



## Metals – aluminium and steel recycling

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Steel and aluminium are common metals in the UK and are produced and exist in large quantities. Their uses and usefulness were discovered thousands of years ago. Longevity, malleability, strength and conductivity –their properties have been used over the ages to provide us with the many goods we see today. They may be found in items as varied as cars, computers, buildings and packaging. Although UK per capita consumption of steel has dropped since the 1970s, aluminium use is still growing. Metals may remain for many years as viable products and so the environmental effects of their production will be lessened relative to using less durable materials.

World primary production of aluminium is around 24 million tonnes on average a year.<sup>1</sup> The largest producer of aluminium is Australia, although other producer countries include Jamaica, Brazil, Guinea, China and parts of Europe.

World crude steel production stood at 1.05 billion tonnes in 2004. This represented a worldwide increase in production of 8.8% compared to 2003. Excluding China, world production rose by 4.5% in 2004.<sup>2</sup>

### Why bother?

Metals can be recycled indefinitely without losing any of their properties. They make up around 8%<sup>3</sup> of the average household dustbin yet in 2003 the recycling rates for aluminium and ferrous metals as a percentage of their consumption were only 33% and 26% respectively.<sup>4</sup>

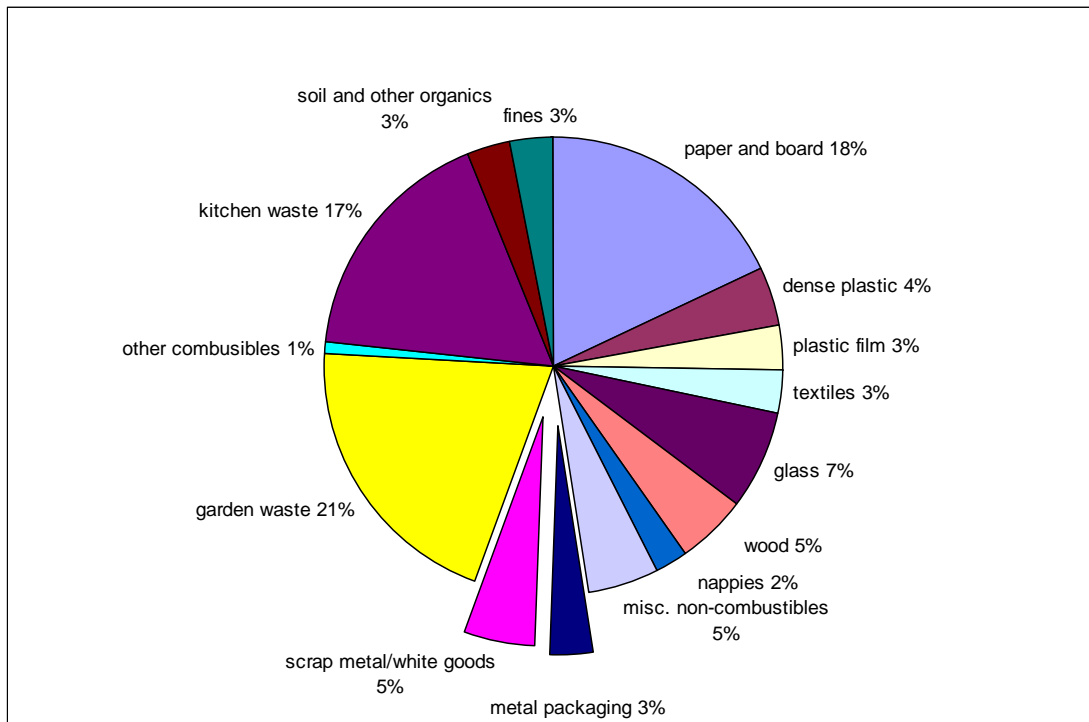
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<sup>1</sup> IAI statistic Jan 2001-Dec 2001 from [www.world-aluminium.org](http://www.world-aluminium.org)

