

The truth about  
**CLIMATE  
CHANGE**

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# Confused about 'Climate Change'?

You're not the only one

One minute it is a certainty, the next there is doubt.

One minute, it's caused by sunspots, the next, it's all down to us and CO<sub>2</sub>.

It'll take thousands of years to make much difference.

**We're doomed in fifty.**

## So what is the truth?

**This little book** tells you all you need to know to understand Climate Change. And it's written in a simple, easy-to-understand way. Because, in fact, it is simple and easy to understand.

More than that, as we'll find out, everyone agrees on three bits of the story:

**1** When we burn oil, coal and gas – 'fossil fuels' – carbon dioxide (CO<sub>2</sub>) is released into the atmosphere. The atmosphere is pretty thin, we are burning massive amounts of fossil fuels very fast, and the concentration of CO<sub>2</sub> is thus rising fast.

**2** Carbon dioxide (CO<sub>2</sub>) in the air acts like the glass of a greenhouse: it lets 'short-wave' sunlight in, but doesn't let all the 'long-wave' heat energy back out: the trapped heat keeps your greenhouse (and our planet) warm.

**3** The temperature of the earth is rising fast.

People only seem to have argued about a few things:

- **How much of this rise in temperature is down to the CO<sub>2</sub>, and how much is 'natural'.**
- **How much will temperatures change in the future, and how fast.**
- **What if anything we need to do, and when.**

This book gives you the answers to all these issues in only a few pages. Read the evidence for yourself. Then decide if you need to take any action. If you think that you should, then we've offered a few suggestions as to what you can do.

And for those of you who would like to look into this in more depth, some useful books and references are listed at the end.

# THE BASICS OF CLIMATE CHANGE

## Do growing plants lock away carbon dioxide?

Yes

Plants take up carbon dioxide (CO<sub>2</sub>) from the air and use energy from the sun to grow, turning the CO<sub>2</sub> into cellulose (their building material) and sugars (to power construction).

**So plants are the natural cleaners of the Earth's atmosphere**

Each year, a fast-growing tree can store 23kg (50 lbs) of CO<sub>2</sub>. This CO<sub>2</sub> (as carbon) also ends up in the bodies of animals that eat plants – or the animals that eat those animals.

When plants die and rot or are burned, most of the CO<sub>2</sub> is released back into the atmosphere. However, some plants get buried (or sink to the bottom of the sea) where they don't rot. Of course, the same is true of animals: if they die and don't rot, the carbon in their bodies can't escape as CO<sub>2</sub>.

# What are 'fossil fuels'?

For over 350 million years, CO<sub>2</sub> was taken out of the atmosphere by trees, leafy plants and mosses. When they died, some fell into swamps, and were slowly covered up by soil and water and more dead plants. This crushed them and, partly-rotted, they formed peat.

**With time, sediments from rivers settled on top, squeezing water out of the peat, and turning it into a hard black 'rock' – coal.**

Meanwhile, tiny plankton lived in the sea, and algae in lakes. When they died, they sank to the bottom and were buried under layers of sediment where they, too, couldn't rot.

**With time, the sediments were crushed to form sedimentary rock, and the bodies of the algae and plankton turned into oil and natural gas.**

Peat, coal, oil and natural gas are thus fuels which are made up of ancient fossilized creatures – they are 'fossil fuels'. And because they are made of plants and animals which hadn't rotted completely, they are full of locked-away carbon – released as CO<sub>2</sub> when it burns.

## How recently did we start burning these fossil fuels?

Very recently, really

**The first gas street light** appeared only **200 years ago** (1807, in London). We now burn 100 trillion cubic feet of it a year.

**The first 'car for the masses'**, the Ford Model T, only appeared **100 years ago**, when there were only eight thousand cars in the whole of America. Worldwide, there are now nearly 650 million-enough, if each were only 12 feet long, to park bumper to bumper around the equator seventy times.

Meanwhile, **the first commercial jet service** only appeared **50 years ago** (in 1952). Now, more than four billion passenger flights are made each year.

Thomas Edison only invented the **electric light bulb** **130 years ago**. There are now 1.5 billion electric and electronic gadgets in use.

