



Personal Carbon Allowances White Paper

How to help consumers make informed choices



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Foreword from Coca-Cola

The Coca-Cola Company *Coca-Cola Enterprises*

At The Coca-Cola Company, we pride ourselves in owning one of the world's biggest consumer brands. The key to our continued success and the success of our brands lies in our understanding of consumer needs and expectations across multiple situations and life stages.

Over recent years, we have seen a steady rise in consumer awareness of sustainability. At the same time we have seen a growing expectation that businesses take action to address key sustainability issues and play a role in encouraging consumers to act and behave sustainably.

At Coca-Cola, we have responded to this challenge by measuring, reducing and reporting the carbon footprint of our business operations, by reducing the amount of packaging and water we use, and by working to encourage consumers to recycle. We continue to enhance our knowledge and understanding of the key sustainability issues that impact our business. Coca-Cola Enterprises (CCE), our bottling partner in North West Europe, was the first soft drinks manufacturer in the world to measure and certify the carbon footprint of some of its most popular products across the full product lifecycle, using the first product carbon footprint methodology, PAS 2050.

We have also piloted a variety of initiatives to communicate our actions to consumers – encouraging them to take action at the same time. In the UK and France we developed an online 'Trace Your Coke' tool which was also introduced in Belgium and The Netherlands to allow consumers to track the local origin of the drink in their hand and to find out information about the environmental impact of our products.

In Belgium we introduced a 'Plant a Flower' environmental awareness campaign, linked to an in-store point-of-sale activation and campaign website. We have also undertaken a variety of initiatives to encourage consumers to recycle more often. We have introduced a recycling programme at many of the biggest music festivals in Great Britain, France and Belgium, encouraging festival-goers to change their behaviour and recycle more.

Whilst we are committed to being transparent about the environmental impact of our products, we have to date adopted a cautious approach to the provision of environmental information on-pack. From our experience

and consumer insight, we know just how difficult it is to provide simple, relevant and reliable information which can be easily understood and acted upon by our consumers.

As this research project shows, this is particularly true of food and drink products, which are often seen by consumers in highly personal terms and are often associated with emotional or habitual choices. Consumers show little natural inclination to change their habits and behaviour, and it will require considerable effort to encourage consumers to alter the choices they make in favour of products which have more favourable environmental credentials.

At the heart of this issue is a lack of consumer awareness and understanding – particularly on a complex issue such as carbon emissions. Context is critical, and information about the carbon impact of a particular product can only be understood in relation to the carbon impact of other products and other day-to-day activities like travelling, cooking and heating our homes.

This white paper seeks to explore the context for one particular environmental indicator – carbon emissions – by developing an initial approach to the concept of personal carbon allowances.

The white paper shows how personal carbon allowances could work in practice and explores the role that personal carbon allowances could play in helping consumers to make more informed choices about the products they consume.

We hope that the white paper (and the project and research which has been undertaken) provides a positive contribution to an emerging debate and highlights the role that product specific carbon information could play in encouraging consumers to behave in a sustainable and low-carbon way. It does not provide a definitive solution and at the same time poses many questions.

Providing environmental information in a credible, relevant and understandable way, which empowers consumers and encourages meaningful actions, is a significant challenge. Yet we believe that it is also an exciting opportunity. At Coca-Cola, we want to work with others to help find the right answers.

Foreword from Carbon Trust Advisory



Most consumers don't realise that the food and drink they consume has released greenhouse gases as result of cultivation, production and transportation processes. Far fewer understand the relative impact of these emissions compared to their home energy or transportation usage. Consumers want to choose lower carbon lifestyles, but they lack the context to inform their decisions. Coca-Cola engaged Carbon Trust Advisory to help them understand how best to educate and equip consumers with an environmental context to inform their buying choices. This work provides valuable insights for business and policymakers about how environmental information can help drive emissions reduction. This report contains a number of findings on how to engage consumers, it indicates defined reduction opportunities and highlights those areas where there is less scope for changing consumer behaviours.

Despite the economic downturn it is clear that consumers' understanding and appetite for environmental knowledge is increasing. They expect businesses to provide better information on their goods and services. Research has shown that when asked if they would buy products labelled as low carbon in preference to unlabelled products of identical quality, 47% say they are more likely to choose the products labelled low carbon, and one in five (21%) would pay more for products labelled as low carbon¹. Yet despite this demand, there is a lack of clear information available to consumers. Helping consumers to understand the environmental impacts of their lifestyles is a challenging concept. It involves helping consumers evaluate the relative impact of the decisions across all areas of their lifestyle: their food and drink choices, holidays, home energy and even their pets. There are many different ways of providing environmental information to consumers. The Carbon Trust has extensive experience of developing and operating

labelling and certification schemes. By working with Coca-Cola, we wanted to explore the concept of a personal carbon allowance to help consumers understand how different aspects of their lifestyle affect their personal carbon emissions. We trialled the concept with consumers to understand how they changed their lifestyles when equipped with improved environmental knowledge.

While many companies are measuring their indirect impacts, particularly following the release of the GHG Protocol Product and Scope 3 Standards, this work has raised the importance of collaboration. Companies need to cooperate between themselves, government and consumers to build our collective knowledge. Collaboration can lead to a common approach to reporting and labelling, and ultimately it can improve the consistency and quality of information provided to consumers.

The results of the trial will be of interest to policy makers, businesses and consumers in terms of regulation, labelling, public awareness campaigns and tools to engage consumers. The trial has shown consumers are ready and willing to use carbon information to inform their purchasing decisions. Companies have a vital role to play to help consumers understand the impact of their decisions. They need to improve the communication of their goods and services to help consumers choose quickly and easily.

We welcome the opportunity to collaborate and engage with business, government and other stakeholders to bring this closer to reality.

A handwritten signature in black ink, appearing to read "Hugh Jones".

Hugh Jones, Managing Director of Carbon Trust Advisory

1 Introduction

1.1 Introduction

Climate change is one of the biggest challenges of our times. Expectations are rising, with civil society placing an increasing emphasis on the important role that business has to play in moving towards a low-carbon economy. This is particularly true in the developed world, where carbon emissions and the per-capita use of natural resources far exceed the capacity of our planet.

For many years, leading companies have focused on the measurement and analysis of their own carbon emissions. Many have put in place robust carbon reduction plans for their own operations. However, increasingly it is understood that, as well as sustainable production, sustainable consumption will need to be part of the solution.

A sustained long term reduction of our collective environmental impact can only be achieved if significant changes are made to existing patterns of consumption. This will require a significant change in consumer behaviour. The involvement of the consumer is key and many observers believe that brand manufacturers and leading retailers have a critical role to play in driving sustainable consumption and in encouraging consumers to 'act sustainably'.

A number of companies have voluntarily begun to measure and communicate the carbon footprint of specific products to consumers – using on-line, on-pack and point-of-sale communications. In parallel there has been growing interest from policy makers across Europe in this issue. As a result, a number of national labelling schemes and consumer information initiatives have been established. More recently, the French government introduced a trial to assess the effect

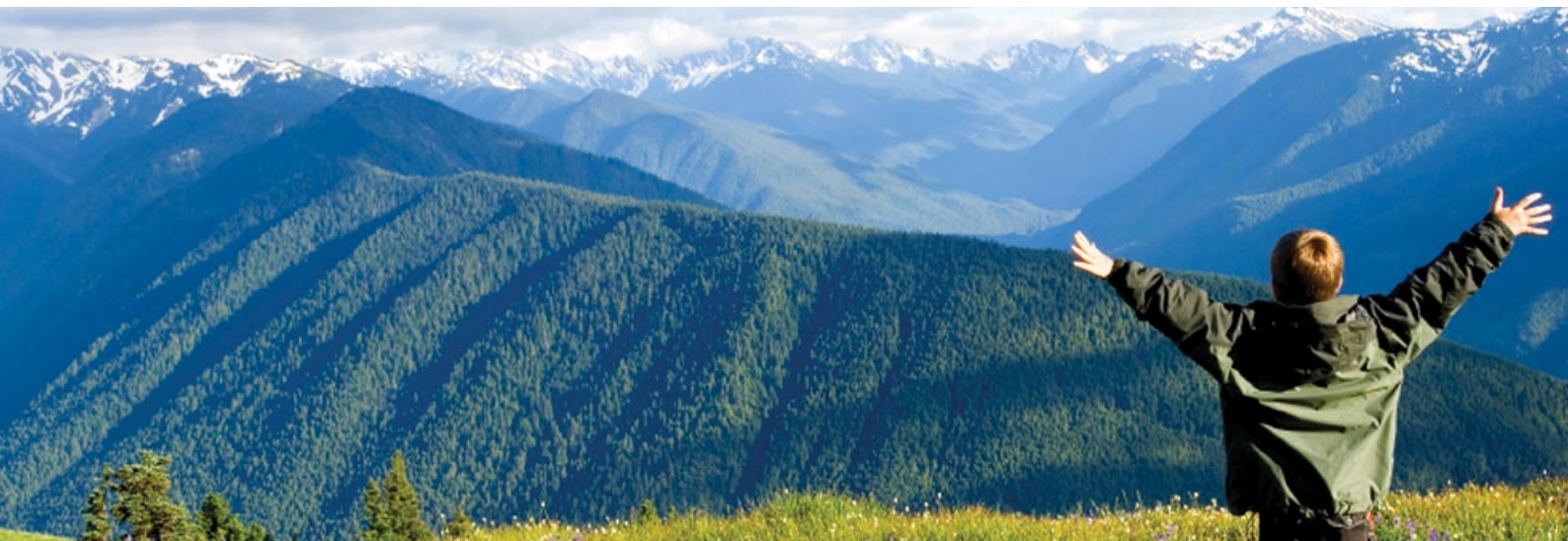
of providing information about the environmental impact of products to consumers, and the European Commission is undertaking a Europe-wide assessment of existing communication schemes.

Whilst a number of companies and organisations have had some success at using environmental information to encourage consumer behaviour (e.g. washing at 30 degrees or recycling), there is still considerable debate as to the best way to communicate the environmental impact of products, particularly in the food and drink sector.

More importantly, it remains unclear what kind of action or behaviour the companies and brands that use environmental information of this kind should be seeking to influence.

For example, consumers increasingly seem to understand the concept of a 'carbon footprint'. Many also understand that specific products have a carbon footprint. When presented with information to detail the actual amount of carbon embodied within a product they understand that too. Critically, however, they lack context. What is missing is an understanding of whether the carbon footprint indicated is 'a little' or 'a lot'. As a result, they are not clear on how to interpret the information they have been given – or what to do with it.

With the right information, consumers *can* make informed choices about the products that they choose to purchase. However, it is important that consumers understand not just the absolute impact of a product – in either environmental or nutritional terms – but also the context.



1.2 Background to this paper

Carbon Trust Advisory:

At Carbon Trust Advisory we help organisations identify and implement transformational strategies to reduce their environmental impacts across the value chain. Our market analysis shows that consumers are opting for sustainable products where price and quality considerations are met. In an increasingly competitive market, businesses who ignore this trend will struggle to compete.

Our experience and expertise in value chain analysis and standard setting, together with our understanding of consumer attitudes to sustainability, help our clients understand the impacts of their supply chains and products. We help clients trace and assess these impacts, and redesign their products and processes to reduce their environmental footprint and at the same time save costs and realise revenue opportunities.

This important work provides recommendations for business and governments seeking to understand how best to improve consumers' environmental knowledge. Specifically, it raises the question of how business can use the power and influence of their brands to inform consumers to make the right purchasing decisions.

Coca-Cola:

At The Coca-Cola Company, we understand our responsibility as a leading brand manufacturer. In Europe we have reduced our net environmental impacts (in terms of carbon emissions, packaging material use and water abstraction) over the past seven years, whilst growing the business. Coca-Cola Enterprises (CCE), the Company's bottling partner in key West European markets including Great Britain, has played a leading role in supporting and guiding the development of product carbon footprinting standard, PAS2050. In 2009, CCE was the first soft drinks manufacturer to communicate the carbon footprint of some of its most popular products and have the results certified by the Carbon Trust.



We are committed to transparency in terms of the environmental impact of our products. We have, and will continue, to share information about the environmental impact of our products with consumers.

However, we find that communicating this science-based information in a way that is meaningful and easy-to-understand represents a considerable challenge. Even more so, if the ultimate desire is to enable consumers to make informed choices about the products that they choose or to behave in a 'sustainable way'.

1.3 Purpose

We (the authors of this report – namely The Coca-Cola Company, Coca-Cola Enterprises and Carbon Trust Advisory) believe that information can play an important role in educating consumers and empowering them to make informed choices. However it is important that information which is targeted directly at consumers should be carefully designed and appropriate to the specific issue it is seeking to address.

In the case of food and drink products, providing environmental information could help to deliver tangible reductions to the environmental impact of that sector. We believe that the provision of more 'context' to consumers will play an important role in increasing consumer understanding about carbon emissions and encourage action.

“A sustained long term reduction of our collective environmental impact can only be achieved if significant changes are made to existing patterns of consumption. This will require a significant change in consumer behaviour.”



One way to provide additional context about the carbon impact of specific products is to explore the concept of a 'personal allowance', which has already been successfully introduced to communicate nutritional values of food and drink products.

Obviously, to provide a full environmental context for everyday purchases would require a broad range of impacts including carbon, waste, water and biodiversity to be taken into account. This project however focused purely on carbon, for the following reasons:

- a) There is already an advanced understanding of carbon related impacts;
- b) The data and the methodologies used to quantify carbon emissions already exist;
- c) Whilst not perfect, carbon stands out as clearly the best single-criterion proxy for all environmental impacts.

The 'personal carbon allowance' project was undertaken in the UK as a partnership between The Coca-Cola Company, Coca-Cola Enterprises and Carbon Trust Advisory, with support from environmental consultants SKM Enviros and market research agency rdsi.

1.4 Objectives of the project

The project sought to establish the feasibility of introducing a 'personal carbon allowance' to provide context for consumers about the carbon footprint of typical activities – including eating, shopping and commuting. Importantly the project aimed to provide guidance on the *recommended personal daily carbon allowance* of carbon emissions per person (Carbon GDA, or Guideline Daily Amount) – and critically aimed to help consumers to understand how the carbon footprints of specific products relate to their total daily allowance.

The project included three distinct phases:

1. **Phase 1** – to develop a personal carbon allowance concept based on existing inventory data.
2. **Phase 2** – to test the personal carbon allowance concept as a 'carbon GDA' with consumers.
 - To research consumer understanding of carbon
 - To test whether the application of a personal carbon allowance as a carbon GDA provides a useful context to consumers to enable informed decision making, i.e. to reduce the total carbon emissions from food and drink products
 - To understand how consumers behave in the light of being informed about the carbon impact of their lifestyle choices
 - To test a variety of methods for communicating the carbon footprint of products to consumers, e.g. in the form of a carbon GDA.
3. **Phase 3** – To use the findings from the project to develop a set of recommendations (see Section 4) which would inform related policy decisions.

2 Developing a personal daily carbon allowance (Phase 1)

2.1 Introduction to carbon allowance concept

Nutritional Guideline Daily amount (GDA) information is already widely used and broadly understood across a variety of European countries. The nutritional personal GDA provides baseline amounts for the daily intake of calories and nutrients recommended for women, men and children. (see Guideline Daily Amount values table below).

