



**Submission by: Aluminium Federation
and Aluminium Packaging Recycling Organisation**

Aluminium: A Truly Sustainable Material

Although a relatively “young” material only discovered in 1807 and produced commercially since 1886, it is impossible to imagine life without Aluminium. Think of any aspect of daily life and Aluminium is most likely to feature in it.

“The life cycle of Aluminium is a never-ending story.”

The Government’s Waste Strategy published in 2007 identified Aluminium as a “Key Material”. The Waste Strategy complimented the Climate Change Bill with a focus on carbon reduction, seeking to maximise the recycling of materials which have the potential to contribute to a significant reduction in carbon emissions.

This is welcomed by the Aluminium Industry.

Some Key Facts and Figures:

- Bauxite, the ore from which Aluminium is made, is available in abundance. It is estimated that at present consumption there remains 300 years of commercially available Bauxite deposits in the world.
- Current global output of Primary (new) Aluminium is 35 million tonnes annually. Global production of recycled aluminium was 16.4 million tonnes in 2006.
- 60 per cent of the world’s Primary Aluminium is produced using clean, renewable, hydro-electric power.
- Currently demand for primary Aluminium outstrips production and immense capital investment is being made in primary production plants around the world. With this investment will come new jobs, new technologies, new products, innovation and new possibilities for mankind.
- 75 per cent of all Aluminium ever produced is still in use today, equivalent to 540 million tonnes. This percentage will increase year on year.
- “Recycling is the cornerstone of Aluminium’s ‘Sustainability’”
- Used Aluminium is almost 100 per cent recyclable—using only 5 per cent of the original power required to produce it, to recycle it.
- If we recycled all the aluminium currently stored in use around the world, from cans to cars, from foil trays to aeroplanes, from wine bottle tops to buildings, it would be equivalent to 15 years’ primary output.

- Recycling from end-of-life Aluminium products, currently saves close to 80 million tonnes of greenhouse gas emissions per year worldwide.
- Projections show that global recycled aluminium supply from end-of-life scrap will double by 2020 from today's level of 6.8 million tonnes to around 14 million tonnes.
- Aluminium is a strategic material and can be regarded as "stored energy". Over 60 per cent of the aluminium produced is produced from renewable hydro electric power.
- Aluminium is truly a material of today and of the future.
- Aluminium is a truly "sustainable" material, being cost-effective, strong, lightweight (one-third the weight of steel), corrosion resistant, flexible in design, and fully recyclable.
- The UK Aluminium Industry has invested heavily to encourage the recycling of aluminium used in applications from packaging to cars.
- The current UK recycling rates for the three major aluminium market sectors are: Packaging (32.5%), Building (92-98%), and Transport/Automotive (95%).
- 96 per cent of the Aluminium used in the old Wembley Stadium (over 400 tonnes) was recovered and recycled during the demolition process. Aluminium is featured extensively in the new Wembley Stadium for roofing (including the retractable roof), window frames, curtain walling and exterior cladding.
- In the UK we use around 143,000 tonnes of aluminium packaging each year. The largest part of this is drinks cans, at around 90,000 tonnes. Aluminium foil trays and lids, etc make up around 25,000 tonnes.
- Although aluminium packaging represents less than 1 per cent of the domestic waste stream in the UK, it contributes around 25 per cent of the value from the sale of recyclables. At around £750 per tonne, aluminium subsidises the cost of collecting other packaging materials.
- Figures published by DEFRA show that 46,719 tonnes of aluminium packaging were collected for recycling in 2006, a 17 per cent increase on the previous year. This equates to a recycling rate of 32.5 per cent for all aluminium packaging. Based on these figures, the recycling rate for aluminium drinks cans is estimated to be 48 per cent and foil 10 per cent.
- The recycling rate in the European Union for aluminium drinks cans was 52 per cent in 2005.
- Every tonne of aluminium drinks cans recycled saves 10 tonnes of CO₂ equivalent.
- However, in spite of our best efforts, over 90,000 tonnes of aluminium packaging in the UK (worth around £80 million) is still going to landfill.

Better design and the use of materials

What role can better design and materials play in minimising the creation of waste? Are there any barriers to how knowledge in this area can best be translated and applied?

