

# Environmental Studies FACT SHEET



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## Offsetting Your Carbon Footprint

This Factsheet focuses on carbon offsetting schemes which aim to reduce the effects of increasing CO<sub>2</sub> emissions. According to the World Bank approximately £1.5 billion of offsets were sold in 2006, representing 374 million tonnes of CO<sub>2</sub>. The vast majority of carbon offsets are used to meet developed countries' obligations to cut their emissions under the Kyoto Protocol. But voluntary offsets are growing fast, albeit from a low base. The volume saved rose from 3.5 million tonnes of CO<sub>2</sub> in 2004 to 10 million tonnes in 2006. In 2008 the saving will be between 50-100 million tonnes.

### Introduction

Not only are greenhouse gas emissions continuing to rise, but last year scientists detected early evidence of positive feedback mechanisms.

- Rising temperatures in Britain were found to be causing soil to release additional carbon dioxide
- Permafrost peat bogs in Siberia were melting, emitting large amounts of methane, a greenhouse gas twenty times more powerful than carbon dioxide
- Higher temperatures mean that increased melting of summer sea ice in the Arctic exposes greater areas of dark sea water, which absorbs more solar radiation than highly reflective ice

**Exam Hint:** Make sure you understand the term "positive feedback" and can give two examples.

To combat the worst extremes of climate change, the government's chief scientist has suggested the UK may need to reduce carbon dioxide emissions by 80% by 2050. This would mean a reduction of 3 – 4% per year every year from now on. However, carbon emissions only fell by 7.7% in total between 1990 and 2002 and actually rose in 2003, 2004 and 2005. What can we do to reverse this trend?

### What is your carbon footprint ?

Your footprint is the total amount of carbon dioxide emitted per year by you and on your behalf (by manufacturers, transport companies etc.) as a result of your consumption habits, usually expressed in tonnes/person/year.

The first piece of research to calculate a carbon footprint for the average British citizen by the government-funded Carbon Trust puts the annual figure at 10.92 tonnes of CO<sub>2</sub> per person per year – approximately half of the 19 tonnes produced by the average American.

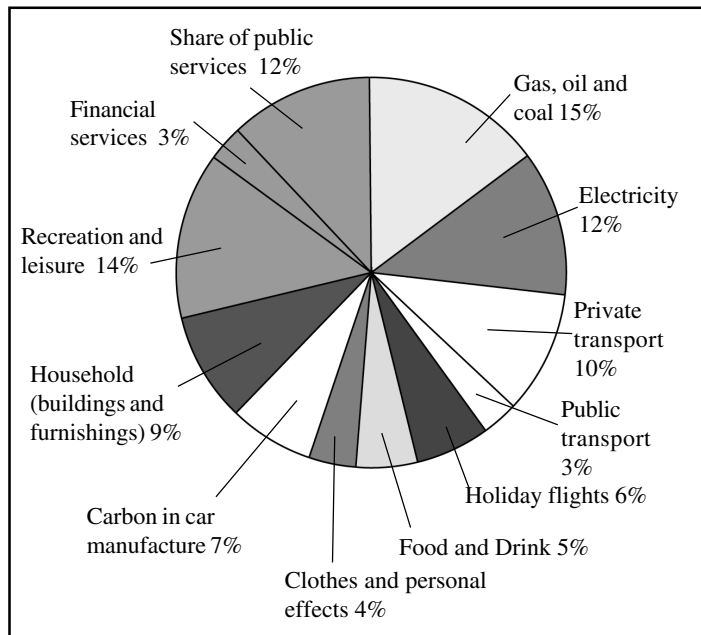
The Carbon Trust takes the 'at source' carbon emission figures generated by the Office of National Statistics, for example electricity production or primary manufacturing and, using a University of Surrey model, reallocates them to the point of consumption. The data reveals an annual carbon footprint for each of 11 kinds of consumer need. This is then divided by the size of the population of Britain.

