



Sustainable Materials, Sustainable Resources, and Responsible Material & Resource Management

Metal – A Permanently Available Resource

In considering the sustainability credentials of different packaging types is important first of all to be clear about the relationship between the natural resources used to produce the materials that are then formed into individual packaging items.

The resources are of different types; biomass, fossil fuels, elements and minerals and are processed into materials that have fundamentally different intrinsic properties and characteristics. A variety of management strategies are therefore required for responsible stewardship of the different resources and materials.

- Natural resources: (e.g.) bauxite, iron ore, oil/petrochemicals, silica, trees, plants
- Materials: (e.g.) aluminium, steel, plastics, glass, wood, paper/board and combinations of materials
- Packaging items: (e.g.) cans, bottles, pouches, trays, films, tubes, boxes, cartons,

In considering natural resources, a division is often made between renewable resources and non-renewable resources:

Renewable resources are those that belong to the natural environment, and are replaced by natural processes as part of the eco-system (eg trees, plants, animals, soil, water) in a timescale of years or decades that supports the rate of consumption.

Non-renewable resources are those natural resources that exist in a fixed amount, or are consumed at a faster rate than nature can create them, as they are replenished over geologic time spans (eg fossil fuels). The assumption therefore is these resources will eventually be used up. For this reason the use of non-renewable resources is sometimes considered to be less preferred. We see this in recent attempts to substitute fossil fuel based plastics by plant based plastics.

So how do we consider metal?

Bauxite (aluminium ore) and iron ore are mined from the earth's crust and processed into alumina/aluminium or iron/steel. Because the ores are mined, it is often said that natural resources are being depleted.

However, an important point is missing from the story here; metals such as aluminium (Al) and iron (Fe) are elements and so cannot be destroyed. In fact planet earth has not suffered any loss of metal elements; they merely move location and appear in different forms.

Aluminium and steel are materials that can be transformed into packaging and many other product applications, automotive, aerospace, construction etc. Once these product applications reach the end of their useful life, the aluminium or steel, from



which the product applications have been formed, can be recycled and used again to make another product application. This gives rise to a virtuous circle.

Note: it is the product application (can, car, plane etc) that reaches the end of its useful life, not the material, in the case of metals. The aluminium and steel remain as a permanently available material resource to be used again by recycling back into aluminium and steel. With every new cycle a new product application can be formed and this cycle can occur an infinite number of times while retaining the properties of the metals.

Can we say therefore that metals are “renewable”?

Commonly accepted convention states that the term “renewable” is applied only to those natural resources short term system described above (trees, plants etc). Hence the focus is on responsible resource management (eg forests).

Conversely the focus of metals is on responsible materials management, the materials themselves being a permanently available resource to be used again and again.

It is obvious therefore that alongside the distinction between renewable and non renewable resources there is an equally valid distinction to be made between permanent and non permanent materials.

Conclusion:

It is misleading to equate mining of metal ore with depletion of the earth’s resources.

Metals are elements and cannot be destroyed.

Metals can be recycled without loss of their properties and can be used again and again to form new packaging and other product applications.

Metals are a permanently available resource.

What is more sustainable than permanent?

And one additional point: recycling metals save between 70% and 90% of the original energy.

Metal – a permanently available material