Similarly, the idea of a personal daily carbon allowance (which could be expressed as a Carbon GDA) would be to provide a guideline daily amount of carbon that should not be exceeded. The assumption is that consumers could use this information to establish an environmental context for their everyday consumption habits. We will outline some key aspects of the carbon allowance concept here; more details can be found in the Appendix.

The first step in defining the concept of a personal carbon allowance is to consider carefully how big an individual's total carbon allowance should be and how this allowance should be allocated to different elements of an individual's lifestyle (lifestyle segments). To determine the size and allocation of the allowance, the size of the UK's current national carbon footprint should be assessed.

There are two possible approaches to determining a country's national carbon footprint:

Production-based footprinting – This method calculates the total emissions a country *produces* within its national boundaries. Whilst relatively simple in its methodology, this is however only part of the story.

Consumption-based footprinting – This method accounts for everything we *consume*. Forty per cent of emissions attributable to UK consumption occur outside of the UK². Whilst similarly, a significant amount of carbon is embodied in goods and services that we export to other countries. An adjustment is required to account for the emissions in this balance of trade by adding the 'embodied' carbon footprint of everything we import and subtracting exports, to create a consumption based national footprint.



The objective of this project was to explore how information can educate consumers to make informed choices. We therefore need to look from the perspective of everything an individual consumes, and hence a consumption based footprint must be used to quantify an individual's personal carbon allowance.

2.2 Understanding the data sources

A top-down approach and a bottom-up approach can both be used to calculate a national consumption based footprint.

Top-down approach:

This approach takes national emissions inventory data, and splits it between different lifestyle segments according to a range of statistics.

Bottom-up approach:

This approach involves determining the embodied carbon in the goods and services that individuals consume. These values can then be combined at a national level to form a picture of a country's total annual emissions based on data of what constitutes an average lifestyle. As this project was undertaken in the UK, we used UK government statistics.

Guideline Daily Amount Values			
Typical values	Women	Men	Children (5-10 years)
Calories	2,000 kcal	2,500 kcal	1,800 kcal

Source: http://www.gdalabel.org.uk/gda/gda_values.aspx

Both approaches, the top-down and bottom-up, have distinct advantages and disadvantages:

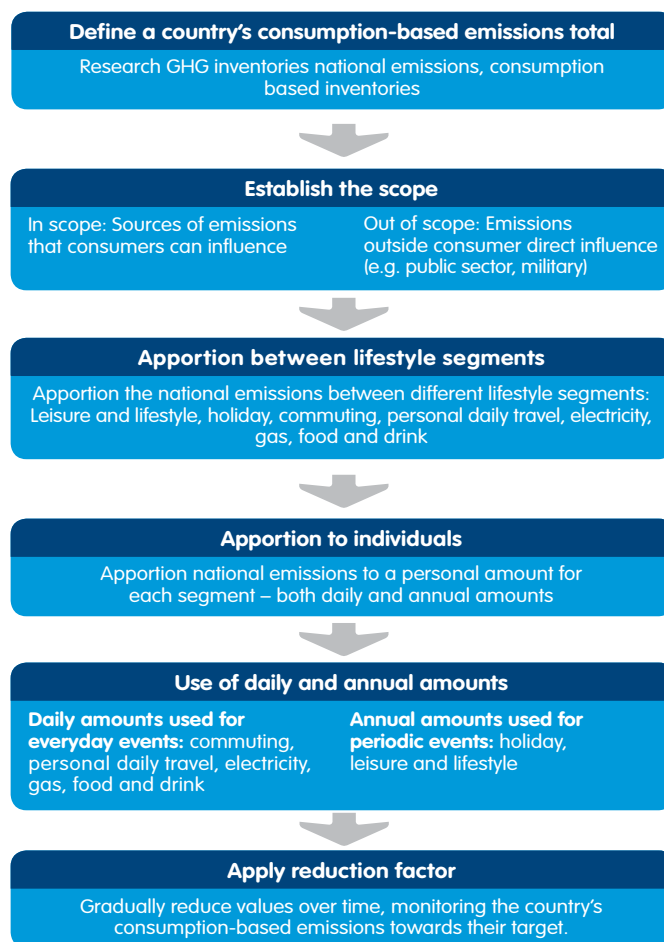
- The top-down approach ensures greater certainty that everything is included, but becomes increasingly uncertain as it is divided down into smaller lifestyle segments
- The bottom-up approach is much more accurate at lower levels, but leaves us with a potentially high margin of error when trying to combine to create a total.

Our conclusion for setting the scope for the carbon allowances was therefore:

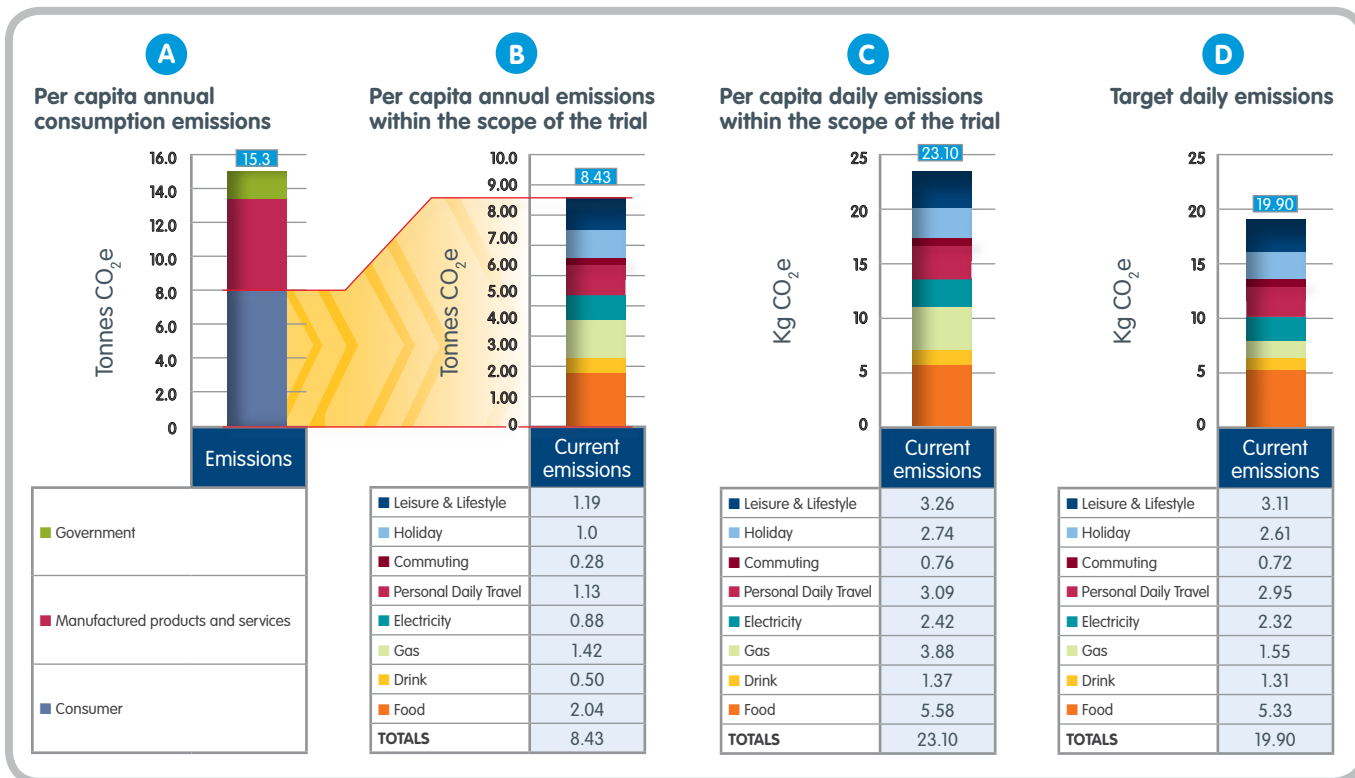
- When setting a total annual carbon allowance, the top-down approach has clear advantages
- When measuring the impact of specific consumption choices, the bottom-up approach has clear advantages
- For the consumer trial in Phase 2 of this project, commuting, personal daily travel, electricity, gas, and food and drink consumption were calculated with a bottom-up approach. Holidays, leisure and lifestyle decisions do not typically occur on a daily basis, and as a result are best modelled on a periodic (annual) basis using a top-down approach. The average daily value of these periodic emissions can then be shown alongside the other lifestyle segments to provide a broader context for a consumer's decisions.

2.3 Scope of the carbon allowance

Steps to establishing a personal carbon allowance



“During this trial we selected 8 specific lifestyle segments; commuting, personal daily travel, electricity, gas, and food and drink consumption, holidays and emissions from leisure and lifestyle activities.”



According to the most recent data³, using top-down consumption based accounting, the national carbon footprint for the UK was approximately 869 million tonnes CO₂e per year. Divided by the population in that year (c.60 million people) gave us annual emissions of 15.3 tonnes CO₂e per person (figure A). This includes all the emissions from across the entire economy including all emissions within the hands of the consumer.

This project, and specifically the consumer trial in phase 2, sought to test the concept of a personal carbon allowance for typical daily activities that consumers control. During this trial we selected 8 specific lifestyle segments; commuting, personal daily travel, electricity, gas, and food and drink consumption, holidays and emissions from leisure and lifestyle activities. Emissions outside consumers' control, such as those associated with public services, business, construction, manufacturing and the military, were excluded from the

personal carbon allowance. The trial also excluded emissions from a number of consumer activities such as emissions embodied within manufactured products and services. The annual emissions for the activities we measured within the scope of the trial was 8.4 tonnes CO₂e per person (figure B).

Annual emissions of 8.4 tonnes CO₂e per person can then be converted to a daily amount of 23.1 kg CO₂e per person (figure C).

A reduction factor (as explained in the following section) was then applied to the values and the guideline daily amount for gas was also adjusted for the particular time of year as the trial took place in June. The annual personal allowance for the trial was 7.3 tonnes of CO₂e per person, equivalent to 19.9 kg CO₂e per day (figure D).

This figure is lower than the national per capita emissions figure, reflecting the restricted scope of the trial. We used a predominantly bottom-up calculation methodology in order to help participants compare the elements of their lifestyle that they could influence. Individual allowances were calculated for the following emission segments: leisure and lifestyle, holidays, commuting, personal daily travel, electricity, gas and food and drink.

More detail about the calculation assumptions used for these values and the data sources used in the trial are provided in Appendix B.



2.4 Setting a reduction factor – issues to be considered

Once the average daily amounts for each lifestyle segment have been established, a reduction factor should be applied to provide a target allowance which encourages carbon reductions. There are a number of issues to consider when setting this target:

Global versus country-specific allowances

One option would be to establish a global personal carbon allowance, based on a sustainable per capita emission level. However, this poses a serious challenge for countries with high standards of living, such as the UK, which rely heavily on fossil fuels for power, transport and supply chains. People in these countries would struggle to live within a globally sustainable per capita target without significantly reducing their consumption levels. They would be required to change their lifestyle to a level most people would find unacceptable.

How should the values be adapted over time?

It is widely acknowledged that carbon emissions must be reduced in the coming decades, with significant national carbon reduction targets (up to 80% by 2050 vs 1990) being adopted in various European countries. This would need to be factored into the personal carbon allowance concept if it were to work successfully. However, the rate of reduction across different lifestyle segments and different countries will not be the same. This, and the frequency with which a personal carbon allowance is updated, is an issue which would need to be overcome.

The need for stretching targets

Having established the need for a personal carbon allowance which gradually reduces over time, the exact relationship between national circumstances and the personal carbon allowance value would need to be established. One approach would be to take the present average per capita emissions and apply a discount based on a carbon reduction path by a given target date (e.g. the 80% reduction target by 2050 vs 1990 adopted by the UK).

Taking the average per capita emissions as the reference point (for example, to set stretching targets) may not be the best option to drive lower personal carbon emissions. Assuming a normal distribution, half the population (slightly less once the annual reduction target is applied) would already be below this figure. Many within this group may respond to this with inaction or even complacency, while many of those above the average may not engage with the concept of a carbon personal allowance at all. The stretched target is shown to the right of figure 1 in comparison to the average reduction target used on the trial.

Segment-specific reductions

One final outstanding question in defining the personal carbon allowance is the way that emissions are allocated to lifestyle segments. Assuming the lowest quartile as the

starting point, we can use average emission distributions across the various segments of leisure and lifestyle, holidays, commuting, personal daily travel, electricity, gas and food and drink. Over time, the relative contribution of these segments to each consumer's carbon footprint will change quite significantly. Grid electricity and transport systems are likely to decarbonise by switching to low carbon sources, which will especially assist those sectors that rely on electricity and transport to deliver their products and services. Other segments such as food and drink are less energy intensive, with many emissions arising from nitrous oxide or methane. They will benefit far less from this decarbonisation. Whilst reductions in emissions from food and drink are being achieved, this sector is likely to reduce at a slower rate than those which consume more energy. Over time, they will therefore become a relatively more prominent contributor to our overall carbon footprint.

The methodology outlined above raises many questions. For the concept of a personal carbon allowance to be used more widely the methodology would require further interrogation and challenge. Significantly, there would be many important issues to consider when calculating the reduction factor that should be applied to set the allowance. There will also be many political questions to be solved, including the need to agree on the total carbon allowance per person. Appendix B outlines some of these challenges in further detail.

Figure 1, below indicates the different lifestyle segments that were calculated for the trial and the difference between the average reduction target and a stretched reduction target.

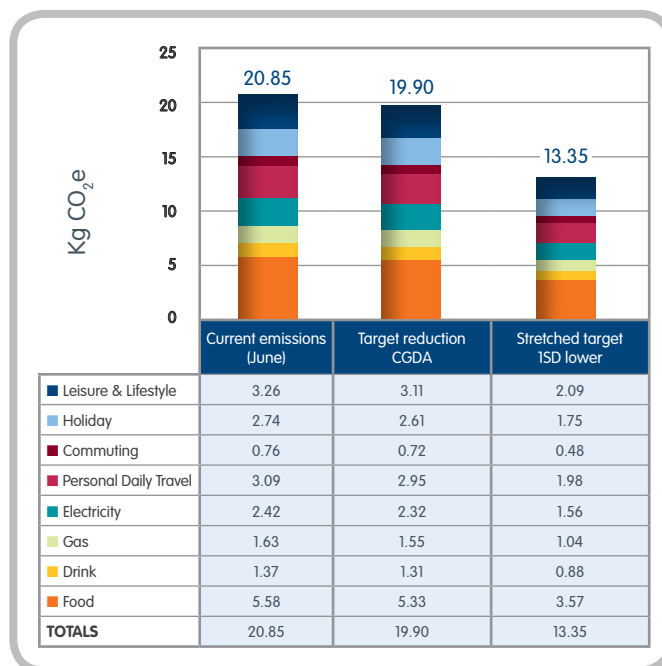


Figure 1. The chart on the left shows the current average daily emissions for the categories chosen on the trial, the daily allowance for gas has been seasonally adjusted to reflect lower consumption in June. The Personal Carbon Allowance used on the trial is shown in the middle. The stretched target described in the previous section of the report is shown on the right. This is calculated by taking 1 standard deviation (1SD) lower than the average figure.

3 Testing the carbon allowance concept (Phase 2)

3.1 Overview / Introduction to consumer trial

The main focus of this project consisted of a 4-week consumer trial, which took place in London in June 2011. This included the following stages:

- The development of a customised Carbon Footprinting Tool, which enabled participants to track and monitor the impact of day-to-day decisions and purchases
- A 4-week trial to test the concept of a personal carbon allowance
- 2 consumer workshops and a series of qualitative consumer interviews
- An online Carbon Blog, which participants were able to contribute to.