Aluminium product manufacturers have been at the cutting edge of design optimisation. This is evidenced in the widespread use of Aluminium in the transportation, packaging and building industries.

Recycling is probably the most effective way of reducing waste. It is therefore essential that products are designed with recycling in mind.

Aluminium is the perfect material for recycling as it can be recycled again and again without any loss of quality. Up to 95 per cent of the energy used in primary production is saved and 97 per cent of greenhouse gas emissions are prevented.

The Aluminium drinks can is 100 per cent recyclable and can be recycled back into a new can with no loss of quality.

The Aluminium Industry is committed to maximising recycling performance because it makes good commercial and environmental sense.

Resource efficiency is also an important way of reducing waste.

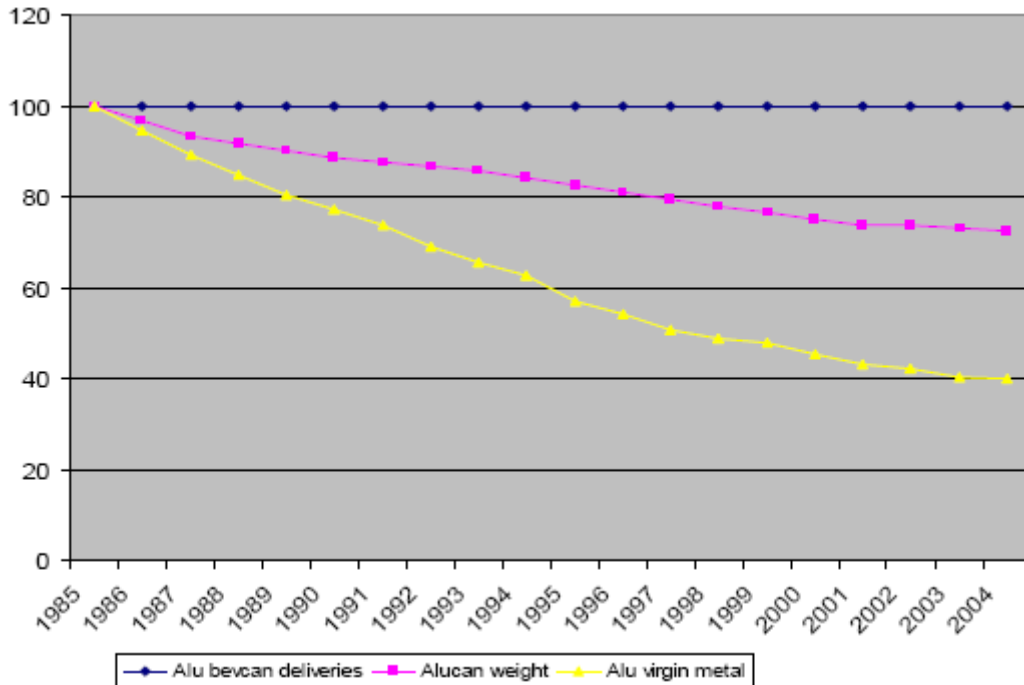
Reductions in the gauge of aluminium car bodies and aluminium packaging are good examples of light-weighting and energy saving, driven by the Aluminium Industry.

The Aluminium Industry works very closely with the international Aerospace Industry. Over 70 per cent of the structure of the Airbus A380, the biggest passenger airliner ever built, is aluminium.

The gauge of flexible aluminium packaging foil has been reduced by 33 per cent in the last 15 years from 12 micron to 8 micron and the weight of the aluminium drink can has been reduced by 28 per cent in 20 years from 18.6g in 1985 to 12.7g in 2003. Clearly this has led to a significant reduction in the amount of aluminium required.

There is always room for improvement and the Education and Research & Development communities can play a significant role in leading design optimisation.

Consumption of Cans Versus Material Usage – A Clear Downward Trend!



What factors influence the use of materials? In what way do considerations of sustainability feature in the selection of most commonly used materials?

Traditionally the main influence on the use of any material has been applicability, i.e. mechanical and other physical properties, and cost. Until relatively recently cost beyond the factory gate was not considered.

Today increasingly, however, the life cycle costs of materials are being considered.

Sustainability is progressively influencing the choice of material for a particular application. Supermarkets are increasingly looking at the environmental performance of the products and packaging materials they sell. Equally consumers are beginning to take an interest in the “sustainability” of the products they buy.

