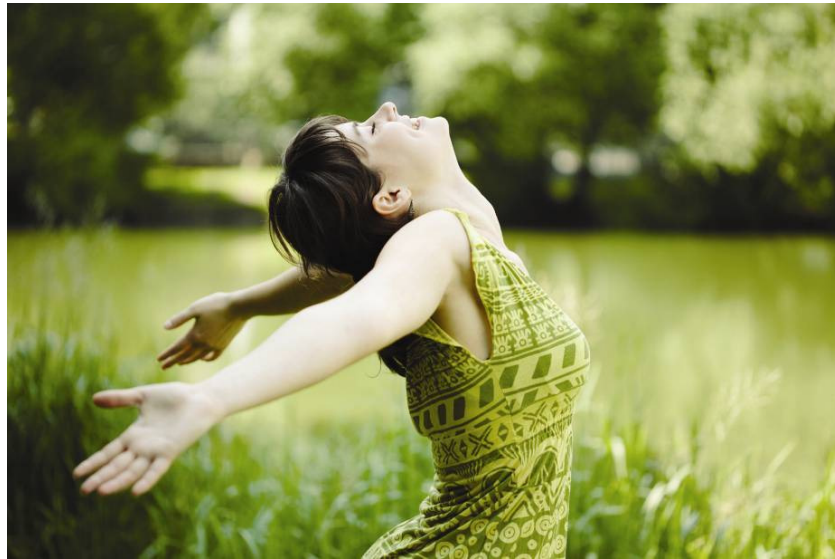


Soft Drinks: Hard on the Environment



A review of the environmental impact of soft drinks packaging

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Commissioned by Pelican PR on behalf of SodaStream

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Executive summary

The soft drinks industry was worth £13.2 billion in 2009 and includes large companies, such as Coca Cola Enterprises and Britvic, with profits larger than the Gross National Product (GNP) of small countries (British Soft Drinks Association (BDSA), 2010).

In the UK in 2009 total soft drinks consumption was 14,140 million litres, or 229.1 litres per person (BDSA, 2010). The average household consumes 540.68 litres of soft drink per year.

Alex Sexton, a current undergraduate student of Lancaster University, and undertaking his degree within the University's Lancaster Environment Centre, has been commissioned to summarise existing data on the environmental impact of soft drinks packaging and to outline the potential benefits of using SodaStream as an alternative.

SodaStream manufactures and sells machines that make carbonated drinks from tap water and a range of flavoured syrups (SodaStream, 2010). The machines are sold with a reusable Bisphenol A (BPA) free bottle that can last for up to three years.

The production of soft drinks bottles produces between one and three kilograms of greenhouse gasses for every kilogram of polyethylene terephthalate (PET) plastics produced (Incpen, 2010) and 43% of British adults believe that products are over packaged (Incpen, 2008).

SodaStream fits well with the Government's 'waste hierarchy' model, which places preference on waste prevention over reuse, recycling, recovery and disposal.

Each single bottle of SodaStream concentrate replaces 9.6 bottles (307.2 grams of PET packaging) and so saves 257.2 grams of PET packaging. This represents a packaging saving of 83.72% and a saving of 21.4 grams of packaging for every litre of drink consumed.

Over the course of a year for the average UK household (drinking 541 litres of soft drinks) this adds up to:

- 45.1 bottles of SodaStream syrup replacing 433 bottles of traditional soft drinks
- 11.7kg of PET plastic packaging saved

If this is extrapolated to include all soft drinks sold in the UK every year (14,140 million litres) it adds up to:

- 1,178 million bottles of SodaStream syrup replacing 11,312 million bottles of traditional soft drinks.
- 303,084 tonnes of PET plastic packaging saved.

SodaStream machines have an anticipated life of 10 years. If SodaStream were used to replace traditional soft drinks over a 10 year period:

- 451 bottles of SodaStream syrup would displace 4,330 PET bottles per household.
- 117kg of PET plastic packaging would be saved per household.

- Nationally, 11,780 million bottles of SodaStream syrup would replace 113,120 million PET bottles.
- More than 3 million tonnes of PET plastic packaging would be saved.
- Greenhouse gas emissions associated with soft drinks packaging would be cut by 0.23 kg per household.
- Nationally, greenhouse gas emissions associated with soft drinks packaging would be cut by 6,062 tonnes.
- Per household, water used in the production of soft drinks packaging would be cut by 25,375 litres.
- Nationally, water used in the production of soft drinks packaging would be cut by 662,996 million litres.