The findings from the trial provided a wealth of insight which has been analysed and synthesised into this paper. As the range of findings has been extensive, much of the more technical data and results from the trial are included within the Appendices.

The trial focused on a selection of 24 London-based consumers to explore attitudes to climate change and test the concept of a personal carbon allowance. The participants were a mix of gender, age groups, life-stages (pre-family, family and empty-nesters) and both suburban and urban lifestyles. All participants were 'light greens': they had a personal interest in 'green' issues, but were not yet fully informed or committed to a particular behaviour.

The participants on the trial were provided with a customised Carbon Footprinting Tool to record their weekly energy consumption, daily food and drink consumption as well as their methods of transportation. At the end of each week, the participants

“The more I look into carbon footprints the more I realise how damaging all this waste is to the world. I am really quite sad that our once beautiful planet is being destroyed and I really don't think it will ever stop.”

submitted data to the Carbon Trust which analysed the information. The information was converted into carbon dioxide equivalent (CO₂e) figures and compared against the carbon allowance for each lifestyle segment. The results were then analysed further to show which segment had the highest carbon emissions.

The trial also aimed to gain feedback on different formats of consumer information related to carbon. Three different formats of carbon label were introduced to test the most effective way to communicate information about personal carbon allowances.

3.2 Headline findings from the trial

3.2.1. Consumer attitudes towards carbon and their own actions

Interviews with participants at the start of the trial captured their opinion of the term 'carbon'. There was a general awareness that our lifestyles are responsible for producing carbon emissions and that our current consumption habits are unsustainably high. Participants were also in broad agreement that carbon emissions must be reduced to avoid dangerous climate change.

Many participants in the trial reacted emotionally to the term 'climate change'. Many expressed concern about the impact of climate change on the developing world and future generations. Others showed evidence of a general apathy, perceiving their own actions as being 'futile' in relation to the scale and inherent global nature of the challenge.

“Big companies lie, people don't care, nobody does enough!!!!”

“We're throwing away our chance to save the world before it's too late.”

Participants in the trial most commonly associated the term 'carbon' with energy, transport and waste. They had a relatively good understanding of impacts and potential reduction opportunities within these areas:

- **Energy** – A high awareness existed of the home energy efficiency measures such as compact fluorescent lamps, 'turning down heating' etc
- **Transportation** – Commonly associated with congestion and pollution
- **Waste** – Several participants referenced landfill sites and the need for increased recycling.

Many of the participants in the trial thought they were already living quite a 'green' lifestyle, simply as a result of using less energy and by recycling regularly. Almost all participants were surprised about the relative impact of their 'food and drink' and 'leisure and lifestyle' decisions, which were measured at the opening of the trial, using the WWF Carbon Calculator,⁴ Figure 2 below shows the emissions during the first week of the trial using the Carbon Trust Footprinting Tool.

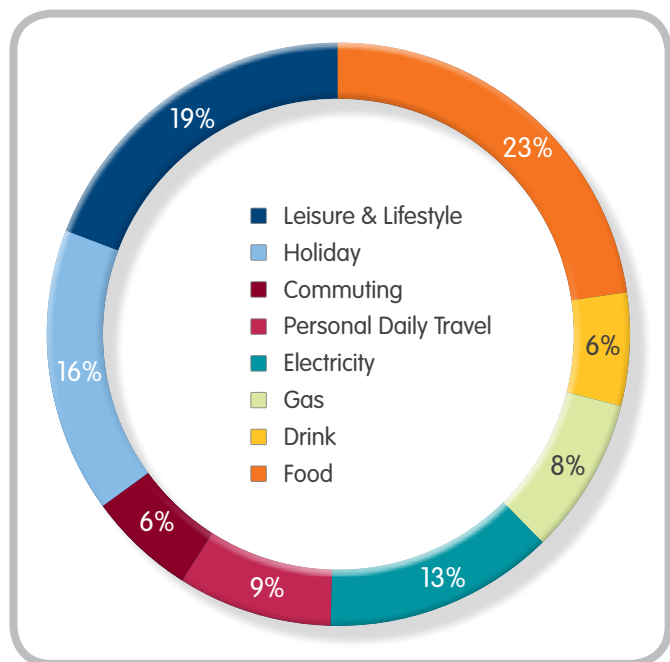


Figure 2. The pie chart above shows the distribution of emissions during the first week of the trial using the Carbon Trust Footprinting Tool. The emissions from holidays, leisure and lifestyle were calculated on an annual basis and presented as average weekly emissions for comparison. The trial took place during June, hence electricity and gas are lower than they would be during the winter months.

Participants in the trial demonstrated little understanding of 'embodied emissions' related to the goods and services that they purchase. This was particularly evident in relation to food and drink, where participants tended to think only of the packaging and transportation impacts.

“ It was an eye-opener how many things affect our footprint apart from the utilities which are the obvious ones...

...we all know that recycling and turning off lights is good but I didn't realise so much that food and jewellery could also have an effect. ”

Many participants in the trial were not aware of the upstream emissions resulting from raw materials, agriculture and food processing, despite the fact that for most products this is significantly larger than carbon emissions from transport and packaging. Neither did participants take into account the downstream impacts of refrigeration nor, critically, the huge impact of food waste. As a result, the majority of participants in the trial did not see food and drink consumption as 'climate-relevant'.

Many participants were also confused by other issues in relation to carbon emissions: for example whether to buy locally-grown versus overseas (many were so focused on transport and packaging that they hadn't even considered whether the local crop was grown in an artificially heated environment), and organic versus non-organic (as they hadn't considered crop yields). Many tended to concentrate on more tangible issues, such as food packaging or plastic bags, even though these form a relatively minor part of the overall embodied emissions of products in their shopping baskets.

The trial identified three distinct life-stage groups: pre-family, family and empty-nesters. The family and empty-nesters tended to be more concerned about environmental issues and willing to make changes in their lifestyle choices to lower their emissions. There was a direct correlation between this qualitative data and the quantitative data that tracked the actions of the participants through the trial. Figure 3, below shows the average change in emissions over the course of the 4-week trial. Pre-family were the only group to increase their emissions. The increase was due to higher emissions from personal travel and commuting and also food waste.

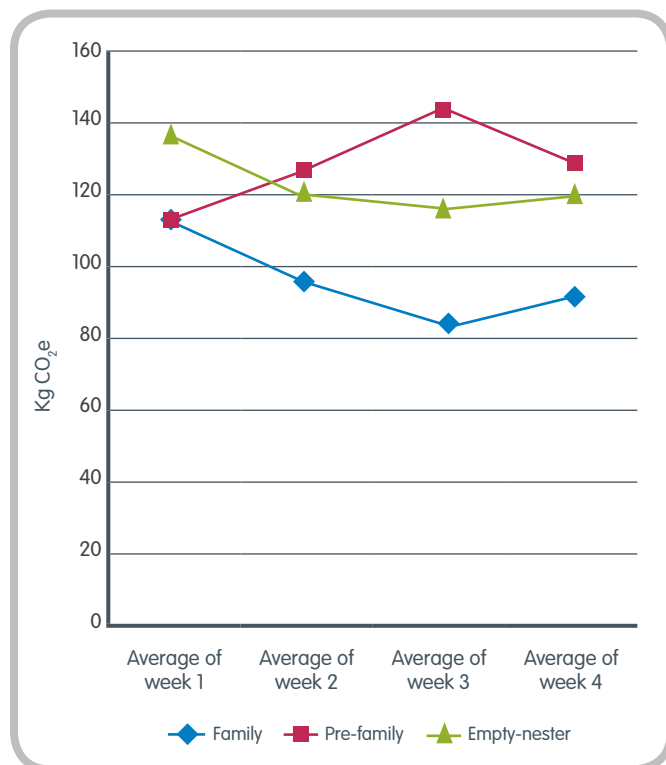


Figure 3. The average weekly emissions by life stage groups over the course of the 4-week trial



Many participants on the trial accepted that they can ‘do their bit’ by using simple, easy and rewarding ways to reduce emissions such as saving energy by switching off appliances and turning thermostats down. Many demonstrated a clear desire to choose low carbon options, however this poses both a challenge and an opportunity for businesses and governments to find innovative ways to leverage the impact of brands, and marketing messages to establish concerted behaviour change.

The research indicated that many participants expect large companies and government to lead the way by helping them to play their part. There was a strong desire to see brands act on their behalf in two separate ways:

- By lowering the carbon impact of their products; and
- By actively guiding consumers to lead lower carbon lifestyles.

The research from the trial indicated that participants lack sufficient knowledge to make informed low carbon lifestyle choices. Changing this requires long term investment to raise awareness, create understanding and influence actions. Whilst this is primarily perceived to be the role of government, civil society and business, there is a fundamental desire to see big brands play their part in building trust, raising awareness and encouraging behavioural change.

The trial has shown that many participants do have a relatively good understanding of their Scope 1 & 2 emissions (emissions from direct use of fossil fuels and electricity consumption) relating to their own at home energy use, their travel, and also the benefits of recycling. The trial showed the importance of

providing an environmental context for the other aspects of their lifestyle. The table below shows the topics where participants have a relatively good understanding and those that cause confusion. It is worth noting that there is still general debate surrounding a) the issue of organic versus non-organic food and b) the relative merits and often misleading information regarding food miles.

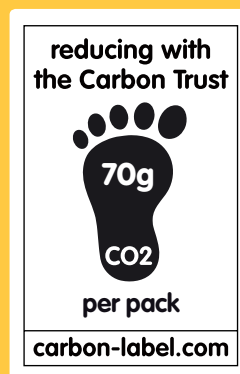
The trial helped to ‘open the eyes’ of many participants to some of the environmental issues related to food and drink consumption, in particular with regard to some ‘every day items’ (e.g. meat and dairy) or ‘surprises’ within their food shopping habits. It was apparent from the research that participants need to be surprised and shocked by the relative impact of high carbon intensity items before they are willing to change their shopping choices. This could suggest that a broad communication programme on the carbon impact of ‘big carbon’ items might lead to increased consumer awareness and understanding.

3.2.2. Understanding of carbon allowance concept

The idea of a Guideline Daily Amount (GDA) for calories and other major nutrients has already been widely accepted by participants. However, to date, this concept does not exist for environmental information for food and drink. Participants are familiar with other forms of energy efficiency labels such as the A-G rating energy efficiency ratings for vehicles, white goods, buildings and some electronics. Product Carbon Footprint labels do exist, such as the Carbon Trust’s Carbon Reduction Label, however they do not provide participants with this type of context for these emissions.

GOOD KNOWLEDGE	CONFUSION
<ul style="list-style-type: none"> • Home energy • Transport • Recycling 	<ul style="list-style-type: none"> • Embodied emissions within purchased goods • The relative impact of their activity e.g. their food compared to the home energy consumption • The relative impact of organic versus non-organic food • The relative impact of food produced locally versus food grown overseas and transported to the UK

“I saw that my consumption of one particular product had contributed 70g of CO₂ into the atmosphere. My problem with this is that the concept is far too abstract. Of course I know that it's a bad (though inevitable) thing that the production of goods and services causes CO₂ emissions which harm our planet. But is 70g good, bad or indifferent? I feel that the communication of relativity in this respect is one of the biggest challenges.”



The consumer trial clearly showed that participants do want to choose lower carbon options, however they feel confused by the lack of clear information and crucially they lack knowledge to gauge whether their purchases are low or high carbon options. This project sought to understand whether providing a Carbon Guideline Daily Amount for different lifestyle segments would help provide this context for participants.

The participants on the trial welcomed the concept of the personal carbon allowance. They quickly understood the similarities with the existing nutritional GDA for food and drink, particularly the similarities with calories.

“I’ve just noticed the CO₂ footprint on my fruit juice carton; it had 400 grams as the footprint but no info regarding what a daily footprint should be e.g. [in contrast to] 2500 cal per day for an average male, which most people are aware of.”

By using the Carbon Footprinting Tool and with feedback from the Carbon Trust, they were able to evaluate the relative carbon impact of products against the relevant lifestyle segment to gauge whether their choices had a high or low contribution. Participants also welcomed the provision of more information on the carbon impact of their lifestyle to inform their decision making and many were curious as to why certain food products had a relatively high carbon footprint.

“I think the idea of having a carbon GDA would be very beneficial on the whole and I believe that the majority of people would appreciate the guidance so they have the choice to alter their lifestyles a little more.”

“This would make my weekly shopping easy to measure as to what my carbon footprint was doing. Once you get used to the measures you would buy out of habit and only need to look at new products that you don’t usually buy.”

Carbon figures for participants’ daily consumer habits were provided alongside the carbon allowance for each segment. When participants evaluated these figures they were curious

to understand why certain product types (particularly food and drink items) had relatively high numbers. Participants shared their experiences on a blog and during the workshops.

“I don’t eat a huge amount of meat but was amazed at the percentage one steak made up of my food carbon footprint.”

“The info is good but for me there is only one major surprise – the fact that food is greater in CO₂ terms than home utilities, though I expect that this changes in the winter.”

Everyday versus periodic values

The results from the trial indicate that participants would prefer to see the total carbon allowance split into large lifestyle segments, such as food and drink or travel. Each product should then show its contribution to its segment.

Participants easily understood the personal carbon allowance concept for their everyday consumer habits (commuting, personal daily travel, electricity, gas, food and drink) as they have a familiarity with the calorie guideline daily amount. When shown the impact of periodic activities, such as holidays and leisure choices (even though they were represented as an average daily value) many participants struggled to understand how these emissions could be assessed when they occur across different timeframes. In this respect a carbon and calorie GDA are very different. For the carbon allowance concept to operate successfully, a workable linkage is needed between emissions that occur on a daily basis and those emissions that have a big impact such as flights and large purchases, as they often have a significant impact.

For example, if a consumer took a return flight to New York they would exceed their personal carbon allowance for holidays by approximately 600kg CO₂. In order to keep within their total annual allowance they would be required to find savings from other elements of their lifestyle equivalent to 29% of their food allowance over that year. The personal carbon allowance values for different categories needs to interrelate in order for the trade-off in emissions to make sense.

“It would be hard to change flying habits. This makes me feel like it is really hard to make a big difference since clearly flying had the biggest impact on my carbon footprint...!”

Labelling

Participants engaged with the personal carbon allowance concept with enthusiasm and many blogged about their experiences of trying to find information about product carbon footprints so that they could assess the contribution of products towards their allowance. Many voiced frustration at the lack of labelling amongst retailers and larger brands. The need for clear and consistent information at point of sale was raised by many of the participants.

“My wife bought milk from [a retailer] this week, and that was the only one (carbon label) we have come across!”

“I have just been shopping and like others I am disappointed at the lack of products with a footprint on them. I spoke with a manager and he didn’t know what I was talking about and hadn’t seen the footprint.”

“I asked if [retailer] would support this new awareness and he was blank!!!... It feels like we as a group are alone.”

A number of different CGDA product labelling formats were tested during the trial and discussed within the workshops. The participants on the trial made a number of suggestions which are outlined in section 3.2.5 ‘Information and format options’.

3.2.3. Using a carbon allowance & carbon GDA in practice

Participants engaged positively with the trial despite the considerable amount of time and effort required. The information and feedback provided on a weekly basis by Carbon Trust Advisory did empower participants to make more informed choices. Many made an effort to reduce their emissions over the course of the trial. Overall, the trial appears to have been a success since participants explored various ways to change behaviours, for a finite period, across a number of segments. All of those involved in the trial now have much greater knowledge than before, which will (hopefully) stay with them for many years to come. Some indicated that they were committed to keeping up their lifestyle changes in order to reduce their emissions, others less so.