<sup>2</sup> [www.worldsteel.org/](http://www.worldsteel.org/)

<sup>3</sup> Dr. J. Parfitt, WRAP, December 2002 - *Analysis of household waste composition and factors driving waste increases*

<sup>4</sup> [www.defra.gov.uk/environment/statistics/waste/kf/wrkf01.htm](http://www.defra.gov.uk/environment/statistics/waste/kf/wrkf01.htm)



## Aluminium

Aluminium is produced from bauxite, a clay-like ore that is rich in aluminium compounds. The aluminium is only found as a compound called alumina, which is a hard material consisting of aluminium combined with oxygen. This alumina has to be stripped of its oxygen in order to free the aluminium. The alumina is dissolved in a molten salt at a reduction plant and a powerful electric current is run through the liquid to separate the aluminium from the oxygen. This process uses large quantities of energy.

**Recycling 1 kg of aluminium saves up to 6kg of bauxite, 4kg of chemical products and 14 kwh of electricity.**

Recycling aluminium requires only 5% of the energy and produces only 5% of the CO<sub>2</sub> emissions as compared with primary production<sup>5</sup> and reduces the waste going to landfill. Aluminium can be recycled indefinitely, as reprocessing does not damage its structure. Aluminium is also the most cost-effective material to recycle.<sup>6</sup>

**A recycled aluminium can saves enough energy to run a television for three hours<sup>7</sup>**

**If all the aluminium cans in the UK were recycled there would be 14 million fewer full dustbins each year.<sup>8</sup>**

5 [www.world-aluminium.org/iai/publications/report2002.html](http://www.world-aluminium.org/iai/publications/report2002.html)

6 [www.alupro.org.uk](http://www.alupro.org.uk) under life cycle

7 [www.alupro.org.uk](http://www.alupro.org.uk)

8 [www.alupro.org.uk](http://www.alupro.org.uk)

## Steel

Steel is also mined from an ore. Iron ore is plentiful but it too is usually combined with oxygen or sometimes carbon or sulphur. The iron ore is stripped in a blast furnace to reduce it to pig iron that can then be used in steel production.

There are currently about 11Mt per year of iron and steel scrap arisings. About 70% of this scrap is recovered. Of the remainder – 2/3 is landfilled.<sup>9</sup>

**Every tonne of steel packaging recycled makes the following environmental saving:**

**1.5 tonnes of iron ore**  
**0.5 tonnes of coal**  
**40% of the water required in production**  
**75% of the energy needed to make steel from virgin material**  
**1.28 tonnes of solid waste**  
**Reduction of air emission by 86%**  
**Reduction of water pollution by 76%**<sup>10</sup>

## Other metals

Although present in smaller quantities – all metals including nickel, copper, silver, gold, lead, brass and more, can be recycled. Given their recognised value a smaller quantity of these metals are in circulation however with reliance on these metals by specific industries eg electronics their presence is often neglected when householders dispose of items.

## How's, what's and where's of recycling metals

Scrap metal is divided into two types: ferrous and nonferrous. Ferrous scrap is scrap iron and steel. This includes scrap from old cars, household appliances, steel beams, railroad tracks, ships, and food packaging and other containers.

Nonferrous scrap metal is scrap metal other than iron and steel. Examples of nonferrous scrap include aluminium – including foil and cans, copper, lead, zinc, nickel, titanium, cobalt, chromium, and precious metals. Although there is less nonferrous scrap than ferrous scrap, it is often worth more financially.<sup>11</sup> Millions of tonnes of nonferrous scrap metal are recovered by processors and consumed by secondary smelter, refiners, ingot makers, fabricators, foundries, and other industries.

Scrap metal, ferrous and nonferrous, can be categorized as either "**home scrap**" or "**purchased scrap**."

**Home scrap** is scrap generated at the mill, refinery, or foundry, and is generally remelted and used again at the same plant. Home scrap never leaves the plant.

