stuff

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We humans really do like our 'stuff'. For some of us this means gadgets and toys, for others furniture, for others clothes, or cars, boats or even planes, yet others like exotic foods or wines. Our economy is utterly dependant on stuff – and our continued consumption of ever more of it. If we all became thrifty, bought and used less, made things last, it would bring recession or even economic crash. Hours, days, weeks of our lives are used up being advertised at – having stuff presented to us alongside a variety of rich emotions.

A car is presented as freedom, fast food is presented as hearty, reasonably priced, delicious and even healthy. Perfume or makeup brings with it a glamorous lifestyle, youth and beauty, and watches place you alongside supermodels, sports stars and movie heroes. At some level we realise how ludicrous this all is - we know this stuff won't bring us contentment or happiness, but we continue to dedicate huge amounts of our time and resources to gathering and acquiring more of it.

'Fill the void – with a product.'

Chimpanzees use sticks to gather termites, sea otters use rocks to break shells, birds make nests, but no species on this planet has ever used a tiny fraction of the stuff we do. Up to a point, this has enabled us to do incredible things, build civilisations, make fantastic discoveries, and at least give ourselves the illusion of taming nature. However, with nearly seven billion of us each demanding more stuff from the 15 billion hectares of land on this planet, the impact of its production can no longer be ignored.

I have my treasures - particularly my bike, my dive gear and my cameras, but all in all I am (for a westerner) pretty minimalist in my belongings. My few clothes last me for years, I don't collect furniture, nor do I have a home or a car. My stuff fits into a few boxes or bags, and much of it will last most of my life. I take a great deal of pleasure from living with a minimum of 'stuff'. In my case, far more of the pollution I am responsible for comes from fuel from aircraft and ships and the packaging and transport of my food rather than from my belongings – but I am atypical.

Carbon emissions out-sourced

George Monbiot in the Guardian noted the UK government's figures for national carbon emissions (627 million tonnes of CO₂ equivalent (mt CO₂e), which is 170 million tonnes of carbon) 'out-sources' a huge portion of our emissions - from the manufacture overseas of imported goods and transport to us. According to the Carnegie Institute, this amounts to over 250mt CO₂e, or 68 million tonnes of carbon. Adding international shipping, aviation and holidaying abroad adds another 115mt CO₂e. All in all, then, our carbon emissions are probably well over a third higher than official figures suggest, at around 5 tonnes of carbon per year for each brit - and somewhere between a quarter and two thirds of this comes from the manufacture and transport of our 'stuff'.

Measuring the footprint of stuff

International bodies have started to look at ecological footprint standards for consumer goods of all kinds. These standards outline the environmental cost of every step in the production of an item, from the raw material production, to the power used at the factory,

to packaging and transport to the point of sale.

- **Cradle to Grave** assessments include everything required for complete disposal of a product
- **Cradle to Gate** only accounts for getting the product to the point of sale

PAS2050 is one such standard, giving a 'global hectare' cost for each product. I prefer the concept used by many of 'grammes of CO2 equivalent' – the amount of carbon emitted to bring the product from raw materials to market.

Obviously, looking solely at carbon does not account for all pollution relating to a product. However, carbon emissions are something we need to address rather imminently, and many other forms of pollution cease to be an insurmountable problem once we take a few key and obvious steps to balance the atmospheric carbon.

Footprints of the mega-mall 'lifestyle'

Most carbon footprint assessments ignore the capital costs (the carbon costs of building the road and factory infrastructure) – which may be a huge omission, depending on the product. Look at the eruption of huge shopping malls and retail parks designed to support our feverish efforts to buy more stuff, then assume 1 tonne of carbon emitted for 1 tonne of cement built.

Is it just me, or is spending our precious recreational time fighting our way into shopping centres looking for even more stuff an utterly ridiculous waste of life? We replace soil and growing plants with highway, parking lots and shopping centres, replacing large soil and plant carbon stores with dead land representing huge carbon emissions. These land use changes may amount to a loss of 15 to 30 tonnes of carbon for each hectare.

Each human can probably get away with emitting a tonne of carbon dioxide a year. At the moment we the 'lucky' few in the wealthy west emit five to ten (or more) times this much. This is not sustainable for seven billion people – atmospheric carbon would rise at a far too rapid rate and we would have huge climate upheavals.

Individual products

So what specifically is responsible for the emissions? Several companies, perhaps to be proactive, have produced figures for the carbon emissions of some of their products. It is difficult to compare them, as different methods are used. I think it is charitable to assume that they are genuine attempts to reflect the true picture, and are at least in the right order of magnitude.

It seems that, contrary to what I would have guessed, most products only have a tenth to a quarter of their emissions from packaging and transport. Exceptions include bulky, low-production-energy items like bottled water, and air-freighted foods. Most products seem to have about half their carbon footprint from their raw materials, and about a quarter in the energy of production.

A 100 gramme smoothie is responsible, apparently for 100 grammes of carbon emitted. A bag of crisps amounts to 80 grammes of carbon. Milk, like anything involving cattle, is carbon-expensive, amounting to 4 kilos of carbon a gallon – a sixth of this in the carton. If you start working out carbon budgets for food, you very quickly become aware that anything involving animals and/or overseas food flown in gets rather quickly very, very carbon-heavy. A diet locally-grown and dominated by fruit, veg and grains brings huge

reductions in our individual footprints.