The qualitative feedback received during the trial correlates very well with the quantitative data collected over the 4-week period, see Figure 4, below.

The average group emissions were below the target carbon allowance; this could be due to the fact that the participants were ‘light green’ and from a metropolitan area. The emissions from their leisure and lifestyle and personal daily travel were lower than the national average. The average temperature also increased over the course of the trial leading to lower gas usage.

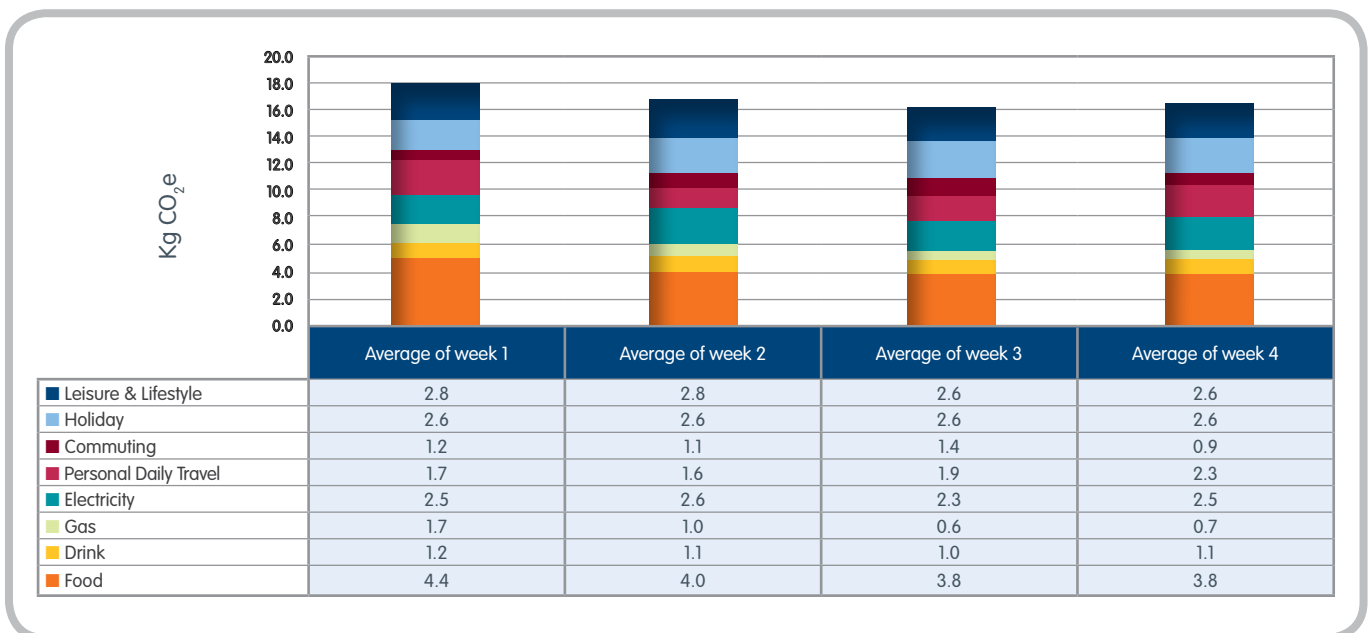


Figure 4. The average daily emissions kgCO₂e over the 4 weeks of the trial



Participants responded well to the concept of a group carbon challenge and the knowledge that they were all trying to operate within the same Carbon Guideline Daily Amount. The qualitative feedback gained from participants suggested that many were far more willing to make tangible changes to their behaviour because they knew their fellow participants within the trial also shared a similar pressure. In the workshops, participants shared enthusiasm to engage with the challenge and the emissions data.

Qualitative feedback was captured over the course of the trial through workshops, a carbon blog and accompanied shopping trips.

Week 1 Participants reported to being a little overwhelmed at the scale of information they needed to record on the trial to embrace the challenge. Many participants expressed surprise at the level of emissions attributed to certain segments (particularly food and drink).

Week 2 Participants engaged well with the challenge, blogging about their experiences and sharing ideas. Many reported that they were finding it easier than expected to make reductions.

Week 3 Having exhausted many of the quick wins in the trial, participants now found it harder to sacrifice other elements of their lifestyle (personal travel and commuting)

- Feedback from Carbon Trust Advisory becomes instrumental in fuelling further reductions
- Participants need education on other areas which impact their carbon footprint
- They do not fully understand the carbon impact of their food and drink choices.

Week 4 Some participants struggle to reduce further and revert to old behaviours, some rally for the final week with one last effort.

End of trial

Many of the participants embraced the concept of reducing their carbon emissions. Many voiced their frustration at the lack of clear and consistent information on embodied carbon. However, they also voiced reluctance to give up certain food items, or their annual holiday.

Many were also frustrated when talking to people (including family and friends) about their experiences. A general lack of interest and understanding from those around them left many of the participants disheartened.

However, participants indicated that if everyone in the country or even the world was similarly provided this information and encouraged to use it to deliver reductions; they would make an even greater effort to make changes to their lifestyles.

Many of the participants were particularly pleased with the dual benefits achieved by opting for a low carbon lifestyle, such as:

- Financial savings in reducing energy and waste
- Moral obligation and feel good factor of recycling
- Healthier lifestyle from eating less red meat and walking / cycling rather than driving.

These are 'easily adopted' behaviours which are likely to be more sustainable in the long-term as they do not impact on lifestyle and can be beneficial in more ways than one.

3.2.4. Barriers & opportunities to behaviour change

The feedback from participants suggests that once environmental information is communicated, there are many quick and easy actions that deliver significant savings. However, the results also indicate that participants are reluctant to give up certain high carbon choices from particular aspects of their lifestyles.

Unwillingness to compromise

While many participants welcomed the CGDA concept as a supportive tool, they remained reluctant to compromise on certain aspects of their lifestyles – particularly food and drink. Many were unable to see any immediate personal (or climate change) benefits by sacrificing their choices in this category. Food and drink choices tended to be intensely emotional, personal and directly linked to their own identities and perceived well-being.

“I love my cheese and I will always buy it, even if you tell me it’s bad for my carbon footprint. It makes me happy.”

Changing habits is hard

Participants on the trial defended some of the higher carbon impacts of their lifestyles (such as flying abroad for their holidays) by citing social pressure and encouragement from society and advertisers to consume these products and services. Many stressed that their lives were busy – juggling work, family and many other priorities, so they were cautious about having to take carbon into account as an additional factor in their lives. When it came to the crunch, many participants were reluctant to give up certain choices. Changing food and drink options is the last thing to be considered by participants. Participants disliked being told not to eat or drink certain items and for many their immediate instinct was to rebel against the concept of a ‘budget’.

“Food is my comfort, you choose something because you really want it.

...Dieting, eating carefully watching my weight is more important to me than thinking about my carbon consumption.”

Figure 5 below shows participants, current awareness of the environmental impacts resulting from their lifestyles and their relative propensity to change their behaviours.

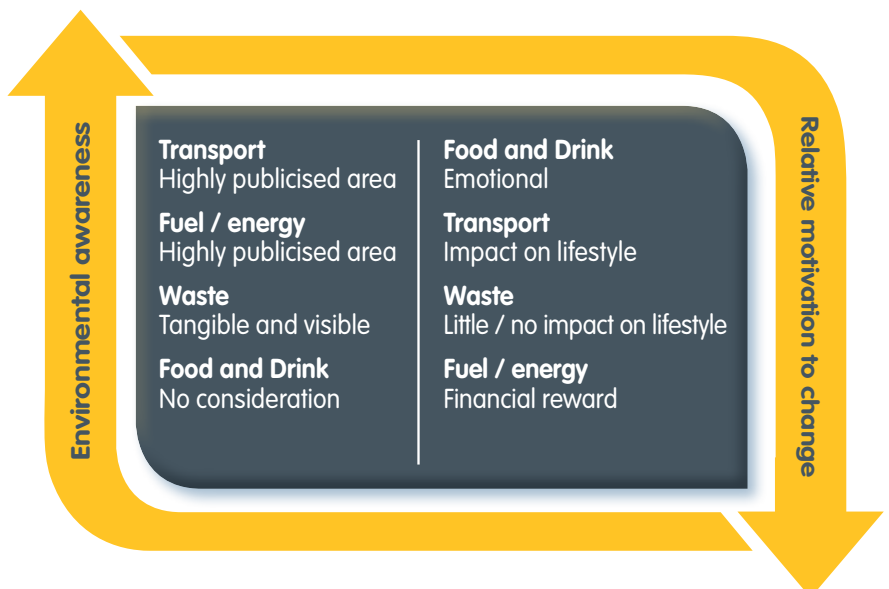
Put your head in the sand

Many participants in the trial welcomed the availability of information, especially on this basis that information allows ‘choice’, but many did not want it to restrict their lifestyles. They viewed the carbon allowance as a supportive tool to enable them to assess a product’s impact within a wider context. For many this would allow a better understanding of the relative size of a carbon footprint and allow trade-offs. However, when pressed on whether public opinion would shift with the introduction of the CGDA labels, participants drew a parallel with nutritional labelling:

“You can only empower people to make informed choices. Many people know and are aware of the health benefits of food GDA but choose not to change their diets. So why would these people make choices to save the planet?”

Some even deliberately choose to bury their heads in the sand and ignore the impact of carbon consumption.

Figure 5. Consumers’ awareness of the environmental impact of their lifestyles is shown on the left-hand column. Consumers have a much higher awareness of the negative impacts of transport, energy and waste – food and drink is not generally considered to be related to climate change. Consumers’ propensity to change behaviour is reflected on the right-hand column. Food and drink is one of the most difficult categories to change as consumers have an intensely personal relationship to what they eat.



“I'm not yet at a point where I am changing my shopping choices even though I realise that some of my purchases are a bit naughty...; my baby likes blueberries so I'll get them as opposed to finding something seasonal from this country and risk his rejection.”

The important role of life stages

Participants suggested that the CGDA concept would work best at specific windows of opportunity. They suggested that CGDA information will be sought at particular times in people's lives, such as:

- When actively seeking to adopt a low carbon lifestyle
- When going through key lifestyle changes; for example having a child/grandchild prompts greater concern for the welfare of future generations
- When purchasing a new product (and using the CGDA to review the energy efficiency rating)
- In collaboration with a media campaign / awareness raising.

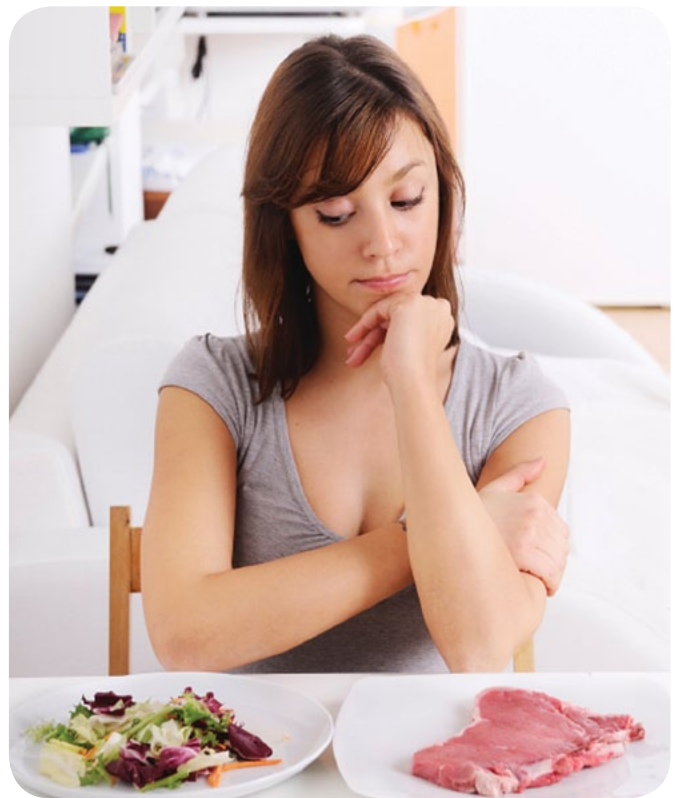
The reduction in emissions from the family and empty-nesters points to a broader concern for future generations. Participants referred to the impacts of climate change and concern for their grandchildren.

While participants may dip in and out of engaging with the information, it was widely thought to be the best way to gradually build up understanding over time, so that attitudes and behaviours could be influenced by hard facts, rather than ignorance or rumour.

Secondary benefits

Low carbon products need to stress the dual benefits beyond their environmental credentials in order to help sustain behaviour change. This is particularly relevant to food and drink advertising, where the perceived benefit of changing diet needs to focus on the benefits to an individual's personal health rather than the broader longer term carbon benefits to society.

When a consumer's attitudes to carbon emissions change, they need to have information at hand to support their commitment to lowering their carbon consumption.



If they cannot make informed fact-based decisions, they will be unable to build up the knowledge of the relative impact of their lifestyle choices.

“My consumption of red meat for the last two weeks has been nothing. This has helped me improve my footprint no end. I also feel like I'm eating more healthily too.”

It's all too long term

The benefits of reducing carbon emissions are seen by many to be too long term and intangible to embed sustainable behaviour change readily amongst participants. While some feel good that they are choosing a low carbon or environmentally friendly option, the majority need to perceive a more immediate additional benefit resulting from their decisions. Often referred to as 'what's in it for me', participants are more likely to sustain change where there are associated co-benefits (cost savings or healthier lifestyles) resulting from their actions.

By making energy efficiency improvements at home, participants are able to save money from their household energy bills. The health and fitness benefits of walking and cycling, rather than taking a car for short journeys were also cited. Defra has published the 'Sustainable Lifestyles Framework'⁵ which draws similar conclusions; namely that people need to be encouraged to see sustainable lifestyles differently and that successful change must go beyond environmental concern to appeal to the co-benefits that different groups care about.

Simply does it

Simplicity and ease of implementation are key requirements for any successful behaviour change campaign. When asked why they decided to choose a lower carbon product or reduce their energy consumption at home, participants referenced large media campaigns which had simple mantras with clear imperatives and directives.

Participants do want to act but need to understand what they can do. Most importantly actions need to be simple and communicated with clear benefits that will persuade participants to adopt the new behaviour. Lower carbon options need to have minimum impact on lifestyles with no additional costs. We also observed that for many, there are still quick wins available: simple actions that can be undertaken that do make a difference. These opportunities should be more actively promoted through public campaigns.