Steel scrap is essential in the process of making new steel and can be recycled indefinitely without losing its quality. Due to its magnetic properties it is easy to recover even from unsorted waste and residual waste at Energy from waste plants.

Aluminium foil, laminates (eg crisp packets) will oxidise in an incinerator and release energy similar to coal. Aluminium cans will usually melt releasing some energy and when cooled can be separated from the bottom ash.

**Purchased scrap** represents the fractions of the metals that need to be collected before they can be recycled. Large goods eg vehicles and fridges have historically been collected by scrap metal merchants owing to the value of the metal recovered. New legislation regarding the recycling of fridges and of end-of-life vehicles is changing the specific role of the metals recyclers in the collection and processing of these goods but their importance in recovering the metal components has not changed. Electronics recyclers are

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<sup>9</sup> Biffaward Programme on Sustainable Resource Use, April 2004 - *Iron, Steel and Aluminium in the UK: Material Flows and their Economic Dimensions*

<sup>10</sup> [www.corusgroup.com/en/responsibility/recycling\\_in\\_action/recycling\\_success/](http://www.corusgroup.com/en/responsibility/recycling_in_action/recycling_success/)

<sup>11</sup> [www.irs.gov/businesses/page/0,,id=7090,00.htm](http://www.irs.gov/businesses/page/0,,id=7090,00.htm)

playing a bigger role in an economy in which waste electronics form an increasingly large part, not least because of new legislation.

## Household metal waste packaging

As householders we are more commonly aware of the metal packaging we receive. Whereas plastic packaging may cause difficulties due to the disparate nature and need to separate it into its different types – metal packaging recycling is simpler. As the ferrous and non ferrous components can be separated using magnets one large problem of identification is solved. Whilst beverage cans remain the most popular choice for collection by local authorities – aerosol cans and aluminium foil are accepted by many.

Each year the UK uses around 600 million aerosols, which is equivalent to about ten cans per person; in total this represents almost 30,000 tonnes of reclaimable high grade metal that could be recycled each year. Approximately 85 per cent of aerosols are made from tin-plated steel, and the rest from high-grade aluminium.

Seventy-five per cent of Local Authorities are now collecting empty aerosols through either kerbside schemes or bring banks.<sup>12</sup>

## Steel packaging

Steel cans have a very thin layer of tin that protects the surface of the can, which is why steel cans are often called "tins". The average weight of this tin coating has decreased by 40% over the last 20 years and the average steel can now only weighs 22g compared to 34g twenty years ago.<sup>13</sup> Although this has given great resource savings, throwing cans away still wastes valuable resources and adds to the amount of waste that has to be landfilled. As local authorities recognise benefits to be gained from including steel cans in their multi-material kerbside collection schemes, so recycling rates have risen. In 2003 44% of all steel packaging, including 2.5 billion steel cans, were recycled, but 9 billion steel cans are still going to landfill<sup>14</sup>, this despite the fact that owing to the high price paid for steel, recycling collections can often be made at zero cost to the collector.<sup>15</sup>

## Aluminium packaging

75% of all canned drinks sold in the UK are packaged in aluminium.<sup>16</sup> In 2001 the UK consumed 5 billion aluminium drinks cans, of which 42%<sup>17</sup> were recycled. Although this is a great improvement on the 2% recycled in 1989, there were still a massive 3 billion cans that were landfilled.<sup>18</sup>

Aluminium cans are recycled into new aluminium cans. Used beverage cans are normally back on supermarket shelves as new beverage cans in 6-8 weeks.<sup>19</sup> With a growing percentage of cans made from aluminium, because of its lightweight qualities, this ensures a healthy market for aluminium can recycling.

**Aluminium foil** and aluminium cans are made of different alloys and must therefore be collected separately. Most recycled aluminium foil is used to make cast components for the automotive industry, such as cylinder heads and engine blocks.