## So, all of a sudden, we're burning more fossil fuel?

Yes. A lot more

The first oil well in North America was 69 feet deep, and was drilled in 1858 – only 150 years ago. In 2006, world oil production exceeded 110 billion litres.

The UK uses a football stadium-full of oil, while the US uses enough to fill an Olympic swimming pool to a depth of two and a half kilometres ...a day.

Worldwide, each year we burn more than 1.2 cubic miles of oil, along with more than 3.5 billion tonnes of coal and 100 trillion cubic feet of gas.

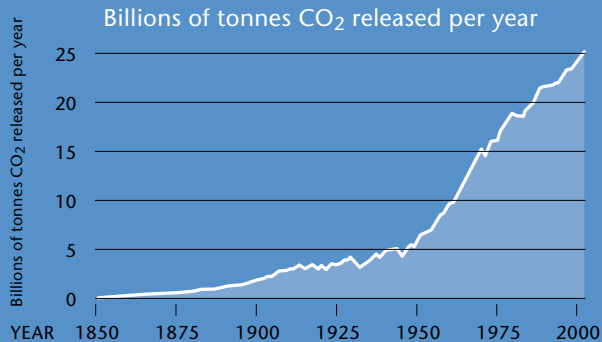
All this comes to nearly  
100 tonnes of coal,  
152,000 litres of oil and  
3 million cubic feet of gas  
...every second.

## Does this release a lot of CO<sub>2</sub>?

Yes, it does

**Burning a litre of petrol releases 2.5kg of CO<sub>2</sub>**

**Burning 1kg of coal releases 3kg of CO<sub>2</sub>**



So far, we have poured over 900 billion tonnes of CO<sub>2</sub> into the atmosphere in the last 250 years, half of this since 1970.

We are now releasing a staggering 30 billion tonnes of CO<sub>2</sub> each year – that’s 17,000 billion cubic metres. By 2025, we’re expected to reach 41.6 billion tonnes.

## And plants can’t lock this up?

Not well enough

A fast-growing tree can take up 23kg CO<sub>2</sub> each year – the amount released when the average UK car drives for 70 miles.

**To soak up Britain’s annual greenhouse gas emissions, you’d need a new forest the size of Devon and Cornwall planted every year.**

But instead of planting trees, we are chopping them down: half the world’s forests were destroyed in the last 50 years, and the area of twenty football pitches vanishes every minute – that’s ten million hectares, or an area four times the size of Belgium each year. And instead of taking up carbon dioxide, the rotting (or burned) plants release it: about 1.8 billion tonnes each year.

Meanwhile, peat bogs lock down twice as much CO<sub>2</sub> as all the world’s forests, and draining those in South-West Asia is releasing at least 632 million tonnes of CO<sub>2</sub> each year.

**OK. But surely  
the atmosphere is huge,  
and this is just a drop  
in the ocean?**

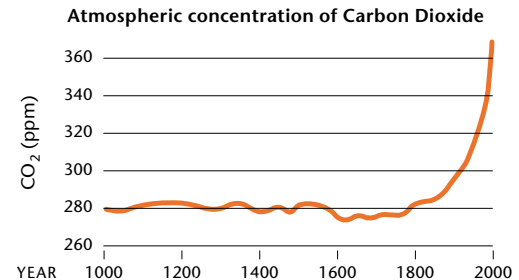


The bottom layer of our atmosphere – the troposphere – is only 11km (7 miles) thick, and contains nearly all the breathable air. Worse still, half the air is actually found in the bottom 5km – or three miles. Think of somewhere 3 miles from your house. Not far, is it? In fact, if the world were an onion, the breathable atmosphere would be the thickness of the first outer thin layer of skin.

**So there isn't actually much air out there to dilute  
the CO<sub>2</sub> which we are releasing.**

**So carbon dioxide levels in the  
air must be rising, then?**

**Yes – and steeply**



Tiny air bubbles trapped in Antarctic ice show atmospheric CO<sub>2</sub> concentrations. Steady at 280 parts per million (ppm) for the last 1000 years, they're now rising fast – and are now the highest in at least 650,000 years. Over that time, the fastest rise seen was 30 ppm over 1000 years. We've achieved that in 17 years. Meanwhile, burning fossil fuels releases 170 million tonnes of methane annually, and each of the world's 1.3 billion cattle another 600 litres daily: concentrations in the air are rising by 1% a year. Car exhausts release low-altitude ozone ('bad ozone'), and levels have risen 50% in the last 100 years.