Soft drinks industry background

The soft drinks industry ranges from carbonated drinks to fresh juices and bottled water. In 2009 the UK soft drinks market grew by 1.7%, while the two previous years' sales had dropped. The industry is now worth an estimated £13.2 billion (BSDA, 2010). The small increase could suggest attitudes are changing to whether soft drinks are really acceptable in today's society, with 74% of people happy to alter their habits in a bid to reduce their impact upon the environment (Goodall, 2009).

In the UK in 2009 total soft drinks consumption was 14,140 million litres, or 229.1 litres per person (BSDA, 2010).

With the average household consisting of 2.36 people, according to the latest census data (Statistics.gov.uk, 2001), this equates to 540.68 litres of soft drinks consumed per household per year in the UK.

The forecast for the UK's soft drinks consumption is predicted to be 229.4 litres per person in 2010, rising slowly to 235.3 litres by 2014 (BSDA, 2010).

Of total soft drinks consumption:

- 42.89% is carbonated drinks (6,065 million litres), or
- 97.76 litres per person per year (BSDA, 2010), or 230.71 litres per household per year.

The bottled water sector has also been the subject of environmental campaigns arguing that tap water is both a safer and more sustainable alternative. This market is worth £1,404 million per year and makes up 14.8% of all the soft drinks the UK consumed in 2009 (BSDA, 2010). This makes it the third most popular type of soft drink after carbonates and dilutables.

About SodaStream

SodaStream produces and sells carbonated drinks makers that create sparkling water from tap water and sparkling soft drinks from a range of syrups.

SodaStream peaked in popularity in the UK in the 1970s and 1980s. The brand relaunched in the UK in 2010, with a new focus on sustainability and being environmentally friendly (SodaStream, 2010).

The company sells a carbonated drinks maker with a reusable bottle and refillable CO₂ gas canister. The company also sells concentrated flavoured syrups in a variety of flavours such as cola, lemonade and cranberry & raspberry in 500ml PET plastic bottles.

Each bottle contains enough syrup to make 12 litres of drink. Each gas canister can carbonate 60 litres of tap water.

SodaStream is an '*active green*' product: by using it, consumers are actively reducing their impact on the environment thanks to reduced transport, packaging reduction and packaging reuse (SodaStream, 2010).

SodaStream machines are manufactured in Israel (40%) and China (60%). An exchange service is offered for SodaStream gas canisters, which are refilled and refurbished in Germany. In the UK SodaStream products are sold through major retailers such as Asda, Comet, Harvey Nichols, John Lewis, Lakeland and Robert Dyas. The products are also available in more than 30 other countries (SodaStream, 2010). Each machine has an expected life of ten years, although many machines remain in use for longer than this.

The bottles provided with each SodaStream machine can be reused for up to three years. They are made from Polypropylene (PP) and Acrylonitrile Butadiene Styrene (ABS) plastics and are Bisphenol A (BPA) free. Where facilities exist, machines, gas canisters and reusable bottles can be recycled.

SodaStream's syrup bottles are made from PET. Every tonne of PET produced creates between one and three kilograms of greenhouse gases, depending on production efficiency (Incpen, 2010).

Soft drinks production and packaging

Packaging is used to protect and maintain the quality of the product. The BSDA states that materials such as glass, aluminium cans, steel cans, cartons (often referred to as Tetra Paks) and plastics including PET, polyvinyl chloride (PVC) and high density polyethylene (HDPE) are used in soft drinks packaging (BSDA, 2010).

The main materials used for packaging soft drinks are PET plastic bottles (74%), cans (23%), and glass (3%) (BCME, 2010). Manufacturing of all these materials uses energy and produces greenhouse gases such as CO₂.

The Industry Council for Packaging and the Environment (Incpen) claims that:

- Depending on the efficiency of the production plant, the emissions associated with PET production are between one and three kilograms of greenhouse gases per kg of PET produced.
- Each kilogram of PET can produce approximately 41 500ml PET bottles or 25 2 litre PET bottles.
- It takes seven litres of water to create one bottle (Direct.gov.uk, 2010).

Four per cent of the world's oil consumption is used in the production of plastics. In the UK 37% of plastic is used to make packaging, with 1.2% of this used to make PET drinks packaging (BSDA, BPF, Plastics Europe, 2009).

Across the soft drinks industry, an effort has been made to reduce the amount of plastic used for packaging:

- The weight of a typical 500ml PET bottle has been lowered from 26 grams to 24 grams, saving 2g per bottle and 1,000 tonnes of PET every year in the UK (WRAP, 2009).
- Similar work has been carried out with 2 litre PET bottles with the average weight reduced from 42g to 40g (WRAP, 2009).
- The average aluminium can uses 35% less material than it did 10 years ago (BSDA, 2010).

