

# Climate change

## in Context

(Nearly) all you need to know



social  
environmental

context

# Context in Context

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Penguin movie: Flip the pages to see what happens to the penguins as the climate changes.



## Climate change in Context

Thanks to **Al Gore**, clearer science and (mostly) a hurricane called Katrina, the sun is finally shining on **climate change**.

Environmentalists and some politicians have been calling for action for decades, supported by climate scientists with their terrifying projections. But very few people in business have really taken the issue seriously – other than those with a vested interest in **fossil fuels** who have effectively undermined the scientific message and lobbied hard to prevent any restrictions on their business.

But now it is all change for climate change as business gears up to deal with the threat: not only from the climate but a worried public that wants action. Businesses increasingly see tackling climate change as a key part of their corporate responsibility.

If you, like so many, have not been engaged in the debate but now need to focus on more than just the **weather**, our pocket guide is for you. It avoids the jargon to explain what the fuss is about. Then it interprets the jargon to ensure you will never again be fazed by the phraseology. (The words in **blue** are in the glossary).

# What is climate change?



The old saying about selling **ice** to Eskimos isn't so funny any more. Inuit people have been buying air conditioners to get through the summer. Not surprising, when the temperature at a place like Kuujuaq, on the northern edge of Quebec, hit 31°C (88°F) in July 2006.

It has been getting hotter everywhere for a while now. All of the 10 highest average global temperatures since reliable records began in 1880 have come since the 1980s<sup>1</sup>. The 1990s were the warmest decade of the millennium. The temperature rose more in the 20th century than at any other time in the millennium<sup>2</sup> (acknowledging that records before 1880 are less reliable).

There have been other **climate changes**, especially in rainfall – more heavy rain, causing floods. But at the same time we have also seen more droughts in other areas. These effects are not necessarily continents apart. For example, the UK has been experiencing flooding in some regions and drought in others.

Higher temperatures mean less ice and more water. Greenland's **ice sheet** lost 224 cubic kilometres in 2005<sup>3</sup>. There is still a lot to go – more than 2.8 million cubic kilometres – but the rate at which it is disappearing seems to be speeding up<sup>4</sup>. Glaciers have also been melting, in countries as diverse as Canada, China and Peru. Melting ice means more water in the oceans, but the main reason sea levels have been rising (by 1 to 2mm a year during the 20th century) is that water expands as it warms.

The **weather** forecast is for more of the same. Average temperatures are expected to continue rising, perhaps by 6°C during this century.

The reason is that there is a lot more **carbon dioxide** (CO<sub>2</sub>), methane and other '**greenhouse gases**' in the atmosphere than at any time since prehistory. Much of the CO<sub>2</sub> has come from burning coal, oil and gas, while destruction of **forests** has made matters worse. Expansion of agriculture has also pushed more methane into the atmosphere, especially from farting and belching livestock.

Even if we manage to reduce **emissions** quickly, warming (and its consequences) will continue for many years because the carbon dioxide in the atmosphere is not going to go away in a hurry.

The effects are also unpredictable because we still have limited understanding of complex climate interactions – ocean temperatures affect currents, which influence air flows, which determine rainfall, and so on. The effects are unlikely to be uniform: some areas will be hotter and drier, others will be cooler and wetter; there may be more rain in winter and less in summer – or vice versa.

That variety and unpredictability are reasons enough to worry. But there's more...

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1 Union of Concerned Scientists. [www.ucsusa.org](http://www.ucsusa.org)  
2 PCC Synthesis report 2001  
3 *Science* 17 Feb 2006  
4 *New Scientist*, 10 Aug 06

# Why should we be worried?

More sun and less rain is quite an appealing prospect for those of us living in the damp north. But a better tan is not all we have to look forward to if the world keeps warming.

Nobody needs to be quite as worried as the 360,000 or so inhabitants of the Maldives. Most of these 'paradise islands' are no more than a metre above sea level. With seas rising, the next generation will have to find somewhere else to live.