## And this can cause the Earth to heat up?

Yes

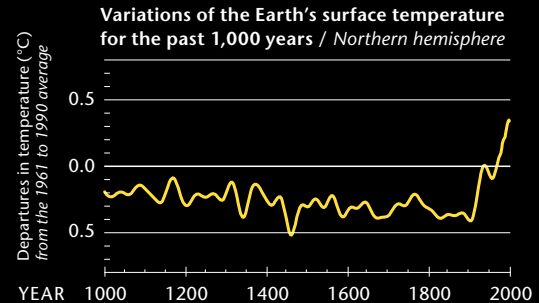
Of the total atmosphere, one part in every 1000 is made up of carbon dioxide, methane and ozone. They are called 'greenhouse gases': they let the sun's rays through to warm the earth, but act like the glass in a greenhouse to trap some of the heat around the earth.

**This warming effect is enormous: the heating-equivalent of burning 1,800,000,000 tonnes of oil every single minute.**

With the right amount of sunlight, and the right amount of greenhouse gases, the Earth's temperature stays pretty constant. But small changes in the radiation from the sun, or in levels of greenhouse gases, can cause dramatic heating or cooling of the planet. And, as we've seen, greenhouse gas levels are rising fast.

## So is the Earth really warming up?

Yes, it is



Although the sea has so far absorbed more than 80% of the heat added to the system (warming to a depth of 3km), the temperature of the lower atmosphere has risen 0.76°C in the last 100 years or so. Global surface temperatures are rising by 0.1-0.16°C a decade—double the rate 100 years ago. The 20th century was the warmest, and 1990s the warmest decade, of the last 1000 years. Fifteen of the hottest years on record have been since 1980, and 11 out of the last 12 are the hottest recorded. NASA tell us that temperatures in the last 30 years have been the highest in the last twelve thousand.

## But surely the Earth's climate has changed a lot before?

### That is true

The Earth's orbit varies in 100,000 year cycles, its 'tilt' in 40,000 year cycles, and it 'wobbles' every 20,000 years. This changes how close we are to the sun – and this makes a big difference: in England, the Earth's 23° tilt puts you nearer the sun in June (making it hot) and further away in December (making it cold).

Over the last one million years, these 'orbit' effects have caused regular ice-ages. The last one peaked 18,000 years ago when, with so much water frozen into snow and ice, you could have walked across the bottom of the North Sea to Norway. After that, the Earth warmed: if you'd visited the Sahara Desert only 8,000 years ago, you'd have found wetlands and lakes. We are currently in a warm period 'between ice ages': the Earth is as warm as it has been for nearly 150,000 years.

On top of these big slow changes, are smaller faster ones. Only 400 years ago, the river Thames froze regularly, and 'Frost Fairs' were held on it in 1607. Some of these changes are caused by sunspot activity. Sunspots are areas of the Sun which are cooler than the rest but, when there are lots of them, the Earth seems to get hotter.

## So couldn't the recent rapid warming be due to sunspots?

No

**We've been in a recent period of low sunspot activity, so the Earth should be getting cooler.**

Instead, we are heating up. And it can't be due to the slow changes in the Earth's orbit or 'wobble' either.

So it is down to us, then?

**Yes**

## But isn't there some debate?

Not any more

The national academies of science of Belgium, Indonesia, Turkey and France released a statement saying that **current climate change is down to us, and that we must take urgent action.** The statement was also signed by the national scientific academies of Brazil, Sweden, Malaysia, the Caribbean, Italy and Ireland. Oh. And Australia, and New Zealand. And Canada, China, Germany, India, and Britain.

American scientists think the same way. In 2006, the **American Association for the Advancement of Science** stated that **"The scientific evidence is clear: global climate change caused by human activities is occurring now, and it is a growing threat to society."**

**The American Meteorological Association** states that **"the atmosphere, ocean, and land surface are warming (and) humans have significantly contributed to this change."**

**The USA's National Academy of Science** states that **"Climate change is real"** and goes on to urge **"all nations...to take prompt action to reduce the causes of climate change."**

Even five years ago, a **Pentagon** report stated that climate change **"should be elevated beyond a scientific debate to a US national security concern."**

And the **Intergovernmental Panel on Climate Change**, prepared by 2,500 experts from 130 countries, is categorical.



