Plastics packaging really is better for the environment

A STUDY published earlier this year by the Environmental and Plastics Industry Council in Canada shows how switching from plastics to other forms of packaging would increase energy consumption and greenhouse gas production in Western Europe.

The study was conducted in 2004 by the Corporation for Comprehensive Analysis (Gesellschaft für umfassende Analysen) and was designed to analyse the contribution that plastics make to resource efficiency throughout a broad range of categories, including packaging, building products, electric/electronic, automotive, housewares, furniture, agriculture, medicine and 'other'.

The amount of energy consumed and the amount of greenhouse gas emissions generated through the use of plastics currently in use were identified and compared with a scenario that saw plastics substituted, wherever possible, by alternative materials. The comparison included the full life cycle of the product (production, use and disposal).

Among its headline conclusions were that there would be a marked increase in both the amount of energy consumed and in greenhouse gas emissions, in the region of 582 million gigajoules of energy and almost 43 million tonnes of carbon dioxide equivalent per year.

This amount of energy being saved through the use of plastic packaging is equivalent to 101·3 million barrels of oil, while the amount of emissions saved are equal to the emissions of 12·3 million passenger cars each year.

Within the packaging component of the study, 60 products were analysed. These products were categorised as:

- Small packaging (smaller than 50 ml);
- Beverage bottles;
- Other bottles;
- Other rigid packaging;
- Shrink and stretch film;
- Carrier bags; and
- Other flexible packaging.

The types of plastics used in the packaging were low-density polyethylene, high-density polyethylene, polypropylene, PVC, polystyrene, expanded polystyrene and PET. The alternative materials were tin plate, aluminium, glass, corrugated card, box-board, paper, paperboard composites and wood.

The study was based on a few basic principles. Firstly, the calculations were always based on the mass of one material to render the same service as another. So, for example, the study looked at how much glass would be needed to replace the 2 litre PET bottle.

Second, the study took plastics' market share of a particular category and substituted alternative materials by pro-rating their existing market shares over the market share vacated by plastics. Third, in the case of 'other bottles', the alternative materials substituted included a mixture of tin plate, aluminium, glass and coated paper-board. So, for example, it would take 5·27 kilograms of the alternative materials in the 'other bottles' category to substitute one kilogram of plastics.

In order to calculate the energy and greenhouse gas emissions used during the production phase of a product, the study used published life cycle inventories. These inventories included the amount of energy used and the amount of emissions generated with the production of the plastics packaging and compared those figures to the energy used and the emissions associated with the production of the alternative materials. Emissions of carbon dioxide, methane and nitrous oxide were reported for the production of each type of package.

In order to evaluate the resource efficiencies of a package during product use, the study looked at the energy used in transportation and the resources saved by avoiding loss of or damage to packed products. Food losses are reduced through the use of packaging. Statistics show that 70 per cent of all food packaging (plastics and other materials) prevents the loss of 20 per cent of the food packaged. In transportation, the fuel consumption correlates directly to the weight transported. The transportation of heavier packaging materials requires more fuel.

The third component to calculating the energy and emissions of a package occurs during the waste phase. The study assumed that the amount of packaging waste to be handled at this stage was equal to the amount of packaging put into the market.

The calculations considered the proportions of each waste material that are directed to recycling, energy recovery and landfill, and were based on European Union data. The calculations include the processes of collection, sorting, reprocessing recyclables, energy recovery and disposal. Credits were given for recycling and energy recovery, as recycling reduces the quantity of virgin material needed and energy recovery reduces the need for primary fuels. Methane emissions for land filling of paper and wood were taken into account.

The table shows the significant savings in both energy and greenhouse emissions that are made through the use of plastics packaging in Western Europe.

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The benefits of different forms of plastics over other materials.

	Energy savings (millions GJ/yr)	Greenhouse gas emissions (millions tonnes CO_2 equivalent/yr)
Small packaging	27·9	2·6
Beverage bottles	83·2	4·3
Other bottles	50·8	8·0
Other rigid packaging	-6·4	3·2
Shrink & stretch film	139·3	8·2
Carrier bags	71·2	3·0
Other flexible packaging	216·7	13·6
Total	**582·6**	**42·9**