

# Single use Cups are the winners!

*from an environmental perspective*

[www.bekerrecycling.nl](http://www.bekerrecycling.nl)



STICHTING  
DISPOSABLES  
BENELUX

A recent study by the leading Dutch research institute TNO (the Netherlands Organisation for Applied Scientific Research) show that single use (vending) cups, generally, are less harmful to the environment than their porcelain or earthenware alternatives.

Study by TNO-Bouw en Ondergrond (TNO Construction and Subsurface), commissioned by the Benelux Disposables Foundation (SDB). The Study and Peer Review, with the exception of the shadow costs analysis, was carried out in accordance with ISO 14040 and ISO 14044.

## What is better for the environment?

### *Drinking coffee from a single-use cup or a re-usable cup with saucer or earthenware mug?*

*Every one his own mug? Or coffee from a 'plastic' cup? On many workplaces, this question crops up again every few years. Concern for the environment is now greater than ever before. That's why it was time for new research into the environmental effects of these so-called single-use and re-usable drinks systems.*

*The Benelux Disposables Foundation took the initiative to commission TNO with the Study.*

### *But isn't this studied already?*

*In the early 1990's, the Tauw independent consulting and engineering company carried out two studies with the catchy titles of 'Reusable versus Disposable' and 'Polystyrene cup recycling: sense or nonsense?' The results of these early 1990' studies were already reasonably positive for single-use drinks systems. But the methodology was still somewhat lacking, and there was some disagreement on the environmental data and assumptions used. Now there are new and more internationally accepted uniform LCA research methods. Some essential changes have also been made to the single use cups themselves and their cleaning and recycling methods. So all this pledged in favour of an updated study.*

## The Study

### *Single-use versus re-usable (coffee) drinks systems: an environmental comparison*

#### THE METHOD

In its study TNO compared various different (coffee) drinks systems:

- re-usable porcelain cup and saucer
- re-usable earthenware mug
- single-use polystyrene cup
- multi-use cup holder with single-use polystyrene insert cup
- single-use cardboard cup

Because in the Netherlands the choice is mainly between polystyrene (plastic) cups and porcelain cups or earthenware mugs, the emphasis in this brochure is on these drinks systems.

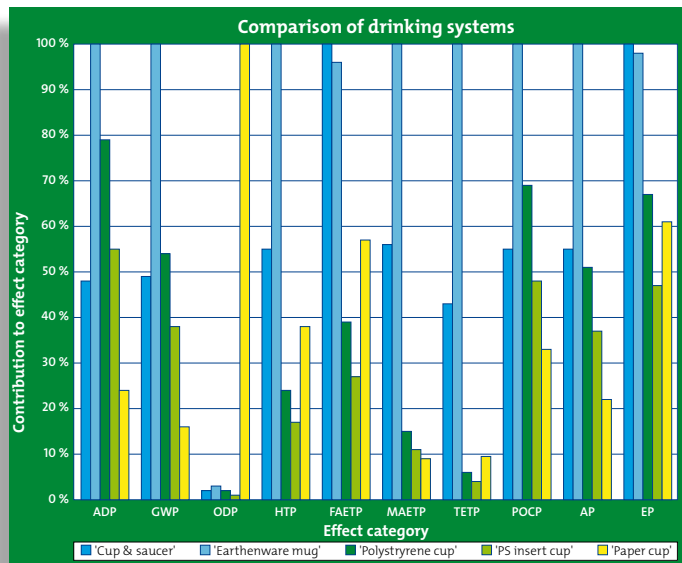
For the study, the different drinks systems had to be brought under one uniform denominator. It was decided to examine the environmental effects for each drinks system based on providing 1.000 servings of a hot drink (tea/coffee/hot chocolate) from a vending machine in an office or factory environment.