Many other low-lying islands are similarly threatened by rising sea levels. The 1,000 inhabitants of the Carteret islands in Papua New Guinea have become the first climate change refugees. They are being evacuated in the face of increasingly untenable conditions.

You don't have to live on an ocean island to worry about **climate change** – or even in a low-lying country such as Bangladesh. Rising sea levels will affect all coastal areas. But floods and storms can destroy property and infrastructure anywhere from New Orleans to Newcastle.

People are also likely to face new health threats. Hotter summers have already been responsible for thousands of deaths in Europe (although warmer winters will mean fewer deaths from hypothermia). The changing climate brings



diseases to new regions as insects such as mosquitoes spread from their traditional habitats. Fresh drinking water is the biggest worry. Changes in rainfall and river flows are likely to result in drought and water shortages in areas of Asia and Africa which have previously had plentiful supplies.

Plant and animal habitats are also in danger, from the poles to the equator. Polar bears face the loss of their Arctic home, while coral reefs – home to a quarter of all marine life – are particularly vulnerable even to small changes in water temperature and sea levels. Elsewhere, many plants and animals can cope with only small variations in climate conditions. Habitats can become too hot, too cold, too wet or too dry. Gorillas in Africa, the Bengal tiger and the resplendent quetzal of Central America are among threatened species.

**Climate change** has fundamental and direct implications for our food. Agriculture depends on the right amount of sun and rain. More or less of either can make a big difference. We might be able to grow grapes in much of England, but many crop yields could drop disastrously – in Europe and elsewhere. For example, Ugandan coffee could become a rarity, as 90% of the growing area could become unsuitable. Very bad news if you are a Ugandan coffee farmer.



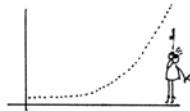
# What is the science?



The Earth is a greenhouse. Our atmosphere traps some of the heat emitted from the surface in the same way that greenhouses trap heat. This is rather a good thing, as a glance at Mars testifies. Without the much-maligned ‘**greenhouse effect**’, life here would not be much pleasanter than on Mars. The average Earth temperature would be about  $-20^{\circ}\text{C}$ . A bit chilly.

The trouble is that more and more heat is being trapped because the composition of the atmosphere has been changing. The main **greenhouse gases** in the air are **carbon dioxide** and water vapour. They make up very little of the total, most of which is nitrogen and oxygen. But the level of  $\text{CO}_2$  has been rising since we began burning coal on a huge scale when industrialisation began. Methane from agriculture and waste is also an important contributor to climate change, but  $\text{CO}_2$  is the main culprit. (Methane and other gases such as **CFCs** are much more potent but there is less of them.)

Concentration levels are measured as parts per million (ppm). Before the industrial revolution the concentration of  $\text{CO}_2$  was about 280ppm (we know this by examining **ice cores** drilled from Antarctica and Greenland). In 2005 it was almost 380ppm<sup>5</sup> but we are adding about 23 bn tonnes a year (about 1% of the total  $\text{CO}_2$  in the atmosphere)<sup>6</sup>. At this rate we will see 500ppm by 2050 and maybe 1,000ppm by 2100.



There is now a broad scientific consensus that average temperatures have risen because there are more greenhouse gases, and that at least some of this is **anthropogenic** – caused by human activity, especially burning oil, gas and coal for transport and energy, and felling much of the world’s **forests**.

But the relationship is complex, to say the least. For example, glaciers and snow reflect some of the sun’s heat. As the ice melts and snows recede, less heat will be reflected. This could accelerate warming. Similarly, warmer air holds more moisture, so warming will result in higher levels of water vapour, which could also add to the warming effect. On the other hand, burning **fossil fuels** produces sulphur dioxide, which results in microscopic particles in the atmosphere. They reflect sunlight, and help to form clouds, both of which could offset at least some **global warming**. The impact of warming on cloudiness is particularly problematic, but cloud cover will have an important influence on the pace of **climate change**.