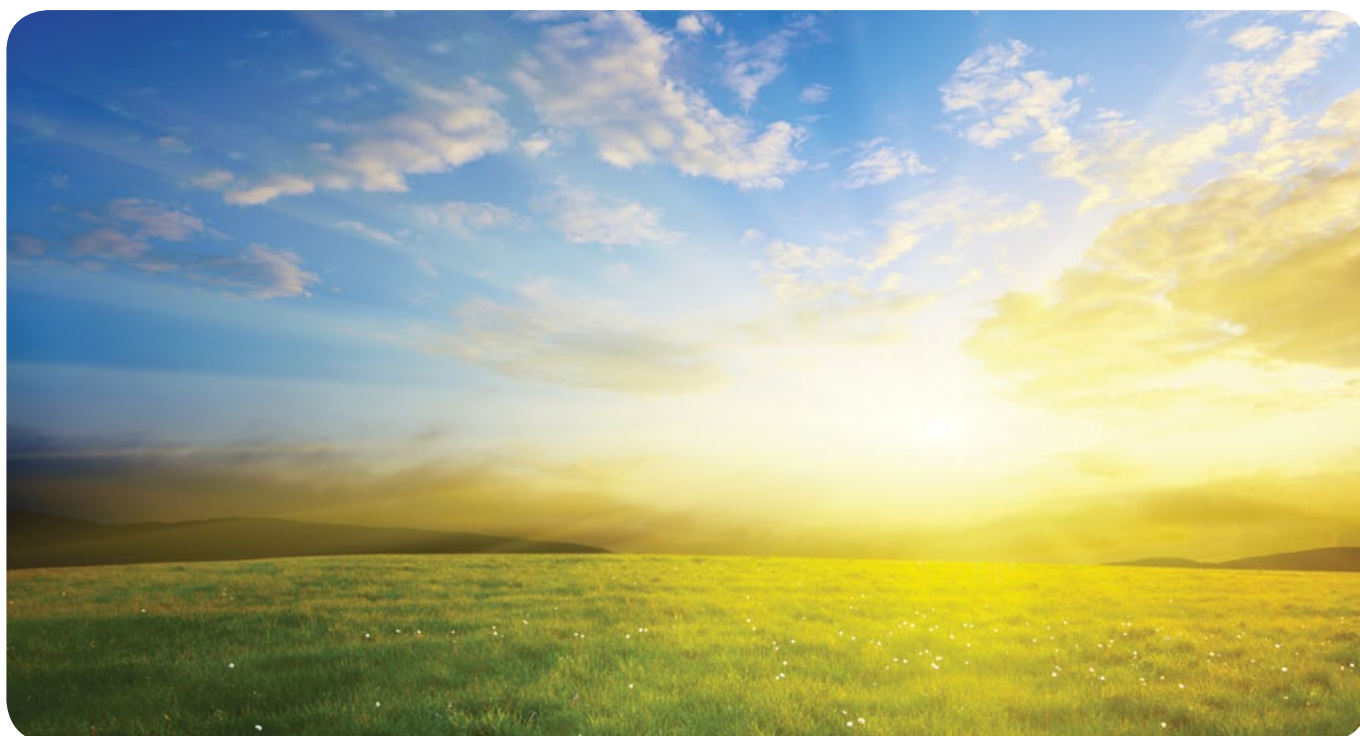
“Just a few simple comparisons can show how easy it is to lower your footprint (e.g. eating white meat instead of red meat; having a shower instead of a bath).”

“I can’t believe that just by making a few minor adjustments it has made such a big difference to my carbon footprint: 14% reduction in my energy is brilliant. This was done just by making sure lights were turned off and not using the tumble dryer so much. Also last week I didn’t realise how much red meat we were eating and so this has also gone down.”

“I made a real conscious effort with energy savings and changed the timings for the hot water and this has made a 20% saving.”

“I do think it’s a good idea but I’m not quite sure how it would work... The GDA on food is there to help our health, but many people don’t take any notice or even care, so to persuade them to look at their Carbon GDA would be more difficult because the effects are more long-term with no immediate results.”

“My overall emissions have gone down by 27% since last week. I still find it hard to believe that just making minor (and I mean minor) changes has made such a difference to my carbon footprint. Changing from having baths to showers... simply switching lights off at night, turning things to stand by and most of all not using my dryer.”



3.2.5. Information format & options – product-specific carbon information

We tested different formats of CGDA information with participants on the trial to understand which aspects resonate well with participants and enabled them to quickly understand and act on the information.

The information covered the typical examples from the lifestyle segments that the participants had been assessing over the duration of the trial – leisure and lifestyle, holidays, commuting, personal daily travel, electricity, gas and food and drink. By examining the information, participants were able to evaluate their contributions towards the CGDA values. Participants were asked which of the labelling formats below they found to be most informative. The reaction to each format is shown in the table below.

Participants on the trial recommended a CGDA format consisting of a number of key factors:

A clear logo



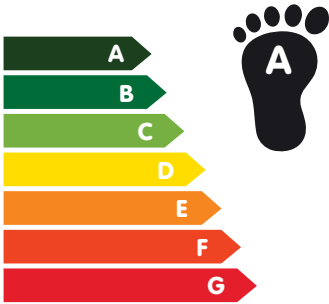
Amongst participants, the footprint was the preferred image to communicate CGDA data. Consumers instantly recognised it as a carbon footprint.

“Images would be a great easy way to recognise this on products. I’m always rushing when in the shops so clear packaging on the front, noticeable from the shelves, would be best – not hidden on the back!”

Colour ratings

Participants suggested that the footprint could be refined to include different colours (red, amber, green) for faster orientation, whether the product had a high, medium or low footprint.

“Maybe if the CGDA logo were coloured by the amount of emission the product gives off it would be easier to identify. So you could look straight at it on products and know its carbon footprint, then you could perhaps balance it out with other lower carbon products. I think that would be very useful for a visual person like me.”

A PERCENTAGE GUIDELINE DAILY AMOUNT	QUANTITY OF CO ₂ e	AN A-G RATING
 <p>Your food and drink CGDA is 6.64 kg CO₂e</p>	 <p>Your food and drink CGDA is 6.64 kg CO₂e</p>	 <p>Your food and drink CGDA is 6.64 kg CO₂e</p>
<p>The percentage guideline daily amount was shown, representing the contribution of a product towards the guideline daily amount for that product’s particular category.</p>	<p>The quantity of CO₂e resulting from the entire lifecycle of a product was displayed alongside the CGDA for that category.</p>	<p>An A-G rating was used to indicate the relative impact of a product against the CGDA.</p>
<p>Many participants did not understand the significance of a percentage. Many became confused when a product’s footprint exceeded their allowance e.g. “This product is 115% of your CGDA”.</p>	<p>Many participants expressed a preference for numbers, as they provide an easier basis for comparison and enable them to keep a running total of how much they had consumed during the day.</p>	<p>Many participants were familiar with this style of rating, as it already appears on a variety of white goods. However, the existing format does not relate directly to food and drink and would cause confusion. Many participants also indicated that there were too many degrees of separation, where A-C could all be perceived to be positive.</p>



The quantity of carbon

Participants found percentage figures confusing, as they weren't sure how these figures were calculated, or what they related to. The 'quantity of carbon' was the most useful measure when presented alongside the guideline daily amount.

Similar to monitoring calorie intake, it is essential that the carbon impact of the serving size is easily understood by consumers. Participants told us they wanted to compare the number of 'servings' and embodied emissions quickly and simply across different products.

Where should the information be and what is the best format?

Participants agreed that the CGDA information needed to be presented on-pack or at point of sale to help consumers assess the key characteristics of a product. Participants also wanted the ability to go online to quickly find additional information about the amount of carbon embodied in a product. They saw this as a valuable way to help disseminate information and gradually improve knowledge.

Evidence from the trial would suggest that there is a balance to be struck between the complexity of product footprint information and the clear need to communicate carbon impact in very simple terms. The trial suggested that consumers need to be able to quickly grasp the relative contribution of products in order to inform their purchasing decisions. A simple label should direct curious consumers to a website or booklet where they can develop their knowledge and understanding further. This will help consumers to build up a mental map of the relative contribution of different products and raise general awareness.

Feedback from the trial would suggest that many consumers do not generally read labels on packaging but act habitually (e.g. buying the same/similar products) or in the most

time-efficient way (e.g. opting for a pre-defined shopping route through the store to save time). For food and drink, shoppers also have a clear priority list of issues they are looking for: brand/price/quality, followed by the health and then carbon impact of their chosen product. See Figure 6, below.

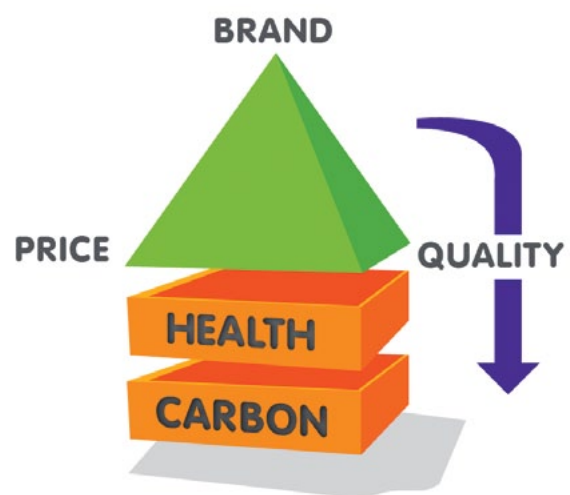


Figure 6. The consumer decision set hierarchy.

Evidence from the trial suggests that consumers seek expedience within store and as a result, point-of-sale material has to work very hard to interrupt consumers. As a result, labelling of products as a single measure will not 'cut through' to the consumer's attention in a normal shopping day. This reinforces the need for sustained awareness campaigns by businesses and government to help broaden consumer knowledge.

Feedback from participants on the trial suggests that consumers often don't read labels in shops. They steadily build up their knowledge of what constitutes a good or bad product, often by reading the information later at home



“The images used would be very useful. Personally, however, I feel carbon labelling will do little to fight climate change unless more low carbon products become available. Also, I am unclear, will images/symbols be introduced as a compulsory scheme?”

(e.g. reading a cereal packet over breakfast, or the preparation instructions while cooking). This knowledge is gradually influenced by media and accepted norms within society. As such, there is a strong analogy with calorie-counting: people don't refer to nutritional GDA labels on every item within their shopping basket; they build up their knowledge (and habits) over time. The speed and propensity to develop this knowledge and habits varies according to the person, their life stage and their situation.

The participants on the trial recommended a CGDA label similar to the examples shown in Figure 7, below. These combine the footprint logo, colour and the quantity of carbon alongside the CGDA value. This format helps to provide a quick, simple indication of the relative impact of a product.

The results of the trial have shown that, once exposed to carbon footprints and the impacts of products, consumers want to know and understand more about different footprints and what they mean. In order to ensure credibility of the information, background information is required, which requires other communication channels and a broader education and awareness approach.

Education and awareness

Participants in the trial recognised the need for broader awareness about the carbon impact of goods and services – and of different lifestyle segments. Participants suggested that carbon awareness campaigns, with simple clear messaging, would be necessary. Importantly, participants suggested that such campaigns should also stress the dual benefits (e.g. healthy balanced diets) which can often be delivered as a result of a lower-carbon lifestyle.

The trial suggests that once an understanding has been developed and consumers have a better appreciation for the relative carbon contribution of their lifestyle, it will enable them to make conscious trade-offs between lifestyle segments.

“I think for it to work, there needs to be a wider campaign, and even though the logo is a good idea, if there is not a supporting campaign, e.g. posters which explain what the carbon footprint means, then I don't think it will have its full effect.”

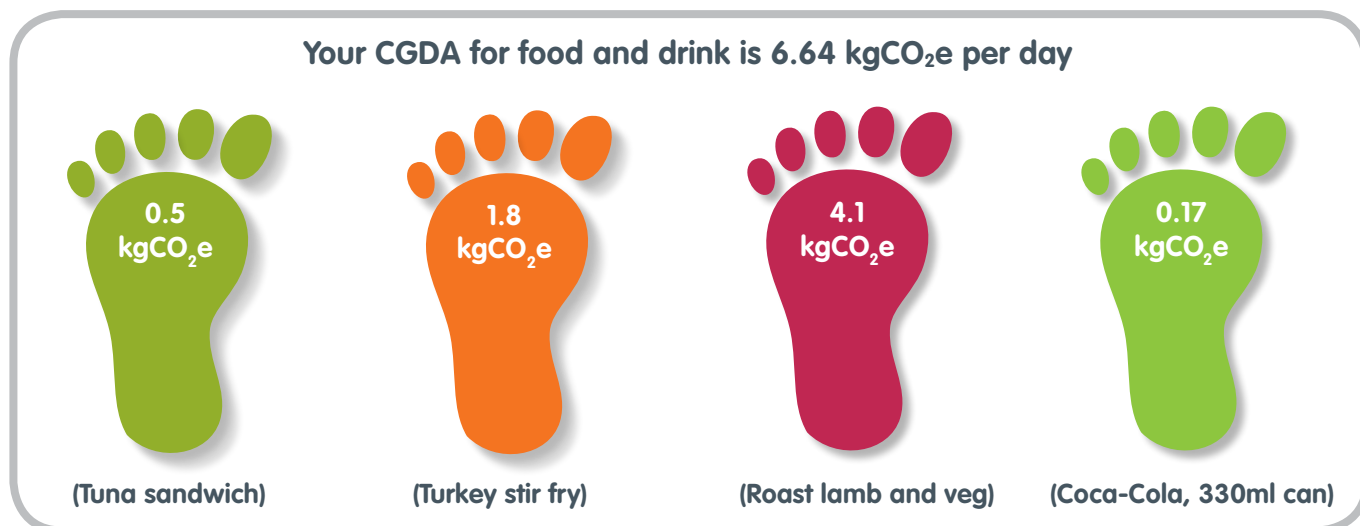


Figure 7. The participants on the trial recommended a CGDA label combining the footprint logo, colour and the quantity of carbon shown in relation to the CGDA value.

3.3 Conclusions

The results of the trial indicate a number of important conclusions.

- 1. Strong desire for knowledge:** Participants in the trial indicated a strong desire to choose a low carbon lifestyle; however many lack sufficient knowledge and understanding to inform their choices. Few of the participants demonstrated an understanding of 'embodied emissions' related to the goods and services they consume. This was particularly true for food and drink. Whilst participants in the trial demonstrated an understanding of food waste, packaging and recycling, very few understand that food and drink products have a significant amount of embodied carbon as a result of their raw materials, manufacture and production.
- 2. Personal carbon allowances:** Participants in the trial reacted positively to the concept of a personal carbon allowance. As a result of the trial, many participants were able to significantly reduce their own personal carbon footprint. The concept of a personal carbon allowance did help to provide participants in the trial with additional context about the choices they were making. In particular it helped many to understand the impact of their food and drink choices.
- 3. Barriers & opportunities:** There are, however, many barriers which would need to be overcome in order to encourage consumers to make consistent low carbon choices in their day-to-day lifestyle. This is particularly true in relation to both food and drink and holidays, both of which were viewed by trial participants in emotional terms.
- 4. Secondary benefits:** Whilst participants in the trial were keen to make low carbon choices, many were highly reluctant to compromise purely in terms of carbon. Many participants related more closely to the secondary benefits (e.g. cost savings or health benefits) which often come as a result of making low carbon choices. As a result, policy makers should be encouraged to stress secondary benefits as well as direct carbon related benefits when developing consumer messaging and consumer awareness campaigns.
- 5. Carbon GDA communication:** Participants in the trial broadly welcomed the idea of carbon GDA information and many expressed a desire to see information about the carbon impact of food and drink products clearly displayed either on-pack or at point of sale. However, it was also acknowledged that there is also a risk of 'too much information', as consumers want to have information about the product itself, as well as information about ingredients, nutritional value, recyclability and environmental impact.
- 6. On-pack or online?:** Many of the participants on the trial expressed a preference for on-pack carbon GDA information, with a number indicating an initial reluctance to go online to seek information about the carbon footprint of specific products. However once communicated on-pack, many of the participants in the trial expressed a high degree of curiosity about the information, with many expressing a desire to go online to find out more. As a result, many indicated that additional online communication channels would be required to support a broader 'carbon' awareness drive.
- 7. Awareness and education:** Participants in the trial recognised the need for broader awareness and education about the carbon impact of goods and services. As such, carbon labelling alone is unlikely to be a sufficient driver of behaviour change.