When washed, foil milk bottle tops, tops of cartons, baking and freezing trays, kitchen foil, cigarette and tobacco foil (without the backing paper) are all suitable for collection. Metal coated plastic film, which is often used for crisp and snack packets, looks like aluminium but can not be recycled. Use the scrunch test to check whether it is aluminium foil. If it springs back when scrunched in the hand it is not recyclable!

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<sup>12</sup> [www.bama.co.uk/recycling.htm](http://www.bama.co.uk/recycling.htm)

<sup>13</sup> [www.apeal.org/Contents/Base04.html](http://www.apeal.org/Contents/Base04.html)

<sup>14</sup> the environmentalist 12/2004 p14

<sup>15</sup> Corus Steel Packaging Recycling - Costing Recycling– 10/2004

<sup>16</sup> [http://www.thinkcans.com/think\\_whyrecycle.asp](http://www.thinkcans.com/think_whyrecycle.asp)

<sup>17</sup> <http://www.alupro.org.uk/life-4.htm>

<sup>18</sup> [www.defra.gov.uk/environment/statistics/waste/download/xls/wrtb16.xls](http://www.defra.gov.uk/environment/statistics/waste/download/xls/wrtb16.xls)

<sup>19</sup> [www.world-aluminium.org/environment/recycling/](http://www.world-aluminium.org/environment/recycling/)

## Other metals

When considering metal recycling we generally refer to aluminium and steel. Other metals eg copper, gold, silver and brass are less frequently landfilled as their value is more generally recognised and consequently the recycling infrastructure more developed. That being said, handling of large quantities of electronic equipment in order to recover precious metals has led to the exporting of equipment to places where little regard is paid to the health of workers and the environmental consequences of poor treatment of this waste stream. For further details see our electronics information sheet.

## What does the law say?

Metals' recycling is effected through ELV, WEEE, and packaging legislation. For more details see our legislation information sheet.

## Useful contacts

### Aluminium, steel, general and packaging, can crushers

#### Aluminium

**Aluminium Federation**  
[www.alfed.org.uk](http://www.alfed.org.uk)

**European Aluminium Association**  
[www.eaa.net](http://www.eaa.net)

**Novelis**  
[www.thinkcans.com/](http://www.thinkcans.com/)

**Aluminium Packaging Recycling Association (ALUPRO)**  
1 Brockhill Court  
Brockhill Lane  
Redditch, B97 6RB UK  
t: 01527 597757f: 01527 594140  
[www.alupro.org.uk](http://www.alupro.org.uk)

**European Aluminium Foil Association**  
[www.alufoil.org](http://www.alufoil.org)

#### Steel

**Association of European Producers of Steel for Packaging (APEAL)**  
Avenue Louise, 89  
B-1050 Brussels  
BELGIUM  
t: +32 2535 7205  
[www.apeal.org](http://www.apeal.org)

**Steel Can Recycling Information Bureau (SCRIB)**  
Port Talbot Works  
Port Talbot SA13 2NG  
t: 01639 872 626  
[info@scrib.org.uk](mailto:info@scrib.org.uk)  
[www.scrib.org](http://www.scrib.org)

**Corus Steel Packaging Recycling**  
30 Millbank  
London SW1P 4WY  
t 020 7717 4444, f 020 7717 4455  
[feedback@corusgroup.com](mailto:feedback@corusgroup.com)  
[www.cspr.co.uk](http://www.cspr.co.uk)

## General and packaging

### **AMG Resources Limited**

77 Francis Road,  
Birmingham  
B16 8SP.  
t 0121 455 9191 f 0121 455 9301  
[amg@birmingham.co.uk](mailto:amg@birmingham.co.uk)

### **British Aerosol Manufacturers' Association**

Kings Buildings  
Smith Square  
London SW1P 3JJ  
t: 020 7828 5111 f 020 7834 8436  
[enquiries@bama.co.uk](mailto:enquiries@bama.co.uk)  
[www.bama.co.uk](http://www.bama.co.uk)  
Provides information about aerosols and recycling.