The uncertainties are greatest at regional level. It’s a bit like the regular **weather** forecast. Meteorologists can be pretty confident about the movement of a front stretching from the west of England to the north of France, but that doesn’t mean they can tell you what

<sup>5</sup> US National Oceanic and Atmospheric Administration

<sup>6</sup> UNEP climate change information sheet



the weather will be in Paris at 11 o'clock on Tuesday. Similarly, even if we could predict with confidence what will happen to average world temperatures, there is much less confidence even at the level of a continent.

That is partly because oceans are incredibly important in determining weather patterns, and ocean currents are very difficult to predict. This is especially true for Europe, where the Gulf Stream brings warm water from the tropics and gives those of us near the Atlantic a pleasant temperate climate (however much we complain about the clouds and rain). Some **climate models** suggest dramatic changes to the Gulf Stream, which would leave Europe colder even as the Earth heats up.

The speed of change is also problematic, largely because of 'positive feedback' which could accelerate warming. For example, rising sea levels could accelerate the rate at which the **ice sheets** melt. That would speed up climate change.

What is certain is that stopping the rise in greenhouse concentrations will be more difficult than turning the proverbial oil tanker. CO<sub>2</sub> remains in the atmosphere for many years, so that even dramatic reductions in emissions over the next decade would not stop concentrations rising for some time.

All these factors have been considered in great detail by thousands of scientists working under the auspices of the Intergovernmental Panel

on Climate Change (**IPCC**), which was set up by the United Nations in 1988. The IPCC published its third major assessment in 2001. Each has been more confident than its predecessor, and has predicted more significant changes – a trend which is expected to be maintained by the fourth assessment, due in 2007.

The Third Assessment concluded:

- Average temperatures in 2100 will be between 1.4°C and 5.8°C higher than in 1990
- Sea levels in 2100 will be between 9cm and 88cm higher than in 1990
- Warming will not be uniform, with the greatest impact in cold northern regions (such as northern Canada) in winter
- Inland regions will warm faster than coastal areas
- There will be more rain in northern latitudes and Antarctica, but less in Australia, Central America and southern Africa
- Extreme **weather** events are likely to be more frequent and more intense.

But some people don't agree....



# The controversy



Most of the scientific arguments about the existence of **climate change** have ended. But there is still debate about how much is due to human activity, and about what happens next. Much of the heat in this debate is caused by large doses of self-interest. Many business sectors and some countries have much to lose in the short term if we radically change the way we live and use energy.

Australia, for example, has been fiercely opposed to the **Kyoto Protocol** – despite accepting the need for action, and actually pursuing the targets the Protocol specifies. Australia's position is partly influenced by its huge coal reserves (big export earner).

There has been room for doubt about the fundamentals of climate change because the science is so complex and, like all science on the boundaries, uncertain. Many forecasts, especially as far as 2100, inevitably carry large margins of error. This has provided plenty of opportunity for both the genuine and disingenuous **sceptics** to spread doubt and even greater uncertainty.

The notion that burning **fossil fuels** could cause climate change was first proposed (by a Swedish scientist) at the end of the 19th century. Doubters were sustained for decades by several basic factors which were not in dispute:

- Warming and cooling have happened throughout the Earth's history, as we know from the evidence of the ice ages
- Heat received from the sun varies due to changes in the Earth's orbit and to sunspots
- The oceans act as huge 'sinks' – they still absorb at least a third of the CO<sub>2</sub> we produce.

Scepticism looked sensible in the 1970s as global temperatures seemed to be falling rapidly rather than rising. (This is thought to be because of the sunspot cycle.) But as the graph began to shoot up in the 1980s, the idea of **global warming** became more believable. More and more scientific evidence also emerged from ice and ocean studies, and better measures of global temperatures.

The work of the **IPCC** since 1988 has gradually hardened this scientific evidence so that it is now clear there is a consensus on the basic message that the Earth is warming and the prime cause is human activity.