So there is no doubt:  
**we are releasing vast quantities of CO<sub>2</sub> into a very thin atmosphere,** where its concentration is rising fast, and causing rapid global warming.

**SO WHAT  
DOES THIS  
MEAN?**

# What is this warming doing?

## Ice is melting

European Alpine glaciers have lost half their volume since 1850. Mt Kenya's (Africa) lost 75% of their area in the 1900s alone, with 40% of this loss occurring in under 25 years. Alaskan glacial melt rate has doubled in the last 10 years. Summer Arctic sea ice has lost 40% of its thickness since 1978, and 2 million km<sup>2</sup> of area. In all, 89,000 km<sup>3</sup> of Arctic ice have melted in the last 40 years.

## Soil is thawing

The maximum area of Northern Hemisphere covered by frozen ground in Spring has decreased by 15% since 1900. Between 1964 and 1990, the southern 120km of Northern Canada's 'permafrost' (permanently frozen soil) has thawed.

## Sea levels are rising

Warming water expands, and melting land ice runs into the sea. As a result, sea levels are rising at a rate of 3.1cm a decade, and this is getting faster.

## Ecosystems are collapsing

According to the Millennium Ecosystem Assessment (by 1,395 experts from 95 countries), extinction rates have increased a thousand fold in only 100 years. Three species are lost every hour. Climate change is likely to worsen this even further.

## The weather is changing

Hurricane Katrina (2005) caused \$250 billion-worth of damage – more than four years of war in Iraq. The first South Atlantic hurricane ever recorded (Hurricane Gafilo) occurred three years ago. The (inflation-adjusted) costs of extreme weather events – some \$10,000 million in 1950 – had risen six-fold by 2000. Flooding in the UK in the summer of 2007 cost £4 billion.

**All that from a  
temperature rise of only  
0.76°C in 100 years**

## Will it get hotter than this?

Yes

Temperatures rose 0.76°C in the last 100 years, but are about to rise of another 0.4°C in only a fifth of that time (the next 20 years). What happens after that depends on the CO<sub>2</sub> we release in the next 5-10 years (as effects are delayed). Unchecked, temperatures will rise by up to 6.4°C this century, and far more in some regions: the Antarctic is already warming five times faster than global average.

## Could it be better than that?

Yes

Temperatures might only rise by 2.5°C or so, if we cut emissions. On the other hand, it could be worse. Global warming might suddenly accelerate, with warming driving faster warming:

- Oceans absorb a third of CO<sub>2</sub> emissions, but hold less when warm. And evaporation releases water vapour, a powerful greenhouse gas.
- Melting permafrost releases frozen methane, 23 times more powerful than CO<sub>2</sub>.
- Rainforest death from climate change would release vast quantities of CO<sub>2</sub>. Warm peat bogs, and they release their 450 billion tonnes of stored CO<sub>2</sub>.

**So global warming causes heating oceans, melting permafrost, and dying rainforests** – releasing more greenhouse gases to make the warming worse. Meanwhile, as polar ice and snow melts, there is less to reflect the sun's rays back into space, more exposed land and water absorbing heat, and more warming.

# What does this mean for humans?

## Certainly a rough ride for our children

**Drought** will affect 250 million in Africa by 2050. Loss of Asian glaciers threatens >1 billion with water shortages by 2050. Elsewhere, agriculture will fall in some areas by >50%.

**Flooding and storm damage** will occur from stronger winds, severe hurricanes & heavy rainfalls, together with rising sea levels (the last time the poles were warmer than this for an extended period (125,000 years ago), sea levels were 6 metres higher).

**Economic Collapse** may occur. Nicholas Stern was the senior economist to the World Bank. According to his 2006 report to the UK government, we are at risk of “disruption to economic and social activity... on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century” and “it will be impossible to reverse these changes”.