In addition, the BSDA is encouraging the industry to reduce its water use by 20% between 2007 and 2020 (BSDA, 2010).

A survey conducted with 1,010 British adults revealed that 43% think products are over packaged (Incpen, 2008). Therefore, to make a real impact on the environment and to appeal to the British public, packaging must be further reduced.

Packaging disposal and recycling

In the UK in 2009:

- 45% of plastic bottles were collected for recycling (260,000 tonnes). This is 6% higher than the previous year (Letsrecycle.com, 2010). In total, 215,000 tonnes of plastic is collected per year through kerbside systems (Recoup, 2010).
- Some of the plastic waste is sent to countries such as China to be remade into other products – an approach which is neither sustainable nor economical (University of Cambridge, 2005).

Therefore, it is advantageous to reduce and/or reuse, rather than recycle packaging. This can be illustrated using the waste hierarchy, a model used by the UK Government to inform waste strategies (The Independent, 2010).

Figure 1 (Waste Online, 2005) The Waste Hierarchy:

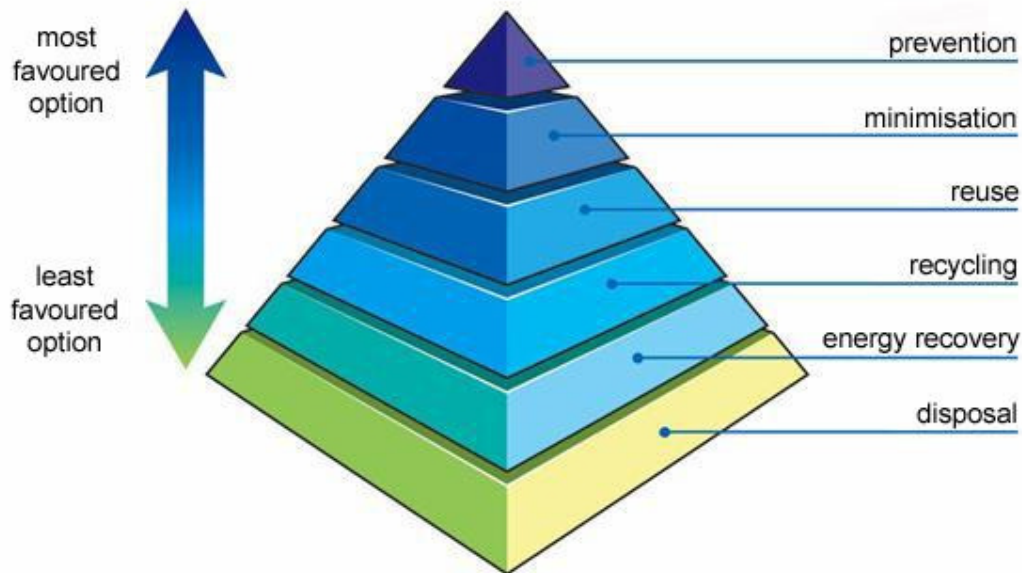


Figure 1 shows that waste reduction, reuse and recycling are preferential to landfill, incineration or other forms of waste disposal (Nakatani et al, 2010).

There is a steady increase in recycling rates, and it has been suggested that bottle deposit schemes are reintroduced to the UK (BBC, 2010)

By supplying a bottle which can be reused for three years with each SodaStream machine, SodaStream is actively encouraging the *prevention* of the need for new packaging and the *reuse* of the bottles supplied.

Soft drinks packaging impact

Each single 500ml bottle of SodaStream concentrate produces 12 litres of sparkling water or soft drinks. Traditional soft drinks are sold 'ready to drink' already diluted and 74% of these are sold in PET plastic packaging.

The most popular PET bottle sizes for soft drinks are 500ml and 2 litre (WRAP, 2009) although no figures exist to break down this figure any further. Therefore it has been assumed that 50% of sales are in 500ml bottles and 50% are in 2 litre bottles, giving an average pack size of 1.25 litres. Using this figure in conjunction with average 500ml and 2 litre bottle weights (WRAP, 2009) gives an average bottle weight of 32 grams. SodaStream concentrate bottles weigh 50 grams each: because they are used over a longer period of time they must be sturdier than other soft drinks bottles.

Using the above figures, each single bottle of SodaStream concentrate replaces 9.6 bottles (307.2 grams of PET packaging) and so saves 257.2 grams of PET packaging. This represents a packaging saving of 83.72%. This means that every litre of SodaStream drink saves 21.4 grams of PET packaging.

