

# Q. Is recycled paper environmentally better than virgin paper?

## The issue

**The UK currently consumes approximately 12.5 million tonnes of paper and board per annum of which over 4.7 million tonnes ends up in the waste stream. From an environmental perspective this is a waste of valuable resource and, where landfilled, produces methane gas, a major contributor to global warming, and uses up declining landfill space.**

The arguments for recycling paper and board, and for organisations to buy more recycled content paper appear compelling. However, a recurring theme in the debates that surround waste and resource management is the extent to which the recycling of materials offers genuine benefits to the environment. Often, critics of the policy drive towards greater recycling assert that the act of recycling may in fact have little or no benefit to the environment, suggesting that more energy may be used in getting materials to the recycling facility than is saved by the process of recycling.

## Life Cycle Analysis (LCA)

In order to inform this debate further WRAP (Waste & Resources Action Programme) commissioned a major international research project from the Technical University of Denmark (IPU) and the Danish Topic Centre on Waste.

This study is the largest and most comprehensive international review of LCA work on key materials that are often collected for recycling – paper/cardboard, plastics, aluminium, steel, glass, wood, and aggregates. More specifically for paper and cardboard, nine “state-of-the-art” LCAs were selected for detailed review, comprising 63 different scenarios, each one an LCA in its own right.

The paper/card element of the study compares the environmental impacts of the alternative systems of disposing of paper and cardboard – recycling, landfilling and incinerating – using a number of different impact categories typically used for the environmental assessment of systems:

- energy use (or generation);
- resource consumption;
- global warming (CO<sub>2</sub> equivalent);
- other energy related impacts;
- toxicity (of emissions); and
- waste generation.

These categories take into account all the common impact questions including bleaching, energy use, transport of recovered paper and many others.

## Carbon

As one of the most commonly raised impact categories, and of increasing importance, the report identified a clear carbon saving for recycled paper versus virgin paper. On average, when comparing the manufacture of 100% recycled content paper to virgin paper, 1 tonne of recycled paper can save 1.32 tonnes of CO<sub>2</sub> equivalent. This considers the complete life cycle and takes in to account that the recovered fibre may otherwise be landfilled or incinerated. If landfilled, degrading paper could produce methane, a greenhouse gas which is 23 times more powerful than CO<sub>2</sub>.

## Energy

The report identified an average of 50% less energy consumption when recycling instead of incinerating paper and cardboard over the entire life-cycle. In other words, on average virgin production followed by incineration with energy recovery consumed twice as much energy as recycling.

## Recycling versus landfilling

The report concludes that, for paper and cardboard, recycling is clearly more favourable than landfilling in almost all scenarios and environmental impact categories considered. The results from the study reflect that the environmental benefit of recycling is especially clear in the categories of energy use, energy related impacts, waste generation, wastewater and importantly the reduction of carbon emissions.





## Recycling versus incineration

The report concludes that for paper and cardboard recycling, is more favourable than incineration in the environmental impact categories energy use, energy related impacts, toxicity, wastewater and the reduction of carbon emissions. The results are less clear or beneficial in the categories of non-renewable resource use and waste generation.

## Overall conclusion

The key conclusion from this report for paper and cardboard is that the overall results of these LCA studies indicate clearly that **recycling of waste paper has a lower environmental impact than the alternatives of landfilling or incineration** in most scenarios. The result is overwhelmingly clear in the comparison of recycling vs. landfilling, and less pronounced but still clear in the comparison of recycling vs. incineration.

## Answer

We can therefore conclude that recycled paper is better for the environment than virgin paper on two counts. First, because it helps divert waste paper away from landfill, and second its manufacture is less damaging to the environment when compared with the manufacture of virgin paper.

## Full Report

The full LCA Review report on all of the material streams, including the findings for each impact area for paper and cardboard, are available to download from the WRAP web site.

[www.wrap.org.uk/about\\_wrap/environmental.html](http://www.wrap.org.uk/about_wrap/environmental.html)



**70% recycled**  
Minimum 70% recovered fibre.

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## Footnote – What about saving trees?

There are a number of people and organisations who assert that recycling paper saves trees. This is not the view of WRAP. For many years the forestry and paper industry have cultivated trees as a crop to supply wood for the manufacture of paper, with more trees being planted to replace the ones that have been harvested. Although it is important to ensure that trees are sourced from sustainable sources, and that plantations do not displace native species, it is not true to say that recycling paper saves trees.

## About WRAP

WRAP works in partnership to encourage and enable businesses and consumers to be more efficient in their use of materials and recycle more things more often. This helps to minimise landfill, reduce carbon emissions and improve our environment.

More information on WRAP's work can be found on [www.wrap.org.uk](http://www.wrap.org.uk)

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