The consensus is supported by the national science academies of the leading industrial and emerging economies (including the US). Consensus is not the same as unanimity,

although this does not always appear to be understood by climate change critics, who also cling to the uncertainty inevitable in science.

These are the main arguments of the remaining **sceptics**:

- It is impossible to distinguish with sufficient confidence between human impacts and natural temperature variations
- Climate systems are so complex that it is impossible to predict long-term trends with reasonable accuracy
- Warming will bring benefits for some regions, especially as higher CO<sub>2</sub> levels will accelerate plant growth
- Attempting to curb **emissions** is an expensive mistake. Instead we should be adapting to the new, warmer world.

Naturally, the **IPCC** predictions for continued warming are the most contentious. They depend not only on climate science but on assumptions about human activity around the globe, especially population growth and economic development.

It is also natural that some scepticism is fuelled by self-interest, especially from the energy industries. The US



**fossil fuel** industry has been particularly active in funding opposition groups, and successful in sustaining President Bush's stance that technology is the answer. US groups such as the Cato Institute and the American Enterprise Institute, and the International Policy Network in London, champion a free-market view which sees little role for government. But they have also sought to dismiss climate change science as bogus and flawed.

As the scientific consensus has grown, it has become increasingly difficult to sustain such positions, but there is still plenty of argument about what should be done.



# What is to be done?



**Adapters** (see Climateers) think we should move to higher ground and learn to adapt to the new climate. But that is a minority view. The majority want to slow down **climate change**, while adapting where necessary – most of the world's governments are officially committed to that.

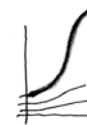
That's why they (except the US) signed the **Kyoto Protocol**. This has legal requirements for countries that would collectively achieve a 5.2% reduction in GHG emissions (as an average between 2008 and 2012, compared with 1990). The scientific consensus is that stabilisation requires a 60% reduction in emissions by 2050 – but Kyoto is a start.

The trick is to achieve these cuts while increasing prosperity. There are several ways:

- Use less energy by using it more efficiently and by changing behaviour – such as shifting to public transport (reduce energy intensity)
- Switch from **fossil fuels** to renewable sources such as wind and sun or **biofuels** (reduce **carbon intensity**)

- Stop destroying **forests** and reverse **deforestation**
- Prevent **emissions** from reaching the atmosphere – eg by capturing and storing **carbon (sequestration)**
- Offset emissions in one place by investing in projects such as **methane capture** elsewhere.

Governments are using various tools to achieve these objectives, including taxation and regulation, and emission trading. They are finding it hard. Adapters might get their way, after all.



carbon emissions

# Climateers – where do you fit in?

People engaged in climate change – we call them Climateers – come in different ideological shades. Where do you fit in?

## Adapters

We should make plans to adapt to climate change, from planting olives in Canada to finding homes and work for millions of environmental refugees from Bangladesh and the Netherlands.

## Armstrongs

'One small step for man...' – everyone has a part to play in the fight against climate change. Small adjustments, done on a large scale, can make a big difference. Their motto: 'Every little helps'.

## Believers

Believe (fervently) that climate change is our fault, and will have

serious consequences for our children. We must act now to slow, stop and eventually reverse its effects.

## Calculators

Led by the Danish green sceptic, **Bjørn Lomborg**, eco is for economics. They say fighting climate change is poor value for money compared with tackling global crises such as HIV/Aids. Their case rests on heroic assumptions about costs and benefits, timescales and trends.

## Climate sceptics

Not in denial, but they want proof before doing anything about climate change. They often feed on alarmism as it allows them to label all environmentalists as eco warriors, tree huggers etc.



## Denialists

Like novelist Michael Crichton, they believe that global warming is the result of normal, natural changes. They categorically deny that climate change is caused by human activity. They say the evidence is false or inconclusive. Carbon is good for us. Scientific concern is an elaborate leftie hoax. A dying breed.

## Free marketers

Believe that market forces solve all problems, including climate change. They argue that free economies will be more adaptive to climate change than those shackled with regulation.