### **Can Makers Information Service**

New Bridge Street House  
30-34 New Bridge Street  
London EC4V 6BJ  
t: 0207 072 4083 f 0207 072 4020  
[canmakers@gciuk.com](mailto:canmakers@gciuk.com)  
[www.canmakers.co.uk](http://www.canmakers.co.uk)  
Provides information on the can manufacturing industry, together with data on recycling, resource management and energy saving.

### **Beverage can makers europe**

[environment@bcme.org](mailto:environment@bcme.org)  
[www.bcme.org/](http://www.bcme.org/)

### **British Metals Recycling Association**

16 High Street  
Brampton  
Huntingdon  
Cambridgeshire PE28 4TU  
t: 01480 455249 f 01480 453680  
[admin@recyclemetals.org](mailto:admin@recyclemetals.org)  
<http://www.recyclemetals.org/>  
A trade association for the metals recycling industry.

### **INCPEN (Industry Council for Packaging and the Environment)**

SoanePoint  
6-8 Market Place, Reading  
Berkshire RG1 2EG  
t 0118 925 5991 f 0118 925 5993  
[info@incpen.org.uk](mailto:info@incpen.org.uk)  
[www.incpen.org](http://www.incpen.org)  
Information and advice on packaging and sustainable development.

## Can crushers

**Can Crush UK Ltd**  
[www.cancrush.co.uk](http://www.cancrush.co.uk)

**PD Rotomouldings PLC**  
Maes Y Clawdd Ind. Est  
Maesbury Road  
Oswestry  
Shropshire SY10 8NN  
t: 01691 659 905 f: 01691 659 344  
[sales@pdrotomouldings.co.uk](mailto:sales@pdrotomouldings.co.uk)  
[www.pdrotomouldings.co.uk](http://www.pdrotomouldings.co.uk)

**Unex Design Ltd.**  
Woodland Business Park  
Torquay  
Devon TQ2 7AT.  
t: 01803 612 772  
f: 01803 613 875  
[www.unex.co.uk/](http://www.unex.co.uk/)

**Kan Krusher**  
G & C Engineering  
Cobham Road  
Pershore  
Worcs WR10 2DL  
t.01386 553 934 f 01386 555725  
[sales@gandc.co.uk](mailto:sales@gandc.co.uk)  
[www.gandc.co.uk/html/can.htm](http://www.gandc.co.uk/html/can.htm)

**Plascan Ltd**  
Units R S T U  
Burnham Trading Estate  
Lawson Road  
Dartford  
Kent DA1 5BH  
t: 01322 551 542 (enquiries) / 01322 223 363 (sales)  
f: 01322 223 234  
[plascan@plascancrusher.com](mailto:plascan@plascancrusher.com)  
[www.plascancrusher.com](http://www.plascancrusher.com)

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[www.wasteonline.org.uk](http://www.wasteonline.org.uk)

[www.wastewatch.org.uk](http://www.wastewatch.org.uk)

Due to changes in funding, we are no longer able to offer a public information service. Should you have further questions on waste and recycling, please contact one of these groups:

Householders and students should call the [Recycle Now](#) helpline on 0845 331 31 31 for further waste based information, and where to find your local recycling facilities.

Small to medium businesses should visit the [Envirowise](#) website, or call 0800 585 794, for further information on waste issues. Larger businesses should visit [www.businesslink.gov.uk](http://www.businesslink.gov.uk).

For industry based questions, please use the WRAP technical helpline on 0808 100 2040 for advice on markets and recycling company development, or visit [www.letsrecycle.com](http://www.letsrecycle.com) for listings of recyclers and reprocessors.

If you find a mistake on this page, or have a technical question regarding the wasteonline website, please email [info@wastewatch.org.uk](mailto:info@wastewatch.org.uk).

Thank you, and apologies for any inconvenience.