Plastics contribution to climate protection
Summary

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A wide variety of materials types have a role to play in meeting the needs of modem society and indeed materials are often selected for their efficiency or synergy within a system or product combination. In the context of the EU commitment to reduce GHG emissions to 20% below the level experienced in 1990 by 2020, and in the interests of long-term sustainable development, it is clear that the environmental impact of materials need to also be taken into account in material selection.

It is the plastics industry's view that because environmental impacts are complex, and even at times counter-intuitive, alternative materials must be assessed based on rational rather than emotional criteria. This is why PlasticsEurope commissioned an independent new study during 2009 to consider the hypothetical scenario where plastics would be replaced by a mix of alternative materials and evaluate the environmental impact in terms of greenhouse gases (GHG) emissions over the complete product life cycle.

This is clearly a completely theoretical scenario as society has come to enjoy the benefits and the convenience that plastics materials provide to such an extent that this it would be an impractical proposition. Furthermore, plastics have established themselves so extensively within the spectrum of modern materials that there are some applications (approximately 16%) designed with plastics, which cannot be feasibly substituted. Nevertheless, the resultant effects on greenhouse gases (GHG) emissions and energy consumption of substituting plastics with other materials have been estimated.

The study, carried out by independent Austrian research institute Denkstatt AG and peer reviewed by Professor Adisa Azapagic of the University of Manchester, in the UK and Professor Roland Hischier EMPA Sankt Gallen in Switzerland, considers several cases in detail which represent 80% of the plastics market place and the results are projected across the industry.

The scope of the study is so large that a number of extrapolations and assumptions have had to be made. Nevertheless the general conclusions are considered valid.

This study is not a Life Cycle Assessment (LCA) by strict definition; however the principles of LCA have been followed and the data for comparison within the case studies are extracted from LCA databases which cover the three main phases of a product lifespan (production, use phase and waste management).

The study consists of two parts:

1) An update of an earlier study (by GUA in 2005) on GHG and energy savings arising from plastics use, which was expanded to comprise the current EU member countries (it is in fact EU27+2); and which considered updated material datasets for the cases selected.
2) Additional arguments on plastics benefits with regard to greenhouse gases and energy efficiencies, and based upon some of the current trends - a forward projection to the potential scenario in 2020.

The key messages and conclusions arising from the study are as follows:

1) Substitution of plastics, where it is feasible, (based upon 2007 scenario) with traditional materials would:
   - Generate 3.7 times more mass (impacting waste management)

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- Result in 50% more GHG
- Lead to 46% more energy being consumed

2) It is important to consider GHG and energy savings across the entire lifecycle of products. The production and use phases being the most significant
3) The deployment of plastics enables GHG and energy savings across a wide range of modern applications
4) Plastics products make a significant contribution towards environmental protection offering resource efficient solutions
5) Plastics often enable reduced material consumption

With regard to energy savings resulting from the use of plastics:

1) Energy efficiencies contribute strongly to emissions reductions
2) 2, 300 Tera Joules (Tera = 10^{12}) less energy consumed per annum
3) 50 Million Tonnes of crude oil per year (equivalent to 194 very large crude carrier loads – or taking 46 million cars off the road)

With regard to greenhouse gas emissions savings resulting from the use of plastics:

1) The current savings (120M Tonnes per annum) are comparable with the entire CO_2 emissions of Belgium
2) These savings currently represent 38% of the original EU15's original Kyoto CO_2 reduction target (or approximately 15% of the EU27's 2020 target of 780 Mt)
3) The absence of plastics from the materials spectrum would effectively impair the EU's ability to meet its Kyoto GHG reduction targets

The findings of the second part of the study show that:

- Production and use phases are the most important.
- Plastics materials play a key role in the generation of renewable energy
- Plastics are an enabler of new technologies which significantly reduce resource use (e.g. de-materialisation in memory cards or MP3 players)
- Plastics represent only a very small proportion of the average European's carbon footprint (1.3%)
- The increased adoption of plastic in thermal insulation, for food packaging or to produce renewable energy enables extraordinary "use"-benefits.
- The carbon balance (the ratio of the carbon intensity of production in relation to the savings and benefits across the life cycle) is presently in the range of 5-9
- This carbon ratio is set to improve to between 9-15 by 2020; indicating that the benefits in use in the future are far higher than the additional emissions from the growth of plastics

Conclusion:

A wide variety of materials types have a role to meet the needs of modern society and sensible product stewardship is a necessity for all products. Plastic products account for the use of just 4% of non-renewable fossil fuel consumption but, paradoxically, increased use of plastics would actually reduce the overall consumption of non-renewable fossil fuels and reduce society's GHG emissions. And, contrary to popular belief, reduced use of plastics would actually have the opposite effect - increasing the overall consumption of non-renewable fossil fuels and increasing society's GHG emissions.

N.B: EU 27+2 represents the 27 Member States plus Norway and Switzerland

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