APEAL

ENVIRONMENTAL BRIEFING

A CONTRIBUTION TOWARDS SUSTAINABLE DEVELOPMENT FROM THE EUROPEAN PRODUCERS OF STEEL FOR PACKAGING

"We must preserve both the industry that is our living and the environment that supports our life" - *Hubert Reeves*

April 2005

In this issue of the Environmental Briefing, APEAL makes a new contribution to the debate on deposits for one-way beverage containers [1]. In the current political context any system that increases CO_2 emissions is unacceptable, especially when other cheaper, less environmentally damaging and more effective systems already exist that will enable all countries to reach the imposed European recycling targets on packaging.

Deposit systems for one-way drinks packaging waste increase greenhouse gas emissions

INTRODUCTION

Global warming has become a real political issue. We can no longer ignore the repeated warnings that the Earth is getting warmer and that this is apparently already causing an increased number of natural catastrophes - droughts, floods and other potential challenges for public health. The ways to tackle these may vary from one continent to the other, but few deny that action has to be taken to combat global warming. Europe has always been proactive in tackling this issue and has taken the political lead.

All of our activities can contribute to these global effects, including our systems which are intended to assist the environment, like recycling. At a time when some National governments are wanting to penalise one-way beverage containers and to favour refillable containers by imposing deposit systems on one-way packs, APEAL initiated a study to investigate whether or not a deposit system, when added to an existing multi-material collection system, has a negative effect on global warming.

APEAL commissioned BIO Intelligence Service consulting to carry out an environmental, cost and efficiency analysis to assess the impact of adding a deposit system to a well established and well functioning multi-material collection system.

The objective of the study was not to be exhaustive on all the possible collection systems but rather to provide the national and European decision makers with an answer to the following question:

"What are the benefits and disadvantages of combining a deposit system with an existing multi-material collection system for one-way packaging ?"

STUDY BOUNDARIES

This study focuses on the collection of all used one-way household packaging for recycling. Thus, the environmental benefits derived, for instance, from the final recycling of the collected materials are not taken into account in the environmental impact evaluation.

Transportation, collection and sorting are the key operations under analysis in this study.

The study analyses the efficiency of two systems: the multi-material collection system and the combined one, i.e. a multi-material collection system to which a deposit system for one-way beverage containers has been added.

Other systems for collection, such as magnetic extraction and/or eddy current separation in incineration plants, or container parks, have not formed part of this study, although these systems do exist in a number of European countries, contributing to the recycling rates for metal packaging.

METHODOLOGY

Two collection systems were analysed: firstly a multi-material collection system using glass igloos for the collection of all one-way glass packaging with a kerbside collection system for all the other packaging materials, such as beverage cartons, paper & cardboard, plastics, steel and aluminium; secondly a deposit system for all one-way beverage containers added to the previous system, defined here as a combined system.

An Excel simulation tool has been developed by BIO Intelligence Service. This tool enables users to adjust the different parameters of the collection schemes under study to reflect a specific national situation in terms of packaging waste composition, collection rates, collection distances, cost data and energy consumption in the sorting and transfer plants.

The data used (2) represents an average European situation for the year 2004. As far as the multi-material collection system is concerned, data coming from existing French, Belgian and German collection systems has been taken into account. As far as the deposit system is concerned, the Reverse Vending Machine (RVM) data comes from TOMRA and all other technical data on the deposit system comes from RETURPACK in Sweden.

RESULTS

▶ *Efficiency*

The efficiency of a collection system is defined as the amount of recyclable packaging waste collected as a percentage of the amount of recyclable packaging waste available for collection. This ratio is dependent upon the involvement of citizens in the collection system and on the quality of their sorting.

Even though beverage deposit systems may reach higher recycling rates than multi-material collection systems, since the former deal only with a fraction of the total packaging stream and since there is therefore only a negative impact on efficiency when both systems are combined, the global recycling rates of the multi-material collection system and the combined system are more or less alike and enable a good 70% of the available packaging waste to be collected.

▶ *Costs*

When introducing a deposit system alongside an existing multi-material collection system the costs per tonne are doubled from 320-770 €/tonne up to 790-1200 €/tonne. These are collection and sorting costs only, not including any costs associated with the final recycling.