Sustainability is a very complex issue involving a whole series of different issues, including resource efficiency, production techniques, energy consumption, carbon emissions, recycling etc. It can be very misleading to look at a single issue in isolation. It is very easy for the wrong decisions to be made based upon incomplete information. We believe that it is essential that standards are delivered and adhered to, to allow materials to be properly compared. The work currently being undertaken by the Carbon Trust and the British Standards Institute (BSI) to develop a protocol for the measurement of carbon footprints provides an excellent example. We would encourage Government to ensure that these standards are adopted by industry.

The average life of an aluminium-bodied car is 30-40 years, compared to 10-12 years for a car with steel bodywork. An aluminium car will have a significant recyclable value at the end of its life.

Aluminium recycling saves energy and reduces carbon emissions—20 times more efficient than landfill!

To what extent do product designers and engineers take into account the availability and the end of life impacts of raw materials?

The automotive industry leads the way in this area, demanding to know that any material specified for a particular application will be readily available in the long term at a commercially viable price. Equally, the automotive industry will be driven (no pun intended) to show that their choice of a particular material has minimal environmental and energy-related impact. The “End of Life Vehicles Directive” will significantly influence this situation.

A number of highly efficient processes are used to collect and separate aluminium from vehicles.

The use of aluminium in automotive manufacture by companies such as Jaguar and Audi is increasing year-on-year by an average of 4 per cent.

More should be done to educate designers and engineers.

What impact does the development of new materials have on design? How much interaction is there between material scientists and designers?

The Aluminium Industry provides detailed innovative technical advice to the international automotive and aerospace industries and to architects and engineers.

The aluminium foil container manufacturers have worked closely with microwave oven manufacturers to overcome technical problems.

In the Aluminium Industry more interaction between material scientists, designers and engineers is needed.

Can better designed products offset the increase in consumption?

There is no doubt that better product design can contribute to offsetting the increase in consumption. A good example is the large range of customised drinks can sizes designed to meet consumer needs more precisely whilst helping to avoid waste.

Aluminium beverage can key facts (1985 - 2004):

- Number of cans sold and the related litrage increased by factor 6.3;
- The weight of the can has been reduced by almost 30 per cent;
- The recycling rate has increased from nil to 48 per cent;
- Requirement of virgin aluminium only increased by a factor of 2.5.

Weight reduction is a crucial part of automotive design, in which aluminium has a leading role to play.

Are there any other gaps in knowledge and how are they being addressed?

The UK Aluminium Industry is a world leader in recycling technology and technical advances are ongoing through research and development. Novelis' recycling plant at Warrington is a state-of-the-art operation producing 1000 tonnes of metal every week from drinks cans, foil, aerosol cans, etc.

Members of the Aluminium Alloy Manufacturing and Recycling Association use state-of-the-art technology—F. E. Mottram's de-lacquering plant; Mil-Ver Metals' furnaces, etc.

Business framework

Does the current policy, regulatory and legal framework support and incentivise the development of better, more sustainable products and processes? How is the framework communicated to businesses and what is the level of awareness and understanding among businesses?

The successful collection of packaging materials for recycling is influenced by the Packaging Waste Regulations and the Landfill Directive. Unfortunately the Landfill Directive does not encourage Local Authorities to collect lightweight non-biodegradable packaging like aluminium.

With 99 per cent of used aluminium packaging arising in the domestic waste stream as small consumer items such as drinks cans and foil trays, or even smaller pack components such as chocolate foil, dairy lidding and the barrier layer in drinks cartons, the industry is almost totally dependant upon Local Authority-run collection programmes.

