



*Plastic products and components represent a significant proportion of goods purchased by the Further and Higher Education sectors. The vast majority of plastics are derived from non-renewable fossil fuels, by processing oil to derive ethylene and propylene which is then combined with a catalyst to produce polymers to form the raw material for plastics. In the last 40 years, concerns about the health and environmental impacts of oil-derived plastics have risen. Impacts arise across the life cycle of plastics, including manufacturing, use of finished products and disposal.*

## The issues

The World's annual consumption of plastic materials has increased from around 5 to nearly 100 million tonnes in the last 50 years, with plastic being the material of choice in nearly half of all packaged goods. The poverty-related impacts arising from plastics are complex and lie in the areas of health and disposal and they mainly occur in parts of the developing world. In addition, plastic production use and disposal also has a range of environmental impacts which has been the focus of much concern from NGOs, scientists and policy makers. There are also cross-cutting poverty, health and social issues related to plastics, covered here and in other information sheets produced for this project.



### Plastics in procurement

Plastic is a miracle material that has supported and driven innovation in the supply and delivery of products, but also a problematic substance that uses non-renewable resources, creates pollution in manufacture and use and presents a global issue for disposal.

Plastics are found in a vast range of products, either as a primary material or as a component. Plastics have also, due to reasons of weight, flexibility, usability and cost, become a primary material used for packaging, containers, furniture and construction materials. As a result of this diverse range of uses it is likely that many procurement activities will involve the purchase of plastics either directly or indirectly.

### Manufacture

The vast majority of plastics are produced from the processing of petrochemicals (derived from crude oil). In the US, plastic manufacture (as a feedstock and energy source) is estimated to consume approximately 4.6% of total oil consumption (US Energy Information Association, 2009). See the Oil & Gas Information Sheet for other related issues.

Petrochemical based plastics are manufactured through the "cracking" of oil and natural gas in order to produce different hydrocarbons. These are chemically processed to produce monomers (small chemical molecules that can bond with others) which then undergo a polymerisation process (bonding with other monomers into long chain chemicals) to produce polymers. These undergo further processing, normally using additives to change their "feel", colour or performance, to produce feedstock. Usually in the form of pellets, this can be transported and further processed through heat and moulding to make finished products.

As with any heavy industrial process, plastics manufacture can give rise to a range of environmental and social impacts, some of which can give rise to poverty considerations. Pollution of water courses and local air quality impacts in parts of the developing world can directly affect the quality of life and opportunities of local people, as they often depend upon fishing and hunting for their livelihoods.

Historically many plastics have been considered to be generally inert. There has been extensive study and discussion in recent years over pollution and health impacts arising from plastics. Concern has focussed upon plastic additives (such as plasticisers - used to enhance the feel of plastics, and flame retardants) which can directly affect human health or which are chemically similar to human

## Health impacts of manufacture

hormones and therefore act to disrupt biochemical processes. These chemicals are “bio-accumulative”, meaning that they build up in the body over time and can cause or contribute to a range of health problems. PVC (Polyvinyl Chloride) has given rise to the most concern, partly as its uses are so widespread, and partly because it is treated with many plasticisers that enhance its feel which are thought to be bio-accumulative. There is still much debate over the validity and extent of such concerns, in general NGOs and some health organisations have raised concerns, whilst plastics manufacturers have sought to demonstrate the safety of their products.

## Disposal of plastics

As petrochemically derived plastics do not degrade, the accumulation of waste, in areas of the developing world has become a key environmental and social issue. While the environmental issues related to this are perhaps clear, the social and poverty issues are more complex. Significant amounts of plastic waste from the UK and other countries are shipped to the developing world. This waste is either recycled to make new plastic feedstock or ends up in dumps or waste sites. In addition, plastic waste can also find its way into the world's oceans where it can have a significant impact upon marine habitats and wildlife, and an associated impact upon those communities that depend upon fishing for their livelihoods. One example is known as the “Great Pacific Garbage Patch” which is estimated to be twice the size of Texas and contains over 3 million tonnes of plastic waste.

Plastic waste in the developing world is considered to be both a contributor and possible solution to poverty issues. A number of studies have focussed upon the economic opportunities afforded to the poor through recycling plastics which are disposed of in their local environment. As with many poverty and environmental issues, whether such disposal is considered to be ultimately positive or negative is perhaps a moot point. However, plastic waste and its safe disposal is the responsibility of all organisations using this commodity.



## Recommendations

*Because the issues of plastics and poverty are so diverse and determining cause and effect is difficult, there are few definitive solutions. However, within the procurement process it is possible to encourage certain types of behaviour change.*

- ⊙ *As with any procurement activity, seek to identify whether the purchase of products containing or wholly made from plastics are absolutely necessary. Explore packaging reduction with suppliers.*
- ⊙ *Where a purchase is required, identify whether products can be made from alternatives to petrochemical plastics such as wood and bio-plastics.*
- ⊙ *Develop a policy on the purchase or substitution of PVC products, considered to be the most contentious forms of plastic.*

### REFERENCES/FURTHER INFORMATION

Sustainable Plastics - website promoting bioplastics: [www.sustainableplastics.org/](http://www.sustainableplastics.org/)  
US Energy Information Association: Crude Oil facts FAQs: [www.tonto.eia.doe.gov/ask/crudeoil\\_faqs.asp#plastics](http://www.tonto.eia.doe.gov/ask/crudeoil_faqs.asp#plastics)  
ChemTrust – information on Chemicals and Health: [www.chemtrust.org.uk/](http://www.chemtrust.org.uk/)  
Plastics Industry Perspective on the health impacts from PVC: [www.pvc.org/What-is-PVC/How-is-PVC-made/PVC-Additives/Plasticisers/Health-concerns-about-Phthalate-plasticisers](http://www.pvc.org/What-is-PVC/How-is-PVC-made/PVC-Additives/Plasticisers/Health-concerns-about-Phthalate-plasticisers)  
Digest of sources highlighting concern about the health impacts of PVC: [www.ejnet.org/plastics/pvc/](http://www.ejnet.org/plastics/pvc/)  
UN Environment Programme – Overview of Marine Pollution: [www.unep.org/regionalseas/marinelitter/publications/docs/anl\\_oview.pdf](http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf)  
PVC Procurement Guidance – produced by Carillion Plc: [www.carillionplc.com/sustain-2001/pdf/pvc%20guidance.pdf](http://www.carillionplc.com/sustain-2001/pdf/pvc%20guidance.pdf)

This sheet is part of a series of 14 on different commodities written for EAUC's Promoting Poverty Aware Procurement project to enable universities and colleges to be more aware of poverty issues when they make procurement decisions. For more information about the project visit [www.eauc.org.uk/promoting\\_poverty\\_aware\\_procurement\\_on\\_campus](http://www.eauc.org.uk/promoting_poverty_aware_procurement_on_campus)



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