Over the course of a year for the average UK household (drinking 541 litres of soft drinks) this adds up to:

- 45.1 bottles of SodaStream syrup replacing 433 bottles of traditional soft drinks
- 11.7kg of PET plastic packaging saved

If this is extrapolated to include all soft drinks sold in the UK every year (14,140 million litres) it adds up to:

- 1,178 million bottles of SodaStream syrup replacing 11,312 million bottles of traditional soft drinks.
- 303,084 tonnes of PET plastic packaging saved.

SodaStream machines have an anticipated life of 10 years. If SodaStream was used to replace traditional soft drinks over a 10 year period:

- 451 bottles of SodaStream syrup would displace 4,330 PET bottles per household.
- 117kg of PET plastic packaging would be saved per household.
- Nationally, 11,780 million bottles of SodaStream syrup would replace 113,120 million PET bottles.
- More than 3 million tonnes of PET plastic packaging would be saved.

It is advised that SodaStream's re-usable plastic bottles are replaced every three years – meaning the average consumer will use four of these bottles over the 10 year life of a SodaStream machine. SodaStream gas canisters can carbonate 60 litres of drinks and are then refilled. With one machine per household, in 10 years the average UK family would require canisters to be refilled 90 times. It is important to remember that SodaStream concentrate bottles are recycled in the same way as other soft drinks packaging.

Incpen (2010) claims that the greenhouse gas emissions for each tonne of PET produced are between one and three kilograms – or an average of two kilograms. It takes seven litres of water to create one bottle (Direct.gov.uk, 2010). Over 10 years, if SodaStream is used in place of traditional soft drinks:

- Greenhouse gas emissions associated with soft drinks packaging would be cut by 0.23 kg per household.
- Nationally, greenhouse gas emissions associated with soft drinks packaging would be cut by 6,062 tonnes.
- Per household, water used in the production of soft drinks packaging would be cut by 25,375 litres.
- Nationally, water used in the production of soft drinks packaging would be cut by 662,996 million litres.

About this research

SodaStream has commissioned Alex Sexton, a current undergraduate of Lancaster Environment Centre, to summarise existing research to show the environmental impact of soft drinks packaging and, where possible, quantify the environmental benefits of using SodaStream.

Lancaster University is one of the top ten academic institutions in the UK. It is rated as 6th in Guardian, 8th in Independent and 10th in Times Good University Guide 2010. In addition, the Independent rated its geography and environmental studies courses as 10th in the UK in the same year.

The Lancaster Environment Centre (LEC), which opened in 2004, is where biological and environmental science and geography is carried out and was developed by the Lancaster University and Centre for Ecology and Hydrology (CEH). Its partnership working with environmentally focused businesses has made it a national centre of excellence for research (LEC, 2007).

Summary and conclusion

Consumers believe that many products are currently over-packaged, and the soft drinks industry is committed to reducing its environmental impact.

SodaStream offers an environmentally friendly alternative to traditional soft drinks by *preventing* and *reusing* packaging. According to the waste hierarchy model, each of these is preferential to *recycling*, *recovery* or *disposal*.

Traditional soft drinks are sold in PET bottles. The use of PET plastic packaging is particularly damaging for the environment because:

- Greenhouse gas emissions from every tonne of PET produced total between one and three kilograms.
- Seven litres of water are used in the production of a single PET bottle.

SodaStream's reduced packaging is both recyclable and re-usable. In addition, transportation can be reduced by using concentrates in place of ready-diluted drinks.

Each single bottle of SodaStream concentrate replaces 9.6 bottles (307.2 grams of PET packaging) and so saves 257.2 grams of PET packaging, which is 83.72% of the packaging that is saved. This means that every litre of SodaStream drink saves 21.4 grams of PET packaging.

Over the 10 year life of a SodaStream machine, the packaging-related environmental benefits per household per year of replacing traditional UK soft drinks consumption with SodaStream would be:

- Nationally, 11,780 million bottles of SodaStream syrup would replace 113,120 million PET bottles
- More than 3 million tonnes of PET plastic packaging would be saved
- Greenhouse gas emissions associated with soft drinks packaging would be cut by 6,062 tonnes
- Water used in the production of soft drinks packaging would be cut by 662,996 million litres.

The soft drinks industry is now working to improve its environmental performance to be "*in-line with sustainability principles, and with re-usability*" (DEFRA, 2009).

This report is an initial piece of secondary research looking at the environmental impact of soft drinks packaging.

Further primary research is recommended looking at the entire soft drinks production, transportation and packaging supply chain to show the full impact on the environment of UK consumers' thirst for soft drinks. SodaStream is currently working on a full lifecycle assessment for its products, with results expected in late 2011.

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