Clothes vary, depending on what they are made of, but a synthetic-heavy fleece jacket might be responsible for 30 kilos of carbon emissions. A load of washing is responsible for a kilos worth of carbon emissions, almost all from the detergent. Those 'must-have' shoes amount to another ten kilos of emissions. An item of cotton clothing from US or Uzbek cotton, made in China, is responsible for at least 20 kilos of emissions. Five items a year means 100 kilos – a tenth of our 'annual allowance'. If we allow ourselves a tonne of carbon a year, clothes need to last. Ecology simply does not have room for disposable fashion for billions of people.

The average brit, according to Fred Pearce in *Confessions of an Eco-sinner*, spends £800 a year on clothes, and we as a species get through 25 *million* tonnes of cotton a year.

The heavy footprint of cars

Our cars, for most of us, bring most of our personal emissions – far more so even than the energy use in our homes and the rest of the stuff we consume. According to Jeffrey Ball in the Wall Street Journal, a typical american sedan is responsible for 63 tonnes of carbon dioxide during its life, or about 17 tonnes of carbon. 85% of this, apparently, is from the fuel burned.

One tonne of carbon per person on earth is not really sustainable unless we effectively sequester carbon, so we really need for our cars to last at least five years, and to be about half as polluting as they currently are. If we give half of our entire 'carbon emissions allowance' to our cars, the only vehicles that are long-term carbon sustainable are the next generation electric vehicles.

Electric cars have a single moving part, are inherently more reliable, less messy and much longer lasting than combustion cars, have full torque as soon as you touch the accelerator, have zero emissions on site, and their motors are inherently three times as efficient as engines. The only downside is the relatively low energy-density of batteries compared to fuels – but battery packs can be swapped as better battery technology arrives.

'Toys' and plastic

I haven't managed to find figures for laptops, mp3 players, game systems, DVDs or cameras. The amounts of metal and plastics, however, means that these items are high-carbon. Disposable electronics highlight another side to 'stuff pollution'. Plastics in particular are not easily re-useable or recyclable, and are often toxic if they are burned or disposed of improperly.

Plastics are fabulous materials – they are lightweight, strong, last almost forever and can be easily molded to any shape. However, they are made at great energy-expense from petrochemicals, and most plastics today are single-use and considered disposable. They can be burned – but incinerators have to be extremely hot to completely break them down - regular incinerators release truly horrible toxins into the air. Plastics can – and I think should, only be used for products designed to last appreciable amounts of time. Few people are making efforts towards trying to recycle these huge reservoirs of material.

About 100 million tonnes of plastics are produced each year, about 3 million tonnes used in the UK, much of it plastic bags, bottles and other single-use containers. Paper, and other organic waste like food scraps and natural fibres, break down into organic compounds and are quickly providing nutrition to soils and seas. Plastics, not only bags

and bottles but clothes and kitchen and bathroom hardware take millenia to break down, leaching rather horrible toxins into the soils and oceans and being directly consumed into the food web as they break down. The infamous 'North Pacific Garbage Patch', the largest human-made object on earth, has been estimated at somewhere around 3.5 million tonnes of plastic. Far more insidious than a big pile of rubbish, the patch is a diffuse mass of small particles spread over a wide area.

I've worked up a reasonably thorough ecological model of the total mass of animal life in different areas of the Pacific, based on dozens of scientific papers, population and stock estimates. The water mass of the north Pacific Gyre - the swirl of water containing the garbage patch - contains about 600 million tonnes of animal life in the summer. The vast majority of this is tiny crustacean zooplankton, with about 100 million tonnes of small fishes, a few million tonnes of squid and maybe a million tonnes of the larger animals, tunas, sharks, dolphins, turtles and whales. This garbage patch, concentrated near the surface where most of the animal life lives, is rapidly becoming a significant part of the mass of this ecosystem, already outweighing the combined mass of all the larger animals in this ecosystem and becoming a significant (and toxic, undigestable) proportion of the gut contents of the smaller animals.

Most plastic, though, doesn't end up in the sea but just sits in our landfills. So the toxins slowly leach out into the water table that we drink from.

Human costs

In the news recently has been a spate of suicides amongst workers in chinese electronics manufacturing zones, working long days packed into massive warehouses for a little over 100 dollars a month. We have become immune to tales of far eastern sweatshops, despite a growing range of excellent documentaries and other media driving home for us all the reasons why we can get our 'must-have' gadgets, toys and foods so cheaply. We no longer want to pay for our stuff to be made by people locally in the west - wages are simply too expensive, and the choices are considered too seasonal and too few. Instead we pay the huge ecological costs of mass transport and large scale, distant agriculture. We outsource our pollution.

Recycling our organic stuff

So the obvious thing is to not buy most of the stuff we buy, and we need a paradigm shift on plastic packaging. Bea Johnson and her family lived for a year (not without challenges) on 'zero waste', refusing packaging, shopping with her own containers. She describes her rather interesting and enriching experiences in *Zero waste*.

The easiest and most accessible way to deal with what we do bring home is via composting food and paper waste, and combining this with composted sewage (perhaps our greatest under-utilised resource) to fertilize soils and plant trees. A further step is 'Bio-char' or 'terra preta' - using charcoal to act as a sponge to build soils and thus sequester carbon. Soil and trees are each larger stores of carbon than the atmosphere. With a little reinforcement with our wasted nutrients, they could easily absorb all of the carbon our activities emit. We'd have to stop flushing our waste down the waterways, and take more care of our food and paper waste.

But it would make that pair of shoes, that top, that new camera, that New Zealand wine just a little more sustainable.