4 Recommendations (Phase 3)

There are a number of recommendations based on the results of our work.

- **Addressing the knowledge gap:** A significant carbon knowledge gap currently exists and only a small number of consumers have a broad and comprehensive understanding of the carbon impact of the goods and services which are consumed on a day-to-day basis. However many consumers do point to the fact that they would be far more willing and motivated to make changes to their lifestyles if they had better information. Addressing this knowledge gap will require long-term sustained investment to raise awareness, build understanding and influence behaviour. Consumers expect both government and business to play their part.
- **The role of business:** Consumers increasingly expect companies to take the lead on carbon reduction and to act responsibly by raising awareness and encouraging behaviour change. In addition, there is a clear opportunity for business to play an important role in building awareness and understanding of carbon emissions, particularly in relation to the products and services they provide.
- **Understanding of lifecycle carbon impacts:** Businesses should be proactive in calculating the lifecycle carbon footprint of the products and services that they provide. This requires more businesses to work to understand carbon impacts across their entire product value chain. To do so, businesses must ensure that they have the necessary skills and knowledge in place to gather, interpret and communicate the data related to their lifecycle carbon impacts.



- **Transparency is key:** Businesses should be transparent about the environmental impact of the goods and services that they provide. There is a clear desire from consumers for simple and easy-to-understand information. However businesses should be encouraged to be creative in the methods used to communicate information about the carbon impact of their products to consumers. Whilst on-pack Carbon GDA labelling is one option, there are many other options which exist, including on-line and POS communication. Technology will also play an increasingly important role in the future, with consumers being able to access information about the environmental impact of products in real-time via their smart phones.
- **The role of brands:** There is a significant opportunity for leading brands to leverage the trust they have with consumers to raise awareness and understanding of their own carbon impact. Brand managers have a particularly important role to play and should be encouraged to be proactive in a) understanding the impact of their own brands and b) in considering the options for integrating carbon related information into existing consumer messaging.
- **Simple initiatives should not be discarded:** There are still plenty of simple, effective and easy-to-understand initiatives (e.g. reduction of food waste or recycling) that can help to deliver significant emissions reductions. These should not be discarded and should be integrated into consumer awareness campaigns which focus on carbon.
- **Personal carbon allowances:** The concept of a personal carbon allowance has proved to be useful and could play an important role in a) providing some additional 'context' about the carbon impact of specific goods and services and b) in encouraging consumer-led carbon reductions. Whilst the concept does certainly have wider applicability, more work would need to be undertaken to address many of the issues outlined in this paper. In particular we would recommend that:
 - Additional work is undertaken to further develop and refine the Carbon GDA values
 - A number of larger trials, in different geographies, should be undertaken to broaden an understanding of consumer attitudes to the carbon GDA concept. Trials should be undertaken over a longer time period. This would help to further test the conclusions from the research.

- **Consumer value proposition:** Consumers are often 'creatures of habit', with many indicating that in terms of shopping, they often have a pre-defined route that they take through a superstore and a sole focus on brand, price and quality. Many consumers remain highly loyal to specific brands and work should be undertaken to integrate the issue of sustainability (and specifically carbon impact) into the traditional consumer value proposition which is based on brand, price and quality.
- **A broad coalition is required:** There is a clear desire for increased levels of information and communication about the carbon impact of products and services. To date, however, no single approach has been agreed. Industry and policy makers should be encouraged to work together to develop practical approaches to better inform consumers about the environmental impacts of the products they consume. It is clear that carbon labelling alone will not be sufficient and may achieve only limited benefits, given:
 - The information overload that already exists on-pack
 - The demand for more on-pack labelling in many other areas (nutrition, product origin, social standards, agricultural conditions, safety, recyclability etc.).

“There is a clear opportunity for business to play an important role in building awareness and understanding of carbon emissions, particularly in relation to the products and services they provide.”

Sustained long term action from a broad coalition of retailers, manufacturers, supply chain partners, government, and civil society is required to drive consumer-focused awareness and understanding of carbon.



5 Appendices

5.1 Appendix A – The personal carbon allowance trial

5.1.1. Participants' recruitment profile:

- 24 respondents
- Mix of male and female
- Mix of age
- Mix of life stage (pre-family, family and empty-nesters)
- Half were considered 'well educated' ('Guardian Readers')
- Half were considered 'Tabloid Readers'
- All were 'light greens'
 - Had a personal interest in 'green' issues but were not yet fully informed or committed to a particular behaviour
 - They were neither absolute believers (dark greens) nor total rejectors (browns)
- All living in or around London
- A mix of urban and suburban lifestyles
- All were enthusiastic and committed to the project
- All owned a personal computer and have access to a personal email account on a daily basis
- All had some experience of using social media (Facebook, Twitter, blogging etc.)
- None booked a holiday during the 4-week trial period.

5.1.2. Participants were committed to the trial:

- They agreed up front to a 4-week consumer trial
- They were invited to work with and alongside Coca-Cola on a leading initiative
- They were engaged via an initial 2.5 hour workshop
- They provided conclusions and recommendations at the final 2.5 hour workshop
- They were motivated throughout the trial via feedback
- They were financially compensated for their involvement.

5.1.3. Evidence of a reduction

Additional findings from consumer trial – 'evidence of a reduction' – food, drink, energy, waste reduction, commuting, personal travel, holiday, leisure and lifestyle.

Figure 8, below shows the results collected within the Carbon Footprint tool and shows that, on average, participants lowered their carbon emissions over the 4-week period. Reductions were mainly observed in weeks 2 and 3. The emissions increased slightly in week 4 indicating that some participants were finding it hard to sustain long term behaviour change in certain segments. A trial over a longer time period would help to confirm this trend.

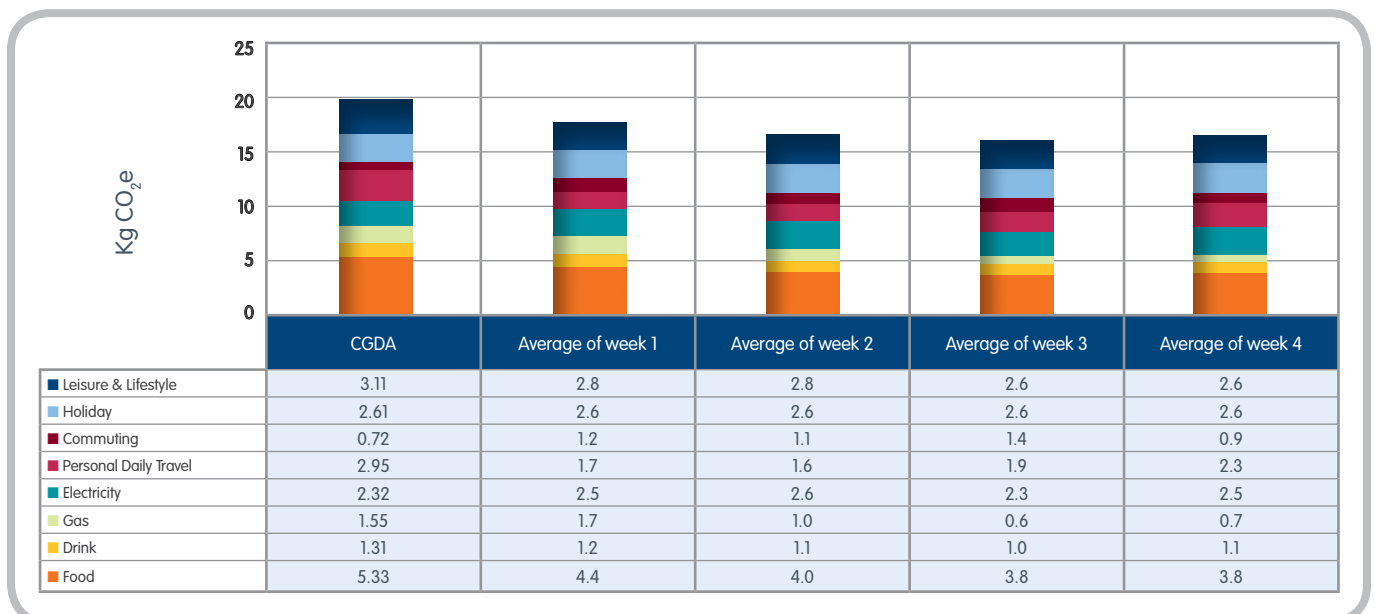


Figure 8. The average daily emissions kgCO₂e over the 4 weeks of the trial compared to the target carbon guideline daily amount. Note holidays and a large portion of leisure & lifestyle were calculated annually, and so no reduction could be observed.

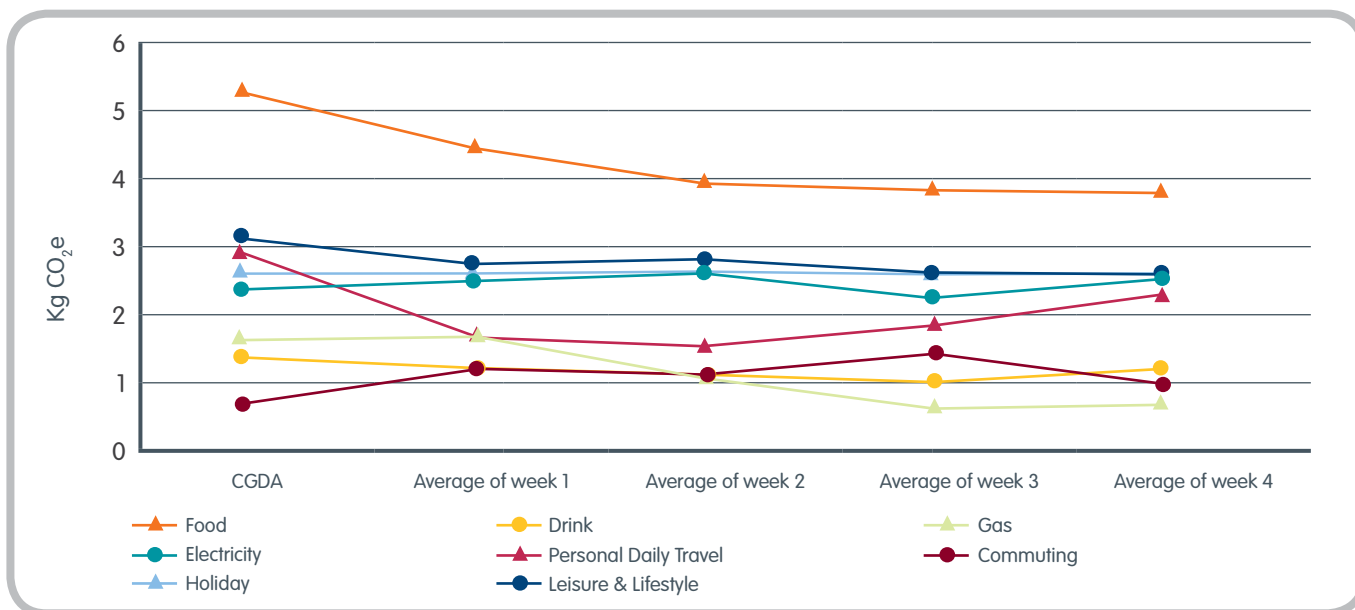


Figure 9. Each line in the chart above represents the average daily emissions for that segment over the trial. Food includes food waste. Note holidays and a large portion of Leisure & lifestyle were calculated annually, and so no reduction could be observed

The greatest reduction in emissions was observed within the food (including food waste), drink, gas and electricity segments. See Figure 9, above.

Participants made a number of immediate changes to their behaviour at the start of the trial. Of course, we were only able to track behaviour change over a 4-week period. As a result, we were unable to track (or take into account) longer-term changes in behaviour resulting from their participation, such as taking a decision to install loft insulation, or re-planning next year's holiday.

The following graphs break down the contributions to the emissions within each of the segments that were monitored on a daily basis:

Food:

Some interesting trends can be observed in the carbon emissions resulting from the participants' choice of food. Many of the participants were surprised at the impact that red meat had on their weekly emissions compared to other food types. In order to lower their emissions, they reduced their consumption and increased their consumption of white meat and cheese. Consumers were then surprised at the carbon emissions associated with cheese and made an effort to reduce their consumption of cheese during week 4 of the trial. The consumption of red meat increased slightly in week 4, most probably as a result of the warmer weather in London (and more summer barbecues!). See Figure 10, right.

Consumers also blogged about their attempts to grow their own vegetables and one consumer purchased a home composter as a result of having a greater understanding of the impact of their food waste.

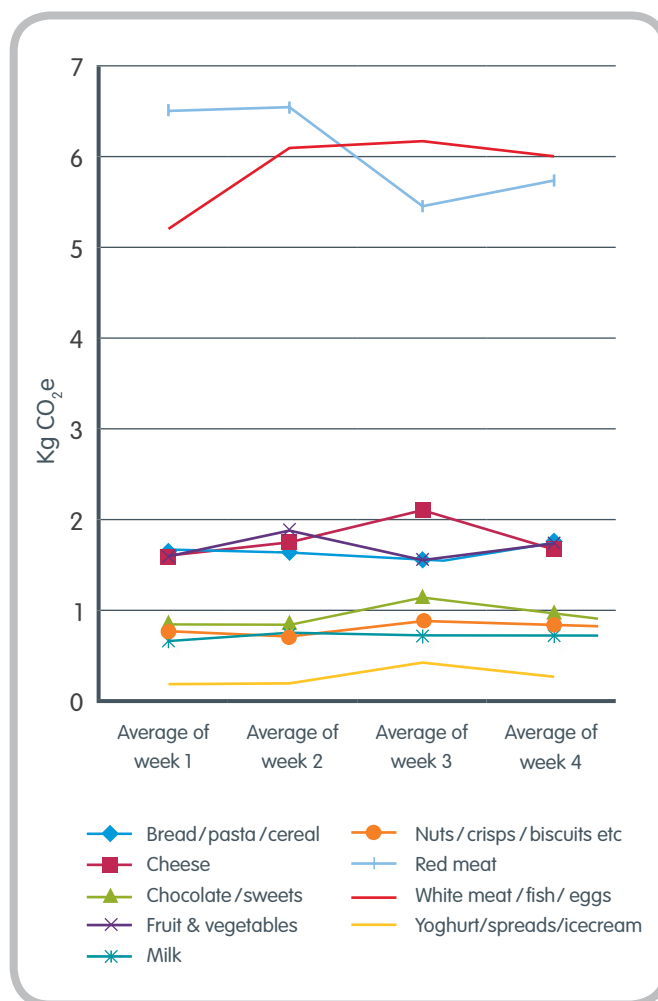


Figure 10. Each line in the chart above represents the average weekly emissions resulting from the food consumed during the trial.

Drink:

An overall reduction in emissions from the drinks segment was observed during the trial. Participants generally moved away from those drinks with the highest emissions intensity (beer) and moved towards drinks with a lower intensity (carbonated drinks and bottled water). The exception to this trend was in week 4 where more spirits were consumed, possibly as a result of the warmer weather in London. This again points to the fact that consumers’ food and drink choices are emotionally driven and linked to feelings of wellbeing and personal choice. Consumers are unlikely to consistently choose low carbon choices where they conflict with strong emotional behaviours. See Figure 11, below.