## Greenukes

Championed by **James Lovelock**, they see nuclear energy as the only solution to cutting greenhouse gas emissions. They say it's clean, safe, low-carbon, and who cares about terrorists?

## HighGrounders

Investors who are investing in attractive properties on high ground.



## Politico-pessimists

They don't believe politicians will be brave enough to take the necessary action. This is their justification to support **adaptation**.

## Saints

They sanctimoniously let everyone know that they are doing their bit in the fight against climate change – cycling to work, offsetting their carbon, turning out lights, staying home for holidays. Saintry.

## TechnoFixers

Believe in the power of technology to slow the human impact on climate change, especially cleaner fuels and more efficient vehicles. Often allied and overlapping with **politico-pessimists** and **free marketers**.

# Carbon leaders



## BT looks beyond carbon neutrality

BT, the UK-based multinational providing telecommunications and networked services, has made great strides in reducing its own **carbon footprint**. It is also helping customers to cut theirs through services such as teleconferencing which reduce the need for travel.

The company has reduced its own emissions by 60% over the past decade – exceeding its target of 25% from 1996 levels by 2010. This is equivalent to an annual saving of almost one million tonnes of **carbon dioxide**.

BT became the world's largest purchaser of green electricity when it committed in 2004/05 to purchase nearly all its electricity in the UK from sources that produce low and no-**carbon emissions**. These include renewables and combined heat and power. Small-scale wind turbines and solar panels are being trialled at two sites and on-site **renewable energy** initiatives will be extended if successful.

## Deutsche Post parcels GoGreen

The logistics group which incorporates DHL and Postbank has launched a range of **carbon-neutral** and low-carbon shipping services. Customers using the 'GoGreen' services pay a premium to reduce or offset emissions from shipping their parcels.

Transport emissions are dramatically reduced using vehicles that produce low or no emissions. They run on biogas, bio-diesel or **fuel cells**. Remaining emissions from shipping the parcel are offset through a range of independently verified programmes.

Deutsche Post supports offset programmes such as a biogas project in Germany, **reforestation** in the Amazon and small-scale solar energy projects in India and Sri Lanka.

In Sweden, around 70% of DHL customers pay extra for a low-carbon bonus. For every 'green ton' purchased from the GoGreen Tonnage service in Sweden, DHL will transport an equivalent amount using low-emission biogas, bio-diesel or electric hybrid vehicles somewhere in its network.



## HSBC goes carbon neutral

HSBC became the world's first major bank to become **carbon neutral** in September 2005.

The bank uses energy to heat, cool and light its offices around the world, to power computers and in staff travel. It set a target in 2004 to achieve zero net carbon emissions by 2006.

It is reducing **emissions** by improving **energy efficiency** and moving to renewable electricity where possible. For example, the global headquarters in London now uses energy-efficient lighting and air conditioning, and escalators that stop when not in use.

The bank buys '**carbon credits**' to offset its remaining emissions. This provides funds for projects such as wind power and capturing methane. HSBC contributed a total of US\$750,000 to offset 170,000 tonnes of **carbon dioxide** at the end of 2005.

The bank has also begun working with customers in the energy and industrial sectors to help them reduce emissions.



## Interface stays cool

The US carpet manufacturer, Interface, has halved its total **carbon dioxide** emissions within a decade through a series of 'cool' initiatives.

Interface recognises that emissions from its manufacturing business represent only a small share of the total released throughout the lifecycle of the product. But its Cool Carpet offers a **carbon neutral** option.

Customers can choose to offset all emissions, from the extraction of raw materials to manufacture, transport and use of their carpet. Interface achieves this through tree planting and **renewable energy** projects in Canada, New Zealand and the US.

Four Interface manufacturing sites are powered entirely by renewable energy, with renewables accounting for 13% of the company's global energy use.

Cool Fuel and Cool Co2mute programmes also mean that employees can offset emissions from using company cars and commuting to work. All business air travel has been offset since 1997.