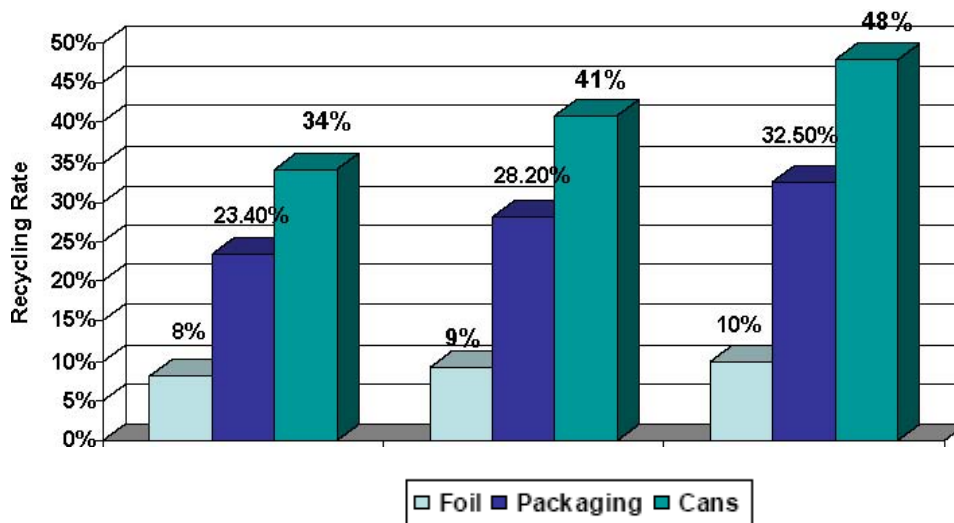
For Local Authorities the collection of light-weight aluminium packaging is not a priority because their targets are weight-based with strong incentives to divert biodegradable waste. Aluminium is the only packaging material which has been almost totally dependant upon recovering material from the domestic waste stream to achieve its targets.

Despite this, aluminium has an excellent record of achievement with a recycling rate for all aluminium packaging of 32.5 per cent in 2006 and an estimated rate of 48 per cent for aluminium drinks cans. With the exception of glass, aluminium's recycling performance cannot be compared on a "like for like" basis with other packaging materials as their achievement is heavily reliant on cheap and easy to access material from the commercial sector.

Much more needs to be done to reduce the regulatory burden on British Industry.

Whilst the UK's Aluminium Industry can demonstrate an impressive performance in areas such as Environment, Labour relations, Health & Safety, increasing regulatory burden not matched in less developed parts of the world means that UK manufacturing is in steady decline, as production shifts inexorably eastwards.

Aluminium Packaging Recycling Performance



How central is sustainable design to business thinking? What initiatives are in place to encourage this and are they meeting business needs?

Increasingly consumers and Industry is becoming concerned about helping to combat climate change. There is no doubt that recycling, saving energy and reducing our carbon impact are all positive steps which will contribute to achieving a more sustainable future. The UK Aluminium Industry is at the forefront of all these sustainability initiatives. We are continually promoting sustainable design to our customers.

Companies such as Innoval Technology and Novelis Automotive are involved in innovation projects in the Transport sector. The most significant project has been the use of aluminium sheet as an alternative to steel for the mass production of cars, using conventional pressing and joining technologies.

More than 70 per cent of aluminium castings are used in the automotive sector. Examples of aluminium castings produced from recycled alloys include engine cylinder heads, engine blocks, pistons and gearboxes.

What other measures can promote a focus on waste reduction among businesses?

Historically the majority of the aluminium drink cans collected for recycling in the UK have been collected through kerbside and bring systems. It has proved more difficult to establish viable systems to encourage the collection of aluminium drinks cans consumed “away from home”. Many of these cans are consumed in the “work place”.

It is estimated that around 30 per cent of the cans sold in the UK are consumed “away from home”, equating to an estimated 30,000 tonnes.

We are optimistic that the new Waste Strategy for England and Wales, the

increasing cost of landfill and the Pre-treatment of Waste Regulations, should encourage businesses to establish recycling systems. In addition, working with key partners, the Aluminium Industry is currently developing a number of significant initiatives with the objective of developing sustainable collection systems to service this key area of opportunity.

The intrinsic value of aluminium encourages a high level of recyclability and, therefore, waste reduction.

What lessons can business learn from international experience?

The Aluminium Industry is a global industry dominated by multinational companies, committed to sharing best practice, including waste reduction.

The Aluminium Federation works closely with organisations such as the International Aluminium Institute, the European Aluminium Association and the Organisation of European Refiners and Remelters, to achieve that major objective.

Government Policy

What is and should be the role of Government in addressing the issue of waste reduction?