All conceivable processes that could have an effect on the environmental impact were included in the study:

- the production of raw materials
- the production of the drinks systems
- the using stage (washing of re-usable drinks systems)
- transport and collection
- waste processing and recycling, and their associated transport
- treatment of waste water in a drainage purification system



## And the winner 'on points' is...



The environmental effects that were examined are:

- Abiotic mineral resources depletion potential (ADP)
- Global warming potential (GWP)
- Ozon depletion potential (ODP)
- Human toxicity potential (HTP)
- Fresh water aquatic eco-toxicity potential (FAETP)
- Marine aquatic eco-toxicity potential (MAETP)
- Terrestrial eco-toxicity potential (TETP)
- Photochemical ozone creation potential (POCP)
- Eutrophication potential (EP)
- Acidification potential (AP)

It can be seen at a glance that re-usable drinks systems have a greater total negative effect on the environment than their single-use alternatives. Porcelain and earthenware cups/mugs score badly in nearly almost all categories. A first general conclusion would therefore be: take always a single-use cup! But this would be premature. There are also other not unimportant factors that play a role.

## Detailed sensitivity analysis

In comparing the various drinks systems, high levels of uncertainty and variation have to be taken into account. Factors such as the life time of re-usable systems and the washing method of porcelain cups and earthenware mugs, and the various waste processing methods for single-use systems, need to be considered. That's why these factors, alongside a number of others, were included in further research, and so a detailed sensitivity analysis was drawn up.

### LESS WASHING, MORE TIMES USING THE SAME CUP

TNO also looked into which of the different drinks systems caused the greatest harm to the environment.

For the re-usable systems, it turned out that the washing involved is the most environmentally damaging factor. For the single-use systems, the effect on the environment mainly relates to the production of the raw materials and of the cup itself.

So doing less washing up really does have an effect! But the porcelain cup or earthenware mug is only more environmentally friendly than a single-use cup if it is used more than four times in a row without being washed. A noble aim, which unfortunately does not really do much for taste, and certainly not for hygiene!

The effects of using single-use systems more than once were also included in the study. The result is plain to see: using a polystyrene cup more than once simply makes it even more environmentally-friendly in comparison with the porcelain cup or earthenware mug. However, also here the hygiene argument is not to be forgotten!

Because the production of their raw materials contributes mainly to the total environmental effect of single-use drinks systems, it's natu-



STICHTING  
DISPOSABLES  
BENELUX



rally best to choose a cup that is as light weighted as possible, which means less raw materials are used. Smaller, so-called 'office coffee systems' (OCSs) sometimes use lighter cups, which cups the user places under the dispenser machine himself. Lighter drinking cups are also used in company canteens etc. as an alternative for re-usable cups and glasses. In the study these lighter weighted cups therefore score slightly better than the more user-friendly vending cups, because of their lower weight.

### REPROCESSING

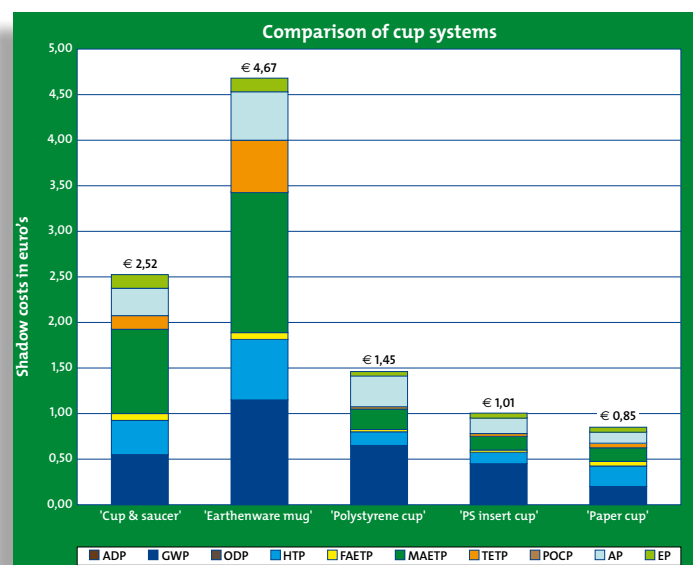
Carefully keeping single-use cups separate for recycling, only to have them finally end up with other waste in an incinerator, because an alternative is lacking. It's still a popular complaint, but now it's outdated. Take the Retoursysteem® for example, where cups are collected separately and ultimately recycled into raw materials for f.e. plant pots, DVD cases and more. An earlier TNO study showed that the Retoursysteem® as set up and managed by the Benelux Disposables Foundation is quite a good choice, like the "Save a Cup" system is in the U.K.