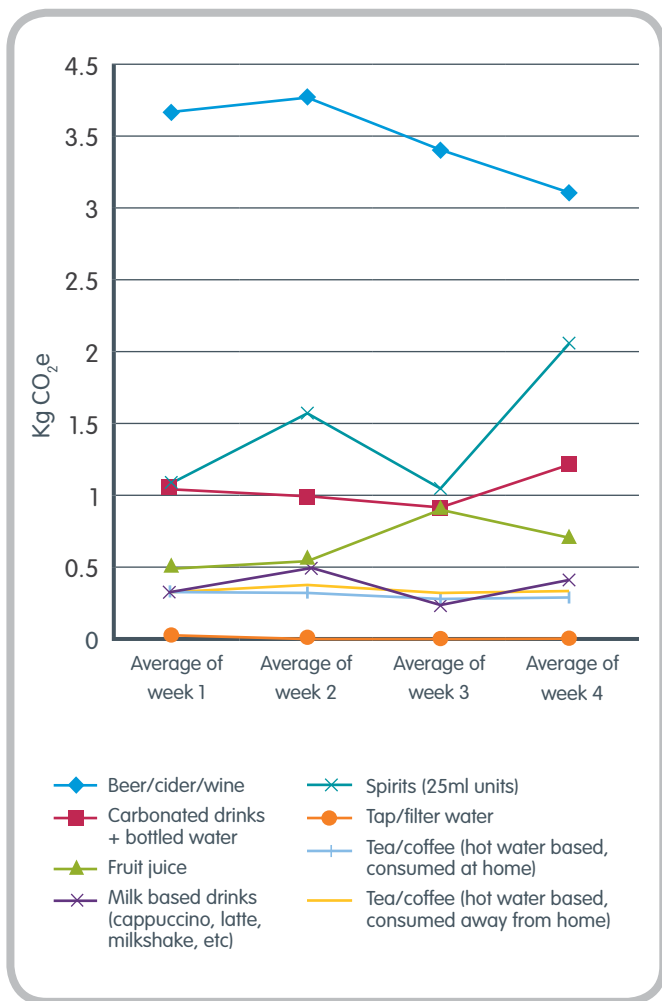


Figure 11. Each line in the chart above represents the average weekly emissions resulting from the drink consumed during the trial.

Home energy:

The participants found saving energy at home a familiar subject and blogged regularly about their actions to make savings to meet the CGDA value. Turning off lights, turning consumer appliances off standby, switching to shorter washing cycles on the washing machine and abandoning the tumble dryer were all mentioned as savings opportunities. See Figure 12, top right.

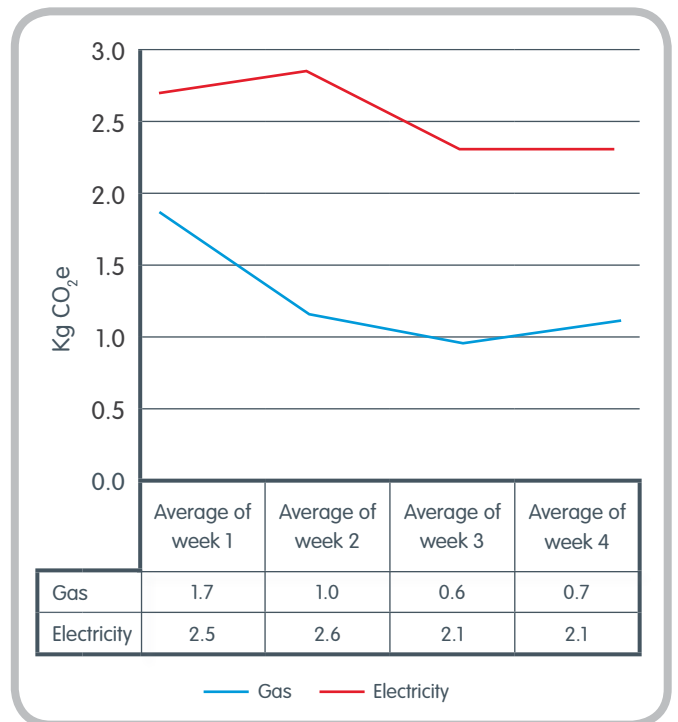


Figure 12. The average daily emissions during the trial resulting from gas and electricity consumption. One consumer’s electricity consumption has been discounted from the results for the reasons outlined in the paper below.

It should be noted that in addition to the observed change in behaviours the average temperature in London did increase over the course of the trial. Average temperature readings are provided below.

Average daily temperatures observed in London over the course of the 4-week trial.

Week commencing	Average of temp.(°C) avg
06/06/2011	12.3
13/06/2011	14.7
20/06/2011	16.4
06/06/2011	17.4

Source: <http://timetric.com/index/Un6FpDulQ7CoZ21Vb1pRIA/>

Almost all participants reduced their electricity and gas consumption during the trial. The reduction in electricity became clear when we removed one particular consumer’s data from the results. During the course of the trial, the individual concerned was using an increasing amount of electricity to power pumps and regulate the temperature in a large pond and aquarium. As the weather became warmer, the individual used more energy to keep their fish cool. In order to keep within their overall CGDA limit the individual would need to make trade-offs from other lifestyle segments equivalent to 22% of their own food CGDA over the year.

“Although the feedback and the CGDA shows there is room for improvement regarding my energy usage, there are certain areas that simply cannot be reduced. I have a koi pond which has large filters and airstones which are on 24/7 during the spring and summer. They can’t be switched off otherwise the fish suffer. It has, however, made me seriously consider if I will replace the fish when they die.”

Waste and recycling:

While all of the participants stated that they frequently recycle all recyclable packaging, many expressed surprise at the level of emissions associated with food waste. This lowered during the trial, partly as a result of consumers eating less red meat and because they were planning meals better. A number of participants blogged about their own local recycling efforts and a number took photos about the lack of recycling facilities in their local area. See Figure 13, below.

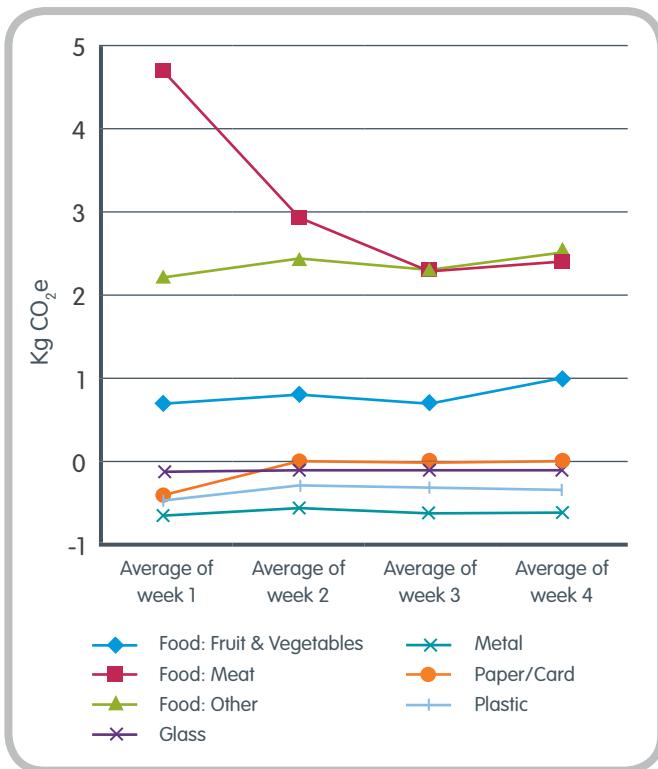


Figure 13. The average weekly emissions resulting from waste and the emissions benefit resulting from recycling over the 4-week trial.

Dividing consumers into 3 life-stage groups, produces quite remarkable results, See Figure 14, right. Not only did the empty-nesters make a significant drop in waste and recycling emissions, they also maintained this, at least for 3 weeks, at near zero emissions, and comments made during the trial showed some real determination to maintain this. The gap between this group and the other groups, particularly the pre-family group is extremely wide. Remembering that emissions from waste were included in the food and drink segments, the **pre-family consumers were using 15% of their food CGDA on ‘waste’, leaving them with a 15% less to use on actual food compared with the empty-nesters.**



Figure 14. Shows the average weekly emissions resulting from waste by different life-stages on the trial.





“When consumers saw the impact of their holidays alongside their other daily activities, they became defensive and reluctant to compromise on the holidays they took abroad.”

Commuting & personal travel:

Some participants tried walking and cycling for shorter journeys. However, overall there was not a general reduction resulting from commuting and personal travel during the trial. Consumers did cite that they were planning their journeys more carefully, in order to reduce the need for multiple trips. Some were using online shopping as an alternative. Several of the consumers cited difficulty using public transport. See Figure 15, below.

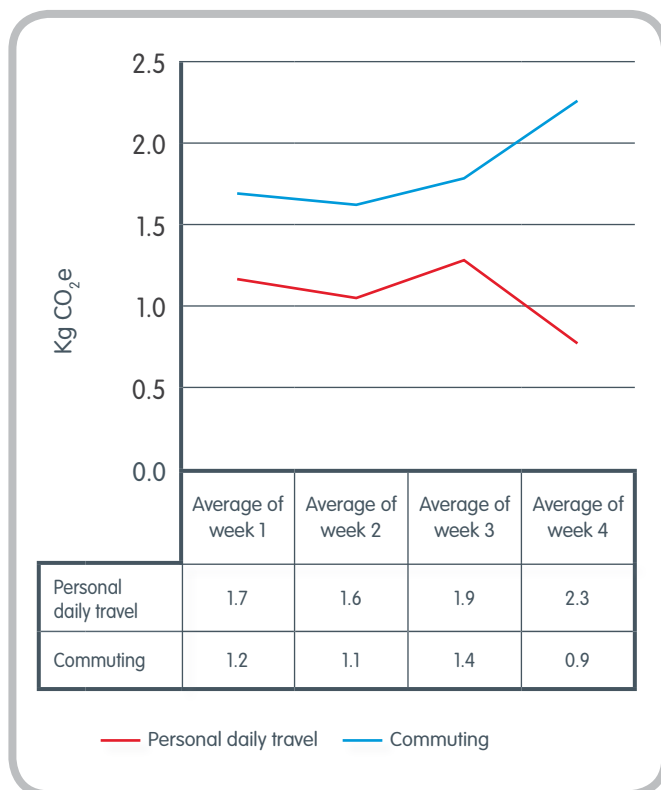


Figure 15. Shows the average daily emissions resulting from personal travel and commuting.

The location of some of the participants’ jobs changed from week to week causing large fluctuations in the data (probably more than the national average).

Holiday, leisure and lifestyle:

Emissions from holidays, leisure and lifestyle occur periodically, and as a result, were predominantly modelled on an annual basis and the average daily emissions displayed alongside the other ‘everyday’ segments to provide a context for the overall impact of their lifestyles. The trial tracked the impact of newspapers and books purchased by consumers and added this to the leisure and lifestyle segment.

When consumers saw the impact of their holidays alongside their other daily activities, they became defensive and reluctant to compromise on the holidays they took abroad.

The impact of consumers’ pets were also calculated and shown within the leisure and lifestyle segment. Consumers were surprised by the sometimes large contribution that pets made towards their overall carbon footprint.

The trial has shown that there are still plenty of simple measures that consumers can take to deliver a significant reduction in emissions. Extrapolating the results of this trial across the country would indicate that huge reductions are possible from simple actions such as reducing the amount of food waste that is sent to landfill. There are obvious co-benefits resulting from simple actions that help to save consumers money and contribute to healthier lifestyles.

5.2 Appendix B – The personal carbon allowance value

5.2.1. Calculation alternatives: top-down or bottom-up

At the heart of the personal carbon allowance concept are the carbon footprint numbers that allow us to determine how big the individual carbon allowance should be, and how this should be is divided into different segments of our lifestyle.

This can be determined in two different ways.

- A top-down approach, (starting with the total and breaking this out into segments), and
- A bottom-up approach (combining granular data together to create a total).

For the purposes of this work, and to calculate the personal carbon allowance we used both approaches.

5.2.2. Top-down approach

The top-down approach takes national emissions inventory data, and splits it between different lifestyle segments according to a different range of statistics. As such, the top-down approach has the potential to be more holistic.

An individual's carbon allowance can be calculated as an individual's share of our national emissions footprint (i.e. the total emissions a country produces per day, divided by the number of people that live here). This is known as a *production-based footprint* as it is based on the emissions *produced* by a country. However, this is only part of the story. A large proportion of our emissions are embodied in goods and services that we export to other countries, and in the goods and services that we import from overseas. Accounting for the emissions in this balance of trade alongside our

national emissions produces what is called a *consumption-based footprint*, as it is based on the emissions associated with the products and services we *consume*.

We took the national annual consumption footprint, and divided this by the national population in order to determine the current individual consumption footprint. We then further divided this to work out the daily carbon allowance. We then broke this allowance down further, into different lifestyle segments, including leisure and lifestyle, holiday, commuting, personal daily travel, electricity, gas and food and drink.

5.2.3. Data used for top-down footprint calculation

The data that we used to calculate an individual's *consumption-based footprint* was based on data generated by the Centre for Sustainability Accounting (CenSA). The data was calculated using a range of sources including national emissions inventories, national power generation mixes and was allocated according to flows of trade (within and between countries, using economic input/output tables⁶).

Using this approach, the datasets were therefore holistic in their approach to capturing carbon emissions. They include the emissions associated with capital items (such as the construction of buildings and manufacturing plant and equipment) which is not included in carbon footprinting standards such as PAS2050⁷, and often not included in Life Cycle Assessment studies.

When understanding how much a specific product (e.g. a can of Coke) would contribute to an individual's personal carbon allowance, we therefore have to recognise a slight mismatch between the datasets used; the personal carbon allowance total includes an allocation for capital items, whereas our PAS2050 product footprints do not. We acknowledge that this is an area which needs to be improved in future calculations, and believe that the difference made by the exclusion of capital items could be in the region of 8% (on average).



⁶ An economic input-output table is a method of quantifying the flows of trade between different economic sectors. These can be applied to single regions (e.g. all sectors within a single country) or multiple regions (all regions in multiple countries).

⁷ PAS2050 is a carbon footprinting standard owned by the British Standards Institute (BSI), to which Coca-Cola has certified its product footprints.

5.2.4. Results of top-down calculation

According to the data from CenSA, the national consumption-based carbon footprint for the UK was approximately 869 million tonnes CO₂e per year in 2004⁸. Divided by the population in that year (c. 60 million people) gave us an annual allowance of 15 tonnes CO₂e per person. This gave us a daily allowance of 40 kg CO₂e to cover all of our activities, including our share of public services and all long-term periodic purchases (e.g. furniture) as well as everyday activities.

We were also interested in the proportion of this that is made up of food and drink. The data we used suggested that the embodied carbon in the food and drink we consume was just over 10% of the total. This gave us a daily allowance of 4 kg CO₂e for food and drink and doesn't include the energy we use to cook or cool our food.

The carbon footprints of many different products have been calculated using the carbon footprinting standard, PAS2050. A 330ml can of Coca-Cola produced by Coca-Cola Enterprises in Great Britain has a carbon footprint of 170g CO₂e. This means that a can of Coca-Cola represents 4% of an individual's personal carbon allowance for food and drink and 0.4% of their total allowance.