Costs vary significantly mainly due to the diversity of the equipment and operating conditions for the deposit system, and the various organisational options available for the multi-material selective collection system.

▶ *Environmental impact*

The environmental impact of the combined system is always worse than that of the multi-material collection system alone, for all environmental themes, as *figure 1* demonstrates.

Kerbside collection is responsible for 80% of the total greenhouse gases in the multi-material collection system.

In the deposit collection system 20% of the one extra monthly car trip made by consumers (3) between their homes and the shops where they can take back their used beverage containers are assumed to be specifically for that purpose. These 20% are responsible for 45% of the total greenhouse gas emissions generated by the combined system.

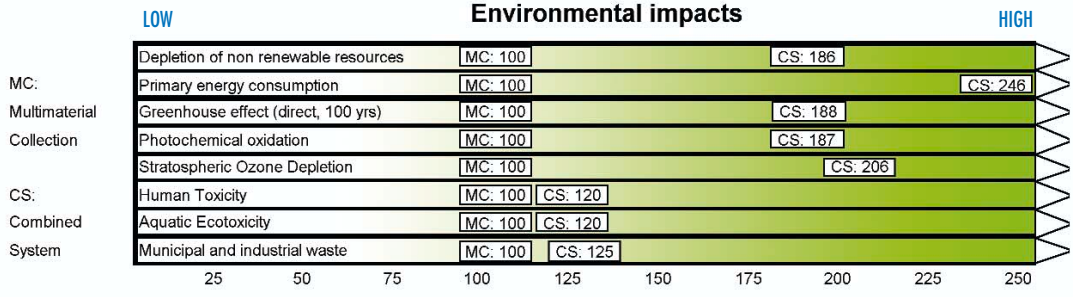

FIGURE 1.
Compared environmental impact of both collection systems for eight environmental themes

INITIAL CONCLUSIONS

For the set of situations considered, the multi-material selective collection system presents a better environmental and cost efficiency performance than the combined system *(see figure 2)*. In other words, adding a deposit system to an existing multi-material selective collection system has a negative impact in terms of costs and environmental profiles of the existing system without any significant improvement in efficiency.

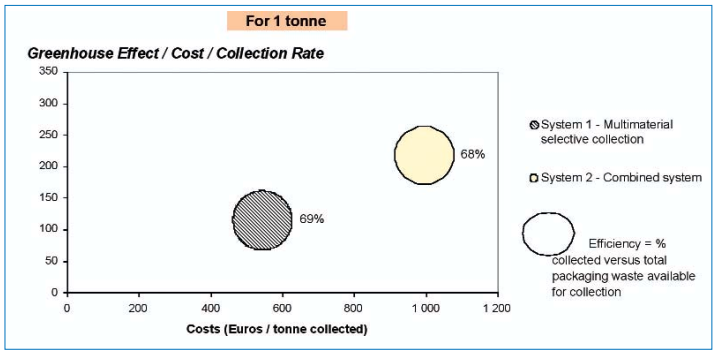

FIGURE 2
Compared eco-efficiency of both collection systems under analysis

SENSITIVITY ANALYSIS

As any figures are subject to a degree of error, it is essential to carry out a sensitivity analysis (4) on the parameters identified as key drivers, so as to measure what influence a change in the values of these parameters could have on the final profile or positioning of the collection system.

These key drivers are described in the Table 1.