The UK has around 400 Local Authorities who are responsible for the collection of waste and recyclables. In effect, this has resulted in 400 different collection systems! This, coupled with the lack of incentives for Local Authorities to collect lightweight packaging (see Business Framework, Q.1) makes the maximisation of recycling rates for aluminium packaging very difficult. Currently, two-thirds of valuable aluminium packaging is being lost to landfill.

We believe that Government, working with Industry, needs to take a stronger lead and do more to encourage the development of a properly integrated collection system for recyclables, operated by Local Authorities. As was highlighted in the Waste Strategy, we would support the development of carbon-based recycling targets for Local Authorities.

The Waste and Resources Action Programme (WRAP) is funded by Government to lead much of its work in the areas of waste reduction. Whilst WRAP has provided a significant amount of support, practical and financial, to the plastic and glass sectors, to date the metals sector has had no direct support. The Aluminium Industry has expressed its disappointment directly to WRAP, Defra and BERR on a number of occasions. There is no doubt that as a “key material” the support of WRAP could make a valuable contribution supporting the Industry’s programmes to maximise recycling performance.

How does Government policy link up with European strategies and action plans?

Two good examples of European legislation in force affecting the UK Aluminium Industry are the European Packaging Waste Directive and the End of Life

Vehicles Directive.

In general terms, Government policy does link up with European legislation and strategies.

What lessons can be learnt from other countries – within the EU and globally?

To encourage the recycling of aluminium packaging, a number of different recycling mechanisms are used worldwide. They are designed for local market conditions.

The Aluminium Industry has a worldwide network of specialist recycling organisations who regularly share best practice and are in regular dialogue with national Governments. The Aluminium Packaging Recycling Organisation (Alupro) represents the aluminium packaging manufacturers, the converters and the recyclers in the UK. The Aluminium Alloy Manufacturing and Recycling Association (AAMRA) represents the aluminium secondary refiners and remelters in the UK. (Both Alupro and AAMRA are Member Associations of the Aluminium Federation.)

Consumer behaviour

How can better product design be used to effect a change in consumption patterns and behaviour?

The development of a range of different can sizes, as described in “Better design of materials section”

In the 1990’s technical advances by the UK Aluminium Industry produced a “stay-on” tab for drinks cans which replaced the traditional ring-pulls, further eliminating waste.

What role do marketing strategies play in influencing more sustainable design?

The “Power of Aluminium” Awards, sponsored by ALFED’s Aluminium Extruders Association, is an excellent example of the marketing and promotion of aluminium extrusions in building and transport applications.

The “Aluminium Imagination” Awards influenced architects to feature aluminium in iconic buildings such as the Media Centre at Lords Cricket Ground, the Selfridges department store in Birmingham, and the new Wembley Stadium.

Major investment, marketing and promotion by the UK Aluminium Industry increased the recycling rate for aluminium drinks cans from nil in 1985 to an estimated 48 per cent in 2006.

The Aluminium Packaging Recycling Organisation (Alupro) has developed and implemented three consumer campaigns designed to encourage consumers to recycling aluminium packaging. Trees have been planted in the UK and Africa for every tonne of aluminium packaging recycled. The “Trees For Africa” campaigns

have involved 2000 schools and over 300 Local Authorities in the UK—more than 100,000 trees have been planted. The campaign contributed to a 17 per cent increase in the volumes of aluminium packaging collected for recycling in 2006 compared to 2007. Currently, Alupro are working in Malawi with the charity Ripple Africa planting fruit trees and developing sustainable businesses with local communities.

Are there any gaps in knowledge in this area?

The Aluminium Industry will continue to invest in this area, but Government funding would be very helpful.

Such funding should be channelled through the major industry organisations, such as the Aluminium Federation and the Aluminium Packaging Recycling Organisation.

Skills

How is sustainable design integrated into the design syllabus?

The Aluminium Federation has an ongoing lecture programme at many UK Universities, using the European “TALAT” (Training in Aluminium Application Technologies) teaching material on CD-ROM. With increased financial resources, ALFED could do much more in this area.

To what extent are considerations of sustainable waste reduction part of broader industrial training courses?

Most of the major aluminium organisations in the UK are involved in education and training programmes, from Primary Schools through to Universities and professional institutes, such as the Institute of Materials, Minerals and Mining.