**Disease:** The IPCC predicts ‘increased deaths... due to heat-waves, floods, storms, fires and droughts’. Rises in ground-level ozone will cause heart and lung disease. Flooding will bring diarrhoea: 2% of cases in some areas are already due to climate change, according to the World Health Organisation. By 2100, those exposed to malaria-prone temperatures may rise by a third.

**Starvation:** Volatile weather (hot one day, cold the next; wet then dry a month later), altered growing seasons, sustained drought or cold weather, and ecosystem collapse (below) will cause crop failure.

**Mass migration and war:** Five thousand years ago, the 5 million humans on earth could move when climate changed. Now, there are seven billion of us, three billion anchored to cities. Ex-president Gorbachev blames 21 recent armed disputes on poor water availability. Half the population of Bangladesh rely on dwindling Himalayan melt water, while a 1m sea level rise would flood 17.5% of the country. Fearing migration, the Indian government is completing a 4500km fence along the entire border. But while developing countries may seem the most vulnerable, a globalized economy means that impact in one place will be felt everywhere, as the US National Academy of Sciences points out.

## And at worst?

**Ecosystems are fragile.** The right plant must bud at the right time to feed the caterpillar which feeds the sparrow... If things change too fast, the whole chain can collapse, and rapid climate change has caused mass-extinction before. If things change too fast, the whole chain can collapse, and rapid climate change has caused mass-extinction before: It was a meteorite crashing near Mexico which caused the massive release of greenhouse gases, and associated global warming, which killed the dinosaurs – and 85% of all land species.

We may now be facing another mass extinction event. We are losing three species an hour already, with

**We are losing  
three species  
an hour**

‘mid-range risk’ that one in three species (and perhaps one in two) will be committed to extinction in forty years. Balancing at the top

of this complex food chain, we are very vulnerable. As long ago as 1998, a survey by the American Museum of Natural History reported that “seven out of ten biologists believe that we are in the midst of a mass extinction of living things, and that this loss of species will pose a major threat to human existence in the next century”. That’s our century. Our existence. Our children’s existence.

CAN  
ANYTHING  
BE  
DONE?

## It is too late to prevent significant and hazardous warming

The CO<sub>2</sub> already released will stay in the atmosphere for hundreds of years, and we are adding to it daily. But we can limit how bad things get. As the National Academies of Science state: “Business as usual is no longer a viable option. We urge everyone – individuals, businesses, and governments – to take prompt action to reduce emissions of greenhouse gases. The balance of the scientific evidence demands effective steps now to avert damaging changes to Earth’s climate.” Nicholas Stern’s 2006 report similarly stated that “The scientific evidence is now overwhelming: climate change presents very serious global risks, and it demands an urgent global response.”

**Of course, there are plenty of reasons put forward for not doing anything:**

- **“I do care, but I need to fly /drive a lot.”**  
Sadly, the climate can’t tell the difference between ‘well intentioned’ CO<sub>2</sub> release and CO<sub>2</sub> from someone who doesn’t care.

- **“Even if I cut down, others won’t”.**  
Each person can educate and encourage others. While they do, the effects of individual actions soon add up. And modest changes in spending and voting change the behaviours of companies and governments, which makes a much greater difference.
- **“Whatever we do makes no difference, because of China”.** China has certainly become a major CO<sub>2</sub> emitter, partly because it is now undertaking much of the manufacturing for the West. China’s CO<sub>2</sub> emissions are thus linked to what we, as individuals, are choosing to buy- and this we can change.

The American Association for the Advancement of Science states, **“The time is now. We must rise to the challenge. We owe this to future generations.”**

**Most people, on reflection, don’t want to have to tell their children and grandchildren that they knew, but did nothing**

# WHAT ACTIONS WILL HELP?

## After 2020 or so, temperatures are set to rise dramatically

How fast they go up, and how high, depends a lot on what we do in the next five years or so: the bulk of the climate impact of CO<sub>2</sub> emissions are felt years. So action should be rapidly taken.

### GOOD GENERAL RULES:

**Everything you buy or do, try to see the CO<sub>2</sub>.** *This helps you make the right choices:*

- **See the CO<sub>2</sub> cost** from mining the ore, manufacture, transport, packaging... and choose the **low CO<sub>2</sub> option** (wine from France, not Australia; train rather than car) or the **no CO<sub>2</sub> option** (if the only apples are from Argentina, don't buy them; don't take the flight at all).
- If it's an appliance, choose the smallest one, and the one with the best energy rating (A\*\* is best). If all UK households had only the most efficient appliances, this would power all the UK 's offices.