## Lafarge sets ambitious targets

Cement production is one of the most energy-intensive processes in the world. It accounts for nearly 5% of global **emissions** from human activities.

One of the world's biggest cement makers, Lafarge, has set an ambitious target to cut its emissions per tonne of cement produced by 20% from the 1990 level by 2010. The company is exploring more **energy-efficient** production processes and alternative raw materials as well as replacing **fossil fuels** with **renewable energy**.

Lafarge supports projects to reduce emissions in developing countries through the UN's Clean Development Mechanism programme. A **wind farm** provides half the energy used by Lafarge's cement plant in northern Morocco, saving 30,000 tonnes of CO<sub>2</sub> a year. Waste from palm oil production is replacing fossil fuels at two plants in Malaysia.

## ST aims for carbon neutrality

The European chipmaker has set an ambitious target to offset all its emissions – both direct and indirect – by 2010. It remains the only company in the semi-conductor sector aiming for carbon neutrality.

ST is reducing its total energy use and replacing traditional fuels with combined heat and power generators or **renewable energy**. Reducing emissions from perfluorinated compounds (PFCs) is a priority because these chemicals – used in the production of silicon wafers – are potent greenhouse gases.

The company offsets remaining emissions through **reforestation** in Australia, Italy, Morocco and the US. It also trades on the Chicago Climate Exchange, a voluntary greenhouse gas trading programme.

ST recognises that energy-efficiency is important in product design. ST designers aim to reduce the energy used by their chips, as well as devising chips that will help manage the energy used by the products that contain the chips.



### Texas Instruments goes green cheaply

Texas Instruments issued a challenge in 2003: to construct a building with significantly lower environmental impacts and running costs than existing facilities – at 70% of the construction cost.

The result is a semiconductor facility in northern Texas which has cut energy use by 20% and water use by 35%.

Shaded overhangs, insulated windows and reflective materials protect the building from the hot summer sun, reducing the need for energy-hungry air conditioning. The structure of the building is designed to bounce natural daylight deep into the interior, which means there is less need for artificial lighting.

Gas consumption by the boilers is only 20% of the norm because heat is recovered from air compressors and chillers, and solar energy heats the water. Sensors in the bathrooms avoid unnecessary lighting and wasted water.

The initial investment in energy saving devices was less than 1% of the US\$300 million construction bill, and total costs per square metre were 30% less than a traditional modern facility.

### Wal-Mart wants the green crown

The world's largest retailer has made a dramatic commitment to cut its climate impact. Wal-Mart has pledged to reduce its greenhouse gas emissions by 20% by 2012 in a bid for the 'greenest supermarket' crown.

The retail giant is using innovative design to improve **energy efficiency** in its network of around 6,000 stores and its vast fleet of trucks worldwide.

It has been testing environmental design features at several stores in the US for over a decade and has now built two experimental 'green' stores. The goal is to reduce energy use and **emissions** by 30% compared with a typical store in 2005.

New trucks will use aerodynamics to improve fuel economy, and more hybrid-powered vehicles will be added to the fleet. These changes will dramatically reduce emissions and save almost \$500 million a year by 2020.

# How to report on climate change



Of course companies could say nothing on climate change, but that won't cut with many shareholders, customers, employees and other people you must please. They want to know what you think about climate change, what you aim to do about it, and what progress you are making. Those are your report headings.

## What you think – policy

Do you accept the scientific consensus that action is needed now to limit the build-up of GHGs? Do you side with the **sceptics**? How significant are the risks and opportunities for your company? This is an opportunity to state policy positions, make clear where you stand and how you think **climate change** will affect the company. And whether you are lobbying for or against action.

## What you want to do about it – strategy, objectives, targets, responsibilities

Climate change may be a threat (if you operate hotels in the Maldives) or a promise (if you make wind turbines). Or it could be both (if you are lending or investing). Either way, people want to know what you are going to do about it. Where do you want to be in five years? How are you going to make sure you get there, adapting and investing to minimise risks, maximise opportunities, and reduce **emissions**? Are

you (or will you) be involved in emissions trading and **carbon offsets**?

