



The problem with plastic

Tackling the plastic problem requires a long term vision of sustainability, argues **John Heathcote**

Geoscientist October 2019 was very much about the evils of plastic. Whilst recognising the problem, we should not forget that the popularity of plastic has grown because it is cheap to make and does a good job. There are many things that are not possible without plastic – I cannot envisage how the computer I used to prepare this could have been manufactured with no plastic at all.

We need to be careful that the popular reaction against plastic does not replace some of it with more harmful alternatives, while not addressing the core problem. Some of the alternatives have their own environmental impacts - paper manufacture or recycling, for example, uses a great deal of energy and water and produces some nasty wastes.

Three options

The real problem with plastic is what to do with it afterwards. Much can be recycled, and should be, but this is not practicable for everything plastic, and in any event some degradation occurs. Allowing it to escape into the ocean is clearly unacceptable, which leaves three options: dispose to landfill, incinerate (with energy recovery), or use as a chemical feed-stock.

Disposal of waste plastic to landfill returns the reduced carbon to the geosphere, whence it came. It might finally produce small pockets of reduced carbon that will be difficult to exploit as a resource, or eventually – presumably when landfills are destroyed by the next glaciation – it may be dispersed to the wider environment.

Incineration returns the carbon to the atmosphere as carbon dioxide. Our planet has dealt with high carbon dioxide levels several times in the geological past, but this process takes

several million years, and while it happens there might be a mass extinction. Our planet recovers from these too, although it may lose in the process the conceited species that calls itself *Homo sapiens*.

Recovery of reduced carbon from mixed waste to use as a chemical feedstock is not yet established technology, and it's not clear that it will ever compete in terms of money or energy with the exploitation of new reduced carbon – hydrocarbons. Oil and gas are abundant and we are unlikely ever use it all – our planet is, albeit over long timescales, recycling carbon dioxide back into hydrocarbons.

New technologies

We can think more widely, and look to new technologies designed to reduce energy use and carbon dioxide production. A number of these use rare elements – gallium, cerium and yttrium for white LEDs, for example – but we don't yet have the means of collecting and recycling these elements on a commercial scale. Moreover, it's not clear to me that our planet has an effective means of recycling these elements from our wastes back into ores.

There is no easy answer to waste, but incineration with energy recovery, and then accumulating the ashes into landfill for future use as a resource, does not seem such a bad idea from a geological viewpoint. Meanwhile, there is a lot that can be done to reduce waste and improve re-usability. Using less in the first place is a good idea too, but that will require some combination of a reduced population and decreased living standards – a politically difficult sell.

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