As the carbon footprint that has been calculated for the 330ml can of Coca-Cola includes an allowance for keeping it cool, we are probably slightly overstating the proportion that it makes of the food and drink basket, but this shouldn't be too significant.

This number doesn't seem very big, and we wanted to understand how it would compare to other food and drink items. For example, a 200g beef steak could represent almost



80% of an individual's personal carbon allowance for food and drink, whereas a couple of slices of bread would be approximately 3%.

Other examples from the dataset show that Public Administration (including Defence, Education and Health) makes up approximately 11% of our consumption footprint, construction makes up approximately 5% and financial services and insurance make up 1%.

5.2.5. Bottom-up approach

Calculating a bottom-up footprint involves determining the embodied carbon in the goods and services that individuals consume. These values can then be combined at a national level to form a picture of a country's total annual emissions based on data of what constitutes an average lifestyle. As the trial was conducted in the UK, we used UK government statistics.

The details of how this was undertaken are outlined below.

5.2.6. Comparing the approaches

Comparing these approaches:

- The top-down approach ensures with greater certainty that everything is included, but becomes increasingly uncertain as it is divided down into smaller segments
- The bottom-up approach is much more accurate at lower levels, but leaves us with a potentially high margin of error when trying to combine to create a total.

Both therefore have their places:

- When setting the total personal carbon allowance the top-down approach has clear advantages
- When measuring the impact of specific consumption choices, the bottom-up has clear advantages.

As participants in this trial were using a customised carbon footprinting tool to track consumption choices, it was important to align the personal carbon allowance for each lifestyle segment in the trial with the related emissions factors wherever possible, i.e.

- Where data in the trial was being collected at granular level, the personal carbon allowance for that lifestyle segment was determined via a bottom-up approach, to ensure consistency
- Where no such granular data was being collected in the trial, the personal carbon allowance for that lifestyle segment was determined using the top-down approach.

⁸ CO₂e means carbon dioxide equivalents. It is an aggregated measure of all 6 commonly reported greenhouse gases. 2004 is the latest year for which these calculations are currently available. There is considerable delay in waiting for the data for each year to be published, including economic statistics as well as global energy data and then the calculations need to be made!

5.2.7. CGDA values used on the trial – calculation and assumptions

Where granular data was being collected in the trial, the personal carbon allowance figures were calculated using a bottom-up approach based on consumption or behaviour statistics. This approach was considered to result in a more comparable figure with the data being collected from the participants than the top-down approach of Environmental Input-Output (EIO) used by CenSA. See Figure 16, below.

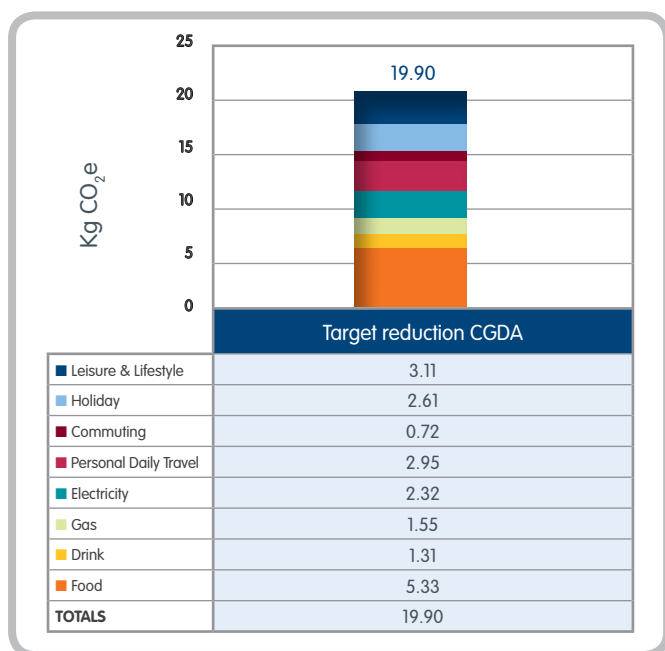


Figure 16. The chart shows the personal carbon allowance values used on the trial.

The personal carbon allowance figure presented in the footprinting tool (7.3 tonnes of CO₂e per person, equivalent to 19.9 kg CO₂e per day) is only a subset of an individual's total carbon footprint, as it excludes a number of support services, such as government services, banking, insurance, as well as a range of recreational activities such as concerts, theatres, clubs, cinemas, spectator sports, etc., i.e. it does not seek to be holistic in its boundaries for the purposes of this trial, but to measure behaviour change within these boundaries.

Travel

Emissions related to personal daily travel and commuting were calculated on the basis of the Department for Transport's (DfT) National Travel Survey data for annual distances travelled by mode and purpose. The emissions were calculated using DfT emission factors and accounting for average car occupancy, where appropriate.

Holiday

The data for emissions related to holidays was adapted from A. Druckman and T. Jackson (2010): An Exploration into the Carbon Footprint of UK Households. This work is based on

an EIO analysis but, contrary to the CenSA data, presents a separate segment for holidays. This data was then adapted, as it included elements such as food and drink consumed on holiday, as well as some personal travel captured in the above segment, which were both removed to avoid double-counting.

Food

The emissions data related to food was calculated on the basis of data from the Food Standard Agency's (FSA) National Diet Nutritional Survey 2008/09, which was mapped against the lifestyle segments used in the model and the same emission factors applied.

Drink

In the absence of a consolidated data source of average drink consumption, a drink profile was developed in order to approximate the average daily carbon impact of drinks. The profile was:

- 1 glass fruit juice
- 2 glasses carbonated drink or bottled water
- 1 large cup tea/coffee
- 1 large cappuccino/latte
- 1 pint of beer.

Gas & electricity

The gas and electricity emissions were calculated on the basis of average household consumption data reported by Ofgem, divided by average household size and multiplied by the relevant emission factors. The figure for gas was seasonally adjusted by allocating a fixed amount to cooking and apportioning the heating component across the year on the basis of monthly degree-day statistics from the Environmental Change Institute, Oxford. In practice, this is likely to result in an overestimate of the personal carbon allowance for the summer months, as there are still some heating degree-days, although in practice, thermal mass and other factors mean that no heating is actually used.



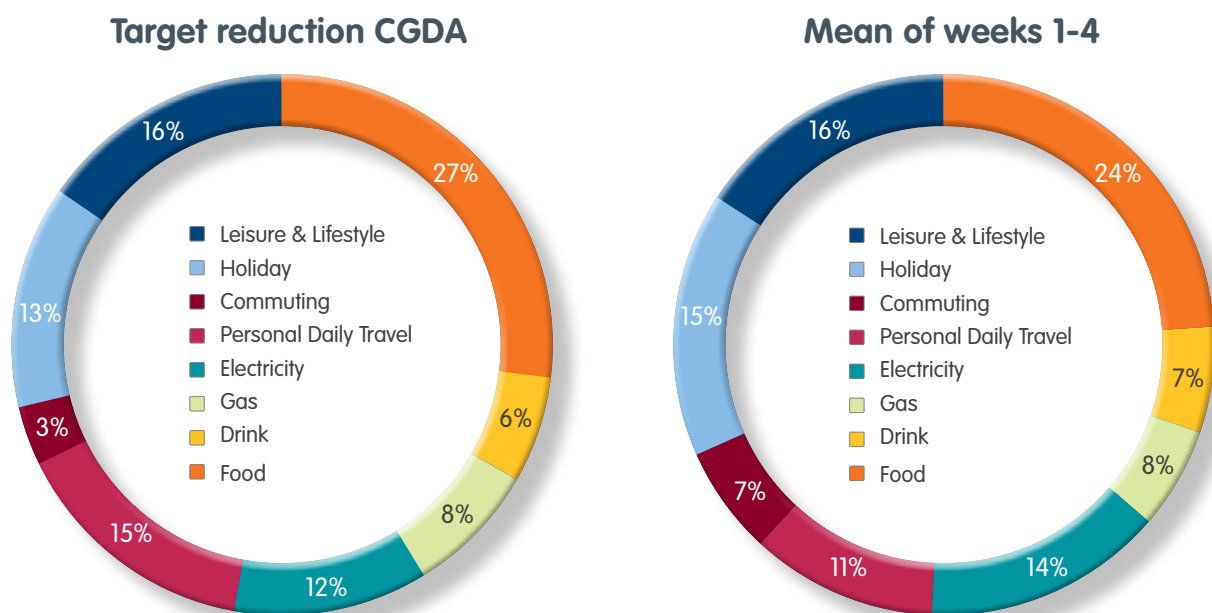


Figure 17. The pie chart on the left shows the distribution of the carbon guideline daily amount between the different segments measured on the trial. The pie chart on the right shows the average distribution of emissions from all the participants over the duration of the trial.

Leisure & lifestyle

No suitable consumption data was found to perform a bottom-up calculation for this segment. As a result, CenSA data for clothing, paper products publishing and recreational and other services were combined. This means that it is a wider segment than we measured during the trial, particularly with regard to recreational services. See Figure 17, above.

5.2.8. Scoping the wider applicability of the personal carbon allowance concept

Part of our research involved understanding how the personal carbon allowance concept could be applied to all areas of our lifestyles. The concept is that it is a *daily* allowance, however, much of our lifestyles consist of consumption of goods and services that occur periodically over a longer time-span than just a day. An example of this is the infrequent purchases of furniture that we may make, or even the purchase of a house. It is much more difficult to understand these in the context of a *daily* allowance than perhaps the consumption of a can of Coke. A link needs to be retained between the everyday and periodic emissions in order to provide a broad context for consumer decisions and enable trade-offs between different segments.

We also looked at those areas of our individual footprint that are easy for us to personally influence, and those over which we have much less control. Whilst we can make credible and lasting changes to our lifestyle to reduce our own *direct* footprint (e.g. by using our cars less or through our choices of the food and drink we consume), we have much less influence over indirect impacts for services that are undertaken on our behalf. A good example of this is the wide range of services provided on our behalf by the public sector. We all have a share of the carbon impact of such emissions as the emergency services,

or of central government but as individuals we have little opportunity to influence reductions in their emissions.

We concluded that for completeness our individual carbon allowance needs to include all relevant emissions, direct or indirect, short-term or long-term. However, if talking about the individual reductions that we can all make in working towards a low carbon lifestyle, we should focus on that subset that is specific to those areas we can influence directly, i.e. those products which we as consumers make the purchasing decision for. For this reason, government purchased services, whilst included within the per capita carbon allowance, should be combined together, and removed as a segment individuals should be asked to consider – these are the responsibility of government to reduce.

Technical issues:

There are a number of issues that need to be addressed with consumption-based inventory accounting such as:

- Double counting e.g. if you buy a t-shirt and some washing powder and a washing machine, and you pay your electricity bill, you could potentially be counting the electricity used to wash the t-shirt four times
- How best to provide additional information when individual behaviour can greatly alter the footprint:
 - i.e. for use and disposal
 - How to deal with multi-use products
 - How much/far to break out the 'single value': i.e. does one assume that all consumers will use and treat the products in the same way?



Furthermore, if the concept were to be more widely adopted, decisions would need to be made on how to set personal carbon allowances within different segments of the population. This leads to a number of interesting questions.

1. How should emissions be allocated between individuals?

- Per capita, where national emissions are divided equally amongst the total population
- Male / female, should males receive a greater carbon allowance than females because they eat more food? (i.e. similar to the calorie GDA)
- Adult / child, should our personal carbon allowance be linked to age, with babies receiving a lower allowance and adults a higher allowance to reflect increased levels of consumption?
- Weight / height, should our allowance be based on how much food we require, the size of our clothing etc.?
- Geography / seasonality, should consumers in colder climates receive a higher allowance to account for increased heating requirements?

2. Global versus country-specific allowances

An ultimate goal could be to establish a globally sustainable per capita emissions level. This would pose a serious challenge for countries such as the UK which rely heavily on fossil fuel for power and transport. People in these countries would struggle to live within a globally sustainable per capita emissions target without significantly reducing their consumption levels. They would need to change their lifestyle to a level most people would find unacceptable.

As a result, the carbon allowance has to take the present social context into account and each country would have to be allocated a different carbon allowances based on

their specific circumstances. The allowance would need to be continually revised downwards (at a higher rate for developed countries) in order to move towards the ultimate aim of a much lower, sustainable, global average.

3. How should the values change over time?

A reduction in the overall carbon allowance over time would be required in order to deliver emissions reductions and incentivise change. The rate of reduction across different segments and different countries would not be the same. The rate at which the carbon allowance value is updated would also need to be addressed.

4. The need for stretching targets

Having established the need for a gradually reducing emissions target, the exact relationship between national circumstances and the value of the personal carbon allowance needs to be established. One approach would be to take the present average per capita emissions and apply a discount based on a reduction path towards a sustainable level by a given target date. That end target might be defined by national targets, such as the 80% reduction target by 2050 adopted by the UK.

Taking the average per capita emissions as the reference point may not be the best option to drive lower personal carbon emissions. Assuming a normal distribution, half the population (slightly less once the annual reduction target is applied) would already be below this figure. A section of this group may respond to this with satisfied complacency, while many of those above the average allowance might not engage with the implications of the CGDA at all. A more challenging, yet realistic reference point, would be needed to apply the reduction. By taking the emissions level of the lowest quartile, and applying annual reductions to meet the final target, a greater proportion of the population would be challenged to make emissions reductions.

5. Segment-specific reductions

The final outstanding question in defining a personal carbon allowance is the proportional allocation to various lifestyle segments. Assuming the lowest quartile as the starting point, we can use their average emissions distributions across the various segments of leisure and lifestyle, holiday, commuting, personal daily travel, electricity, gas, food and drink. Over time, the relative contribution of these segments to each consumer's shrinking carbon footprint will change quite significantly. Grid electricity and transport systems are likely to decarbonise by switching to low carbon fuels, which especially assists those sectors which rely on electricity to deliver their products and services. Other segments, such as food, are less energy intensive, with many emissions arising from nitrous oxide or methane, and would benefit far less from this decarbonisation. Whilst reductions in emissions from food are being achieved, this sector is likely to reduce at a slower rate than the energy consuming sectors, and therefore would become a relatively more prominent contributor to our overall footprint.

5.2.9. Should our personal carbon allowance reference nutritional values?

There are a growing number of carbon footprints and life cycle assessment studies being undertaken for food and drink products, such as those undertaken by Coca-Cola⁹. These determine the carbon emissions per product, or per litre/kg of that product. We believe this is useful for consumers in allowing them to understand the carbon impact of products, and to calculate their individual carbon footprint should they wish.

A number of studies are starting to make the link between carbon and a unit of *nutrition* in order to establish how minimum needs for *nutrition* can best be satisfied in a low carbon way.

The difficulty that these studies face is in understanding what a unit of *nutrition* means. It is wider than simply a measure of the *calories* the food or drink product contains.

Furthermore, that which is classed as nutrition to one person may not be the same balance of nutrition required by another.

Many products are chosen for more than their nutritional composition, taste being an obvious example, and therefore given these difficulties, we do not believe that it is possible to state a simple link between a CGDA and nutrition. We are keen to see how such work evolves, and broadens to include other indicators of the reasons why food and drink products would be selected, such as taste, enjoyment and accessibility.

5.2.10. Acknowledgements and further reading

Provided below is a list of documents and references that provided us with the data and provided some of the context for much of this work.

Data provided by:

The Centre for Sustainability Accounting (CenSA)

Further reading:

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⁹ <http://www.cokecorporateresponsibility.co.uk/big-themes/energy-and-climate-change/product-carbon-footprint.aspx>.

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