

# Any old Fe<sub>2</sub>, Cu, Al, Pb, Zn, glass, paper. . . ?

*The future availability and price of key raw materials, placed in doubt by the events of the past year, have emphasised the need to conserve by recycling. Attitudes in the UK are reflected in the following three articles. The first is by Christine Thomas, of Friends of the Earth.*

IN modern times, industrial societies have been characterised by an attitude to the use of resources which earlier societies necessarily regarded as untenable. The difference in attitudes was born of a different appreciation of resource availability: in recent years industrialised regions have evolved a sophisticated system of resource-monopolisation and hence cost-control which enabled them for all practical purposes to regard raw materials as infinite or at least theirs for the taking.

This system and the attitudes which it bestowed are now breaking down for two reasons. First, there has emerged a greater maturity of view shared by many of the countries described alternatively as 'developing' or 'emergent', which have important raw material reserves. Second, the real resource scarcity predicted for certain commodities has begun to bite and has been reflected in the rising prices of raw materials.

It is therefore self-evident that the more efficient use of raw materials in 'developed' countries should become an important 'development' goal. Britain, a country more heavily dependent than most on the import of essential raw materials, can no longer afford to discard over 100 million tonnes of waste every year. Even if more efficient recycling systems and policies of re-use were instituted, Britain would still be dependent on raw material imports.

Recycling of industrial products is one option that can lead to a thriftier use of resources. By attempting to approximate to natural cycles, such as those for carbon and nitrogen, where no material is lost from the system, recycling can partially close the loop of industrial production. By doing so this decreases both the production of waste and the extraction of virgin raw materials associated with a given level of materials consumption.

Current practice though shows these loops to be far from closed. The table below illustrates the present use of reclaimed materials in Britain. The figures in the first column are deceiving as they include the use of 'new' scrap or manufacturers' scrap. More telling is the percentage of 'old' or 'post consumer' scrap recovered.



Material	% (by weight) of total production accounted for by:	
	All scrap	Old scrap
Iron and steel	52	10
Copper	40	13
Aluminium	30	—
Zinc	25	—
Lead	65	—
Glass containers	22	3
Paper	43	15-30

Comparison between the energy requirements for a number of metals produced from secondary materials and from their ores show that for the former the energy needs are invariably smaller. Often dramatically so, as with aluminium where the energy costs of its production from bauxite are 30 times that for its production from scrap. Recycling paper also offers potential energy savings, as production of fibreboard from virgin pulp requires about twice the amount of energy compared with its production from waste paper.

The British Steel Corporation accrue considerable savings through their recycling efforts. They used 19 million tonnes of scrap steel last year, nearly half their raw material requirements and with a 30% saving in energy associated with processing scrap this resulted in almost 80,000 kWh (thermal) saved.

Since it would seem desirable on many accounts to maximise our recycling effort, why is current performance so low? Basically it is a question

of economics. In many cases it does not pay the individual firm to recycle, even though it would be of benefit to the country as a whole. A situation therefore arises in a free market, in which industry can externalise the social and environmental cost of production, creating a situation where virgin material use does not reflect its true cost to society. Thus recycling suffers unreasonably in competition with raw materials.

One controlling factor which is often overlooked and which is of great importance in deciding what is a desirable level of recycling is energy. In many cases recycling would not be justified where the energy costs of recovering a material far exceed that of initial production. Generally this is not the case, but mixing materials together, particularly in small proportions, makes it energy expensive to reverse the process and recover one material.

An additional constraint on the achievements of recycling is imposed by our attempts to continue growth in the production of consumer goods. In a 'growth' situation, reclaimed material arising from the previous year's production cannot by definition meet this year's demand. And in a situation of exponential growth the gap between the total supply of materials required to meet demand and that met by recycled products will continue to diverge.