- **Recreation** = 1.95 tonnes : the single largest source of emissions. Includes everything from seaside trips in the car, which create 200kg per person, to watching live evening sport under floodlights. TVs and stereos create 35kg.
- **Heating** = 1.49 tonnes : results from the burning of gas, electricity and oil. One of the easiest to reduce; turn down the central heating thermostat by 1°C and save 25kg of CO<sub>2</sub> per year.
- **Food** = 1.39 tonnes : generated by cooking, refrigerating, freezing and food miles. Food transport in the UK equates to 300kg per person, driving to supermarkets is another 40kg, a restaurant meal generates 8 kg per diner.
- **Household** = 1.37 tonnes : includes lighting, household appliances such as vacuum cleaners, DIY equipment and the electricity used to produce furniture and make the building. A fridge is responsible for 140kg of carbon, while lighting a house contributes a further 100kg.
- **Hygiene** = 1.34 tonnes : includes emissions from the NHS and individuals washing. Taking a bath instead of a shower adds 50kg of carbon in energy production, heating a house's water costs 150kg of energy.
- **Clothing** = 1.0 tonnes : emissions generated in producing, transporting and cleaning clothes and shoes. New clothes cost 70kg of energy per year, washing machines will use 100kg and tumble driers 36kg.
- **Commuting** = 0.81 tonnes : travelling to and from work on both public and private transport including aviation. A car journey of three miles undertaken five times a week represents 500kg of energy per year.
- **Aviation** = 0.68 tonnes : the fastest growing source of CO<sub>2</sub> due in part to the boom in low-cost airlines. A return flight to Malaga would represent 400kg of energy per passenger.
- **Education** = 0.49 tonnes : emissions relating to schools, educational travel, books and newspapers. School buildings, for example, made up 172kg of energy use and books 13.6kg.
- **Telephones** = 0.1 tonnes : all sources of CO<sub>2</sub> emanating from communications including computers. Mobile phone chargers account for 35 – 70kg per person whilst letters represent 0.01kg.



Fig 2 summarises the key components of a typical person’s carbon footprint.

**Fig 2. Breakdown of a typical carbon footprint**



**Calculating your carbon footprint**

Visit [www.carbonfootprint.com](http://www.carbonfootprint.com) to calculate your carbon footprint and read tips to reduce your carbon emissions. Also visit [www.carbontrust.co.uk](http://www.carbontrust.co.uk) or [www.energysavingtrust.org.uk/commit](http://www.energysavingtrust.org.uk/commit) for practical advice such as :

- Sign up to a green energy supplier (e.g. using wind or hydro-electric power)
- Leaving a TV on standby uses as much as 60% of the electricity used when switched on
- Go for a run rather than drive to the gym
- Energy-saving light bulbs last 12x longer than ordinary ones and can save up to £70 each over the life of the bulb
- Buy local fruit and vegetables or grow your own to reduce food miles

**Offsetting your CO<sub>2</sub> emissions**

Carbon offsetting involves individuals or organisations paying others to reduce emissions of greenhouse gases on their behalf. Offsetting carbon dioxide emissions as pioneered by rock bands such as Coldplay (who planted 10,000 mango trees in India to absorb the CO<sub>2</sub> produced by the making of their last album) is becoming increasingly popular but the proliferation of schemes and web sites vary in terms of cost-effectiveness and ethicality. As yet, there is no government monitoring or kite-marked scheme but the Government is planning to give seal-of-approval kite marks to favoured schemes by mid-2007.

Carbon offsetting involves taking the carbon dioxide you have emitted out of the atmosphere or reducing emissions in other parts of the world through various strategies :

- Tree planting : is one of the most popular methods as it also improves habitat and in places such as Africa can reduce soil erosion and provide fuel wood
- Retiring CO<sub>2</sub> credits : by purchasing carbon credits from a Climate Exchange programme and not using them, no other person or organisation can buy and use them.