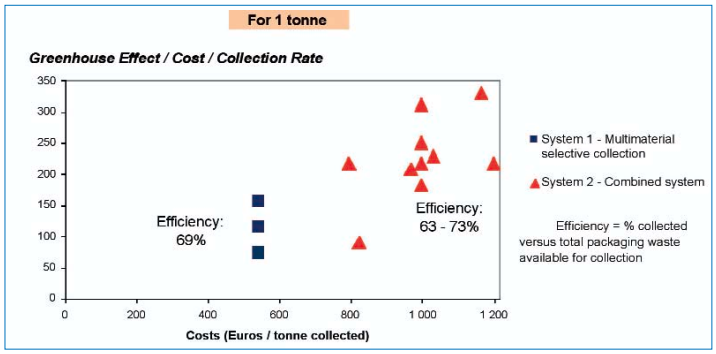

FIGURE 3
Results of the sensitivity analysis – range of values

Drivers	Initial hypothesis	Upper range of sensitivity analysis	Lower range of sensitivity analysis
Collection rates generated by the combined system	*Kerbside collection:* 60% *Glass bring back:* 70% *One-way beverage deposit:* 80%	+ 5 points. *Kerbside collection:* 65% *Glass bring back:* 75% *One-way beverage deposit:* 85%	- 5 points. *Kerbside collection:* 55% *Glass bring back:* 65% *One-way beverage deposit:* 75%
Retailer's shelf space costs and sales losses in the combined system	*Retailer's shelf space costs:* 9 €/m²/month *Sales losses:* from 280 to 1,250 €/m² occupied	+50% *Retailer's shelf space costs:* 13.5 €/m²/month *Sales losses:* from 420 to 1,875 €/m² occupied	-50% *Retailer's shelf space costs:* 4.5 €/m²/month *Sales losses:* from 140 to 625 €/m² occupied
Collection distances	50 km	+50% 75 km	-50% 25 km
Allocation of the one extra monthly trip made in personal cars to bring back one-way beverage containers to the shops (RVM)	20% allocated to the combined system	+100% 40%	-100% 0%

TABLE 1.
Key drivers and range of values for the sensitivity analysis

The results of these simulations made one by one and altogether are illustrated in *figure 3* using the greenhouse effect as environmental indicator. The other indicators vary in the same way and can be found in the complete study (5).

In this sensitivity analysis, the combined system never becomes significantly better than multi-material selective collection for any of the aspects under study, in terms of environmental impact, costs, or efficiency.

The combined system may in certain rare circumstances become equivalent in terms of environmental impact or slightly better in terms of efficiency compared to the multi-material collection system, but its costs are always higher.

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CONCLUSIONS

This environmental and cost-efficiency analysis carried out by BIO Intelligence Service clearly:

Indicates that a deposit system for one-way beverage containers should not be implemented in addition to an existing multi-material selective collection system under any circumstances.

Indeed, if Europe were to implement a deposit system for one-way beverage containers in all countries where a green dot system already exists, this would generate an increased greenhouse effect equivalent to an increase of 500,000 to 700,000 cars on the roads in Europe, each of them travelling an average of 10,200 km per year.

Regional analysis is necessary to determine the best local solution taking into account the local conditions, such as the distances, the expected public participation, and the technical and organisational options such as the possibility to optimise existing means of collection.

REFERENCES

(1) See APEAL Environmental Briefing of January 2002 on "Recycling of packaging and barriers to trade".

(2) For the multi-material collection system, costs are based on the following recent studies performed by BIO team members while they were consultants at TN SOFRES Consulting:
"Study about 2001 costs of recyclable municipal waste selective collection and sorting", December 2002, carried out by TN SOFRES Consulting for ADEME (French Agency for the Environment), this is the reference study in France about selective collection and sorting costs.
http://www.ademe.fr/collectivites/Dechets-new/Maitrise couts/Connaissance/couts/synthese 2001.pdf;
« Overview of Collection and Sorting Costs in France », March 2001, carried out by TN SOFRES Consulting for Eco-Emballages (Green Dot organisation in France) ;
Comparison of French and Belgium costs of municipal waste selective collection, 2000, carried out by TN SOFRES Consulting for Eco-Emballages;
"Cost benefit analysis of packaging waste management systems in Europe – case studies for France, Germany, the Netherlands, and the UK", 2000, carried out by TN SOFRES Consulting for the European Commission – DG Environment.
http://europa.eu.int/comm/entreprise/environment/reports studies/studies/study00cost-eff sofres 502038.pdf

(3) The one extra monthly trip made by the consumer is explained by the fact that in addition to the existing refillable packaging, they will also have to return one-way packaging, which represents a considerably higher total number of units to be returned, with some variations according to the country. For example, in the Netherlands this would mean returning 9 billion units as opposed to 3 billion units currently.

(4) See APEAL Environmental Briefing of September 2002 on "Towards the development of objective environmental legislation on packaging –use of Life Cycle Analysis (LCA)", page 2.

(5) See APEAL website ref. : http://www.apeal.org under Environment/Legal issues.

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