In addition to this, a method has been developed, mainly for domestic household waste, where among other plastic waste fractions, single-use cups are processed into what is called 'subcoal'. This relatively clean fuel can be used as an alternative for coal in power

stations. This appears to be the most environmentally friendly way of reprocessing domestic plastic packaging waste. And of course this option enhances the environmental friendliness of single use drinks systems.

### SHADOW PRICES METHOD

TNO supplemented its research by carrying out an analysis based on the so called shadow prices method. These shadow prices express the environmental load, in this case of the various drinks systems, in Euros. Via this approach it is possible to reflect all relevant environmental effects in one (financial) denominator, in the case of this study the Euro (€). On that basis a relative ranking of the different drinks systems can be determined. This approach too shows that all single-use drinks systems score better than their re-usable alternatives!



\* Costs based on providing 1.000 servings of hot drink.

## WHO'S GOING TO DO THE WASHING UP?

Where's my mug? My tea tastes of coffee!  
Who's going to do the washing up?  
Having your own mug is definitely not always more environmentally friendly, or even particularly hygienic. These inconveniences are often put up with under the slogan that 'it's good for the environment'.

**The TNO study now clearly shows that this idea has lost its' relevancy !**

## The final verdict

### TAKE SINGLE-USE CUPS!

It's not for nothing that our slogan is: Single use cups are the winners from an environmental perspective!

The final verdict of the study says (quote):  
**"The results of the comparisons made, based on the shadow prices method, clearly point in the direction that disposable (coffee) drinking systems being the least environmentally burdening".**

Of course the way single-use and re-usable drinks systems are used in praxis is of relevancy. But in most office and business working environments it is the best environmentally choice, to take advantage of the convenience and hygiene of single-use cups.

In fact, **it's better for the environment!**

## More information

A copy in English of the full Study can be ordered at a cost of € 90,- p/copy (Incl. postal charges in W-Europe). Want to know more about this subject? Or do you want to read or print out the Management Summary of the study? Then go to [www.bekerrecycling.nl](http://www.bekerrecycling.nl)



STICHTING  
DISPOSABLES  
BENELUX

In the Benelux Disposables Foundation (SDB), the Dutch vending Industry, disposables manufacturers/traders/importers and raw material producers jointly work together to provide information to the general public, users, social groups and political decision-makers on the positive aspects of the use of single-use cups and tableware, and to promote their collection and reprocessing.

SDB is active on the improvement of cup collection systems, and encourages the re-use of recycled materials. The Foundation developed the Retour cup collecting and recycling system, in which companies and organisations can participate via a subscription.



## Colophon

Published in 2007 by the *Stichting Disposables Benelux* (the Benelux Disposables Foundation - SDB).

Study carried out by *TNO-Bouw en Ondergrond* of Apeldoorn, the Netherlands.

Report RO246/B, October 2007

Authors: T.N. Ligthart and A.M.M. Ansems

Design and production: *Adrichem Reclame Advies* of Hazerswoude-Rijndijk, the Netherlands.

Copyright © reserved

If you wish to make use of any information from this brochure, then we ask you to accompany it with a mention of its source.

### ***Stichting Disposables Benelux***

Postbus 12,  
3740 AA BAARN  
The Netherlands

Tel: +31 (0)800 022 20 24

Fax +31 (0)35 542 76 16

[www.bekerrecycling.nl](http://www.bekerrecycling.nl)



S T I C H T I N G  
D I S P O S A B L E S  
B E N E L U X