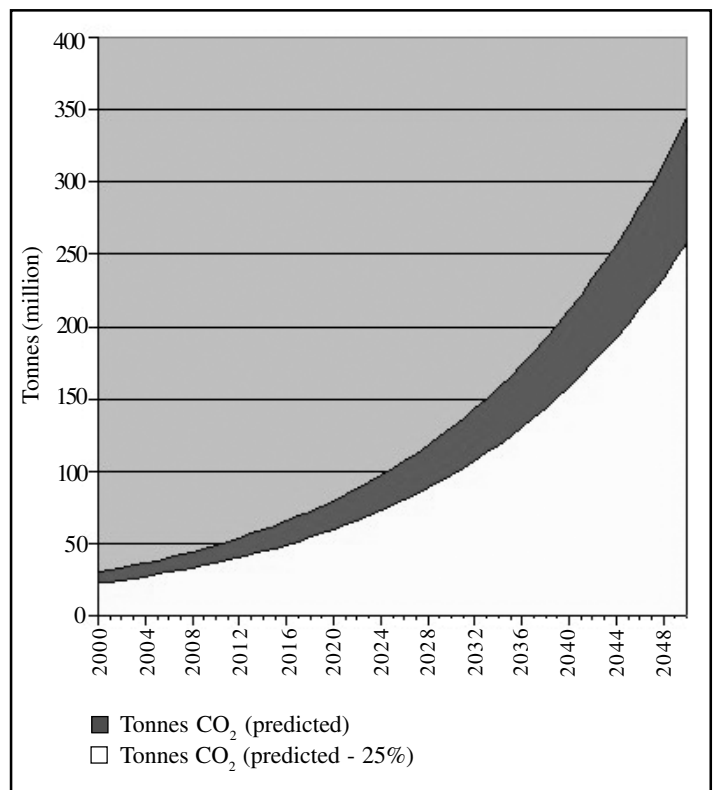
- Investing in sustainable technology development : such as solar, geothermal, biomass fuels, waste to energy schemes etc.
- Donating to energy efficient technologies : for example, a solar-powered water purification system for a Third World community.

One major UK offsetting company, **Climate Care**, supplies efficient cooking stoves to some of the poorest people in Honduras. This supports conservation by reducing the amount of wood that is used for cooking. Each stove reduces CO<sub>2</sub> emissions by 1.5 tonnes compared to an open fire, saving 7,000 tonnes of CO<sub>2</sub> – the equivalent of taking 2,000 cars off the road for a year. Another project involves restoring rainforests in Uganda. Each hectare is expected to absorb 400 tonnes of CO<sub>2</sub>, equivalent to the annual emissions from 80 average-sized UK homes.

**Aviation** currently accounts for between 5.5% - 17% of the UK’s total emissions of CO<sub>2</sub> – depending on whose statistics you believe!

What is certain is that it is the fastest-growing source and will continue to be for the next 50 years unless we do something drastic to stop it (Fig 3).

**Fig 3. Growth in global air transport emissions**



Compared with other forms of personal energy use, flights produce disproportionately large amounts of CO<sub>2</sub>. If you book a flight to Hong Kong through lastminute.com the website invites you to pay an extra £19.60 to ‘offset the 2.8 tonnes of carbon dioxide emitted by this flight’. According to the calculator on the website, your share of CO<sub>2</sub> emissions on the return flight is equivalent to leaving a car idling for 51 days. Contributions made via lastminute.com go to an organisation called Climate Care. Last year, 60% of its expenditure went on funding to reduce greenhouse gas emissions.

Is this a good proportion? Are the projects well chosen?

The environmental pressure group **Friends of the Earth (FoE)** have concerns. Tony Juniper, its director, told a recent ABTA conference that, “A lot (of schemes) focus on reforestation. But in some countries there are land-rights issues and people are being turfed off agricultural land so that someone can plant a tree to make themselves feel better about flying”.

Investments may not produce the savings expected; energy-saving projects in developing countries may well have been funded anyway; and the Earth’s atmosphere may not benefit from tree-planting schemes for decades. There are other drawbacks to tree planting: some scientific studies show that afforestation in high latitudes decreases albedo, thus actually helping the atmosphere to become even warmer.

Disturbance to soil while digging holes to plant saplings release CO<sub>2</sub> and CH<sub>4</sub> from the soil. FoE would rather see more holidays taken by rail, an end to the expansion of UK airports and huge increases in aviation taxes.

### Conclusion

Reducing your personal carbon dioxide emissions is far more beneficial than subsequent offsetting.