**Keep good company.** Take your custom to the companies that seem to be making a serious effort.

**Reduce.** We can do a lot by being more efficient. But world population rose steeply only recently: 99% of all the humans who have ever lived are alive today. We all need to try to use less and buy less.

**Reuse whatever you can.** Choose reusable rather than disposable (cups, razors). Bring a bag instead of taking a carrier bag.

**Recycle.** Making products with recycled materials uses a third less energy for glass, half for paper, and a more than two thirds for aluminum: recycling one tonne of aluminum saves 15 tonnes of CO<sub>2</sub>. For every half-bin of rubbish you recycle, you save about 500kg CO<sub>2</sub>/ year.

## ✓ Things to do today

These things will take you less than an hour in total, and will make a big difference.

- 1 Move your electricity account.** Your electricity can come with no CO<sub>2</sub> cost at all, if it's made only from wind, sun and tide power. Moving is simple, and can be done online at [www.good-energy.co.uk/switch1](http://www.good-energy.co.uk/switch1) or [www.ecotricity.co.uk/switch3](http://www.ecotricity.co.uk/switch3). Or contact Good Energy (tel 0845 456 1640; Monkton Reach, Monkton Hill, Chippenham SN15 1EE) or Ecotricity (tel 01453 756 111; Axiom House, Station Road, Stroud GL5 3AP). This will save 1.5 tonnes / CO<sub>2</sub> a year.
- 2 Move your bank account.** Most banks lend your money to companies that make Climate Change worse. The Co-operative Bank tries not to. Call 08000 284 284, or go to [www.co-operativebank.co.uk](http://www.co-operativebank.co.uk).
- 3 Go to the kitchen and turn the fridge thermostat down** (it's usually inside). Every unnecessary degree releases up to 10kg (5520 litres) CO<sub>2</sub> a year.
- 4 Go to the washing machine, and set it to 30°C.** You'll save over 36-200 Kg (up to 111,000 litres) CO<sub>2</sub> a year.
- 5 Go to the water heater/boiler and turn the thermostat down.** Each degree saves 35-50kg CO<sub>2</sub>.
- 6 Go to the central heating thermostat, and do the same,** saving up to 300 kg (167,000 litres) of CO<sub>2</sub> a year.
- 7 Go around the house and turn off everything on 'standby',** to save 86,000 litres CO<sub>2</sub> a year.
- 8 Take five minutes to decide whether you can save for the big things:**
  - *Cavity wall* insulation would save 1 tonne (556, 200 litres) of CO<sub>2</sub> a year.
  - *Internal insulation* if you haven't got cavity walls.
  - *Double-glazing* can save 2-10 tonnes (up to 5 million litres) of CO<sub>2</sub> a year.
  - Fitting *solar water heating*, or *solar roof panels* for electricity. See [www.nef.org.uk/greenenergy/solar.htm](http://www.nef.org.uk/greenenergy/solar.htm).

## ✓ Things to do this weekend

These things take a trip to the shops, and perhaps a little help (ask a friend, perhaps, or book a handyman/woman). Whatever, plan the date **NOW** and write it in your diary, or it won't happen!

### 1 Change your light bulbs.

**Replace your light bulbs** with a compact fluorescent ones. They also save money by lasting up to 12 times longer and using 80% less energy. Each will save 125 kg (69,500 litres) CO<sub>2</sub>.

**Use fewer bulbs.** A 100 watt bulb gives the same light as six 25 watt ones.

**Buy a halogen bulb or (better) an 'LED'** for areas where you feel you have to have a very bright light. They use half the energy of ordinary bulbs. Try [www.low-energy-lighting.com](http://www.low-energy-lighting.com) or most supermarkets, electrical outlets, or DIY stores.

### 2 Top up attic insulation.

You need 10.5 inches (270mm) or more. B&Q are offering half-price loft insulation. Add extra

insulation to your hot water tank and pipes at the same time. This will save 100-500kg (up to 278,000 litres) CO<sub>2</sub> a year.

### 3 Buy a low-flow or 'aerating' shower head, and fit it.

This can save up to 450kg (250,000 litres) CO<sub>2</sub> a year.

### 4 Arrange for someone to fit individual thermostats to each radiator.

### 5 Educate and empower others.

Talk to them, pass some copies of this book, get them a copy of Al Gore's 'An Inconvenient Truth' on DVD, or choose something from the reading list at the end.

### 6 Calculate your carbon footprint at [www.btplc.com/ClimateChange/CarbonCalculator/index.cfm](http://www.btplc.com/ClimateChange/CarbonCalculator/index.cfm) using the bills up to date.

Make changes, and repeat your footprint calculation every three months. You need to reduce your total footprint by at least 20% this year, and then keep bringing it down. The world may only be able to sustain a CO<sub>2</sub> production of only 1.1 tonnes per person.

## ✓ Things to do at home every day

- 1 Only boil what you need:** fill the kettle from the cup, to save 22kg of CO<sub>2</sub> a year.
- 2 In the kitchen:**
  - **Cook cleverly.** For big meals, use the stove – twice as efficient as the microwave, and four times as efficient as the main oven. For small meals, use microwaves and slow cookers (80% less energy than the stove). Boil water with the kettle not the stove, and add to the pan (half the energy). Turn off near the end: let the hot pan finish off for you. Keep pan lids on.
  - **Compost.** This reduces methane release from landfills (equivalent to 1.5 tonnes, or 834,000 litres of CO<sub>2</sub> per tonne of waste).
  - **Use the dishwasher well.** Fill it to the brim. Use the ‘energy saving’ setting (if it has one) or turn it off at the end of the rinse cycle and open to let the dishes air-dry. This saves 100kg (55, 620 litres) CO<sub>2</sub> a year.

- 3 Don't use 'standby' on your electrical or electronic appliances:** another 155kg (86,211 litres) CO<sub>2</sub> a year saved.
- 4 Switch off lights when you leave a room.** It's a myth that this wastes energy. An ordinary bulb only has to be off for three seconds to meet the cost of switching it back on. For fluorescent bulbs, its five minutes.
- 5 Close the curtains when it's dark, or in rooms you're not using.** This can be as efficient as some window replacements.
- 6 Shop shrewdly.**
  - Choose the shops that are ‘trying hardest’
  - Shop locally (saves costs of transport)
  - Buy produce made as close to home as possible
- 7 Use computers sensibly.** Use a laptop when you can: it uses 90% less energy than a desktop. Turn it off when not using it (this won't shorten its life). Remember to switch the screen and printer off too. If buying a new printer, get a ‘double side printer’: all in all, this is ten times more energy efficient.
- 8 Take a short shower (low-water head, above) instead of a bath.**

## ✓ Travel Changes

- 1 **Only take the trip that you have to take, and make it short.**
- 2 **Go on foot or by bicycle wherever possible.**
- 3 **If that isn't possible, use mass-transport.** Every litre of petrol generates 1390 litres (2.5 kg) of CO<sub>2</sub>. An average driver produces more than 100 litres of CO<sub>2</sub> per km, and can be responsible for four tonnes (over 2 million litres) of CO<sub>2</sub> a year. A single driver produces 8 times as much CO<sub>2</sub> per person as someone on public transport.
- 4 **If you have to go by car, try to car-share.**
- 5 **If you must drive, drive better.** Most drivers can reduce energy consumption by 10-20%:
  - **Slower:** Fuel consumption at 70 mph (110 km/h) is 20% higher than at 55 mph (90 km/h). At speeds above 62 mph (100 km/hour), fuel costs rise 1% per km/hr (1.6% per mph) speed increase.
  - **Steadier** (no 'racing the lights'; go at a steady speed over and between speed bumps).
- **No idling.** If you're going to wait more than 60 seconds, switch off the engine.
- **Check the tyre pressure** every time you fill up. Keeping it right saves 5% on fuel.
- **Keep the engine tuned well** (15% saving).
- **Remove roof-racks.**
- **Empty out unnecessary weight.**
- **Try not to use air-conditioning** – it increases fuel consumption by 10%.
- 6 **Change what you drive.** Do you really need a car? If you do, consider the lowest-emission one. A Land Rover V6 automatic Freelander releases nearly half a kg (479g) or 265 litres CO<sub>2</sub> per mile – that's 170 litres of CO<sub>2</sub> per mile **more** than the petrol/electric Honda Civic (175g, or 96 litres per mile). If everyone swapped to most efficient car in its class, this would save one third of car CO<sub>2</sub> emissions.
- 7 **Minimise your flying.** A 'plane releases nearly 750 litres (1.3kg) of CO<sub>2</sub> per passenger per mile – and for very long distances. Eurostar trains to the continent release ten times less CO<sub>2</sub> per passenger than a flight.

# FINALLY

## Educate other people

Help them change.

## Vote

With your money:

Buy the right goods from the right companies.

At elections:

Make the 'CO<sub>2</sub> agenda' of your candidate a prime concern.

## Pressure for

**NO NEW COAL POWER STATIONS  
WITHOUT CARBON CAPTURE AND STORAGE.**

Embarking on a new wave of these power stations will inevitably take us past the point of no return.

*Stay in touch*  
with the issues at  
[www.projectgenie.org.uk](http://www.projectgenie.org.uk)

## Things to read

### Some sources

[www.ipcc.ch](http://www.ipcc.ch)

*The Intergovernmental Panel on Climate Change. It's 2007 report can be found here, as can its 'summary for policymakers. See the graphs and presentations, especially.*

[www.aaas.org/news/releases/2007/0218am\\_statement.shtml](http://www.aaas.org/news/releases/2007/0218am_statement.shtml)

*American Association for the Advancement of Science's statement, 2006.*

[www.royalsoc.ac.uk/displaypagedoc.asp?id=20742](http://www.royalsoc.ac.uk/displaypagedoc.asp?id=20742)

*The Joint Science Academies' Statement: The response to climate change.*

[www.well.com/~davidu/amnh.html](http://www.well.com/~davidu/amnh.html)

*Press release relating to the American Museum of Natural History survey.*

[www.monbiot.com/archives/2007/03/13/channel-4s-problem-with-science](http://www.monbiot.com/archives/2007/03/13/channel-4s-problem-with-science)

*A good précis of why Channel Four's 'The Great Global Warming Swindle' was wrong.*

[www.ametsoc.org/POLICY/2007climatechange.html](http://www.ametsoc.org/POLICY/2007climatechange.html)

*American Meteorological Society statement.*

[www.agu.org/sci\\_soc/policy/climate\\_change\\_position.html](http://www.agu.org/sci_soc/policy/climate_change_position.html)

*American Geophysical Union statement.*

**The Economics of Climate Change:**

*The Stern Review, by Nicholas Stern.*

**National Academy of Sciences Committee on the Science of Climate Change, *Climate Change Science: An Analysis of Some Key Questions*** (National Academy Press, Washington, DC, 2001).

## Books

**The Weather Makers; The History and Future Impacts of Climate Change**, by Tim Flannery.

*Magnificent and far-reaching, detailed text. Beautifully written.*

**Carbon War**, by Jeremy Legget.

*Compulsory reading if you want to understand why there seemed to be debate.*

**Six Degrees: Our future on a hotter planet**, by Mark Lynas.

*A very readable summary of the implications of Climate Change.*

**Heat: How We Can Stop the Planet Burning**, by George Monbiot.

**Global Warming: A Very Short Introduction**, by Mark Maslin.

## DVDs

**An Inconvenient Truth**, presented by Al Gore.

*A very simple and engaging presentation. Worth seeing, then passing on.*

## Useful Websites

**[www.giss.nasa.gov](http://www.giss.nasa.gov)**

*Great for the latest science from the NASA Goddard Space Centre.*

**[www.nef.org.uk](http://www.nef.org.uk)** *For sustainable energy solutions.*

**[www.energysavingtrust.org.uk](http://www.energysavingtrust.org.uk)**

*Energy Saving Trust: great for all aspects of saving energy.*

**[www.nef.org.uk/energyadvice/co2calculator.htm](http://www.nef.org.uk/energyadvice/co2calculator.htm)**

*Calculate your carbon footprint.*

**[www.projectgenie.org.uk](http://www.projectgenie.org.uk)**

*Simple and useful, good for children and families.*