Don't forget targets and milestones, and governance aspects – who is ultimately responsible, how is strategy implemented and monitored?

For many companies, the most difficult part of reporting is to tackle the impacts of products or services. For oil and car companies, the main impact on climate change is when customers use their products. The same applies to manufacturers of electrical or electronic equipment, and providers of services such as banks and insurers. Ignoring these aspects can make a nonsense of climate change reporting. It may be difficult to put numbers on these emissions, but it is essential to report strategies and objectives to reduce impacts.

## How well you are doing – performance

This is one area of the corporate responsibility report that should not suffer from an absence of numbers. But nor should it be overwhelmed by them.

First, talk about what has been happening. That will include a commentary on performance (don't fall into the trap of publishing many numbers but not explaining trends). But it can also include specific action, such as investments, product development and new plans. In this sensitive area, commentary should also cover any lobbying activity – for or against government action.

Now, the numbers. The details depend on the nature of the business, but there is some excellent specific guidance on how to calculate the figures and decide what is most relevant – such as the WBCSD/ WRI GHG Protocol. The Protocol requires analysis between direct emissions from the company's activities (scope 1), emissions from energy bought in (scope 2) and **indirect emissions** from the use of products and services (scope 3).

In general, the numbers should show emissions of the main GHGs, in absolute terms and normalised according to a measure of business activity (production, sales etc). But more important than the absolute numbers are comparisons and analyses which will make them more meaningful:

- Historic trends, so people can see whether emission reductions are improving, and how fast
- Comparisons with targets, and ideally with other companies in the same sector
- Analyses of where the emissions came from – power or transport, one section of the business or another, Europe or Asia.

The data will need some detailed explanation of methodology, boundaries and limitations. And to be really credible, the numbers will be independently verified.



## Wanna buy some C?



Long before **Al Gore** made carbon fashionable, revellers at summer rock festivals were being offered C along with their regular range of mind-bending substances. C stood for **carbon offsets**. For a small fee the shady C-dealers would promise to offset the carbon you emitted driving to the festival, by planting some trees.

Times have changed and C dealers are now more respectable.

Offsetting emissions is increasingly popular for organisations that want to do more than just save energy and buy renewables. Buying offsets can make them '**carbon neutral**', ie they have no net emissions because their offset projects save as much CO<sub>2</sub> as their own operations produce. HSBC bank and the satellite broadcaster BSkyB are the first major companies to make this claim (see page 20).

These companies choose offsets voluntarily – unlike the high-energy sectors in the EU, such as steel and cement, that are obliged to trade carbon in the EU Emissions Trading Scheme to meet their legal limits.

### Offset projects

Organisations can invest in offset projects run by intermediaries. The price of offsetting a tonne of CO<sub>2</sub> varies from \$3 to \$45 (see *Carbon Offset in Context* on [www.econtext.co.uk](http://www.econtext.co.uk)). Projects can be situated anywhere in the world (carbon knows no boundaries) and usually combine two or more of these options:

- **Energy efficiency** programmes – reducing emissions, for example by increasing boiler efficiency or reducing the amount of energy wasted (eg using the waste heat). The offset represents the emissions saved through the increased efficiency.
- **Renewable energy** – wind farms, solar power generation or similar initiatives. The offset is the level of emissions from equivalent **fossil fuel** generation (assuming that the renewable energy replaces existing generation).
- **Carbon sequestration** – tree planting or some form of carbon storage which prevents the carbon reaching the atmosphere.
- **Methane capture** – burning methane from landfill or agriculture, which prevents it from reaching the atmosphere. The offset is the difference between the resulting CO<sub>2</sub> emissions and the methane which has been avoided.

Many projects offer additional social or environmental benefits, such as local employment or reduced local pollution.

### Do they work?

Critics complain that offsets are a con – they let companies buy their way out of trouble, claiming credit for action while they continue to guzzle the gas.



Tree planting is particular contentious. The