### The future – low carbon consumerism?

When, as a careful consumer, you read the label on a packet of crisps, what do you look for? How much salt or how many additives, E-numbers or artificial colourings it contains? What if the label told you how much CO<sub>2</sub> had been emitted during its manufacture? What part in causing global climate change it had played? Furthermore, what if a comparison of labels showed you that crisps X were responsible for fewer CO<sub>2</sub> emissions than crisps Y? Would it affect your buying decision? The idea of embedded carbon is a powerful and radical idea just starting to gain momentum.

How much CO<sub>2</sub> is embedded in those crisps? The Carbon Trust has been calculating it with Walker’s Crisps. When it is calculated on a wider basis, the embedded carbon in a retail product, fast food, new trainers or a 4x4 car could become more important than artificial sweeteners or salt content in driving consumer choices.

### Exercises and activities

1. Calculate your personal carbon footprint by using the form available as a pdf on website : [www.ch4.org.uk/ideas.php?id=57&fullitem=true](http://www.ch4.org.uk/ideas.php?id=57&fullitem=true) or [www.climatecare.org.uk](http://www.climatecare.org.uk) or [www.carboncalculator.com](http://www.carboncalculator.com) will do it for you.
2. Compare the accuracy of the different websites and the range of values across your class.
3. At what age should someone become responsible for their carbon footprint?
4. Your ecological footprint (EF) is a measure of your consumption of natural resources. A population’s EF is the total area of productive land or sea required to produce all the crops, meat, seafood, wood and fibre it consumes, to sustain its energy consumption and to give space for its infrastructure. The EF can be compared with the biologically productive capacity of the land and sea available to that population. For an EF quiz go to [www.earthtoday.net/footprint/index.asp](http://www.earthtoday.net/footprint/index.asp).

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### How carbon trading works

There are two sides to the carbon market – the trade of permits issued under the EU’s emissions trading scheme and the trade of credits issued under the Kyoto Protocol. Under the EU scheme, companies in energy-intensive industries are issued with permits for the CO<sub>2</sub> they are allowed to produce each year. Those wanting to produce more must buy spare permits from cleaner businesses, thus placing a price on emitting CO<sub>2</sub>, and encouraging companies to reduce their greenhouse gas output.

The other side is the trade of carbon credits between developed and developing countries. Under the Kyoto Protocol developed countries must cut emissions by an average of 5% of 1990 levels by 2012. They can cut their own emissions and also invest in projects, such as wind farms, that cut emissions in developing countries. These projects earn credits that can be traded. EU members are expected to spend approximately £3.8 billion on carbon credits before 2012.

### Does carbon trading really work?

Many environmentalists are sceptical for the following reasons:

1. **They don’t form part of what they call “joined –up thinking”.**  
On the one hand the government is spending millions making homes more energy efficient. The plan launched in March 2007 would save 7m tonnes of carbon. At the same time it was announced that UK airports were to keep growing: by 2030 the number of passengers will increase from 228 million to 465 million. As a result, carbon emissions will rise by between 22m and 36m tonnes.
2. **Carbon shouldn’t be separated from other greenhouse gases**  
None of the calculations about the impact of increasing air travel takes into account the other greenhouse gases aircraft produce. They simply ignore completely the nitrogen oxides, for example. According to the Intergovernmental Panel on Climate Change, these create a global-warming effect, 2.7 times as great as carbon dioxide alone.
3. **There is no point to it if we keep subsidising air travel**  
The government has been authorising “route development funds” to establish “new links from regional airports”. European rules permit governments to provide up to 50% of the start-up costs for regional airports and their new connections. Derry City Council has been secretly giving Ryanair £1.3m a year. In simple terms, public money is being used to subsidise climate change.
4. **They don’t reduce our CO<sub>2</sub> emissions**  
CO<sub>2</sub> emitters such as UK airlines can keep growing as long as they buy carbon permits from other industries, who can cut their output more cheaply. All that counts is that the European economy as a whole is reducing its emissions - it doesn’t matter how they are distributed. Why should aviation force the rest of the European economy to reduce its emissions much faster than the average? Is flying more important than heating and lighting?

**Exam Hint:** In the Exam you might be asked to:

- Explain the term carbon footprint
- Suggest ways in which individuals can reduce the size of their footprint
- Carry out simple calculations on the benefit of carbon offsetting schemes such as tree planting
- Interpret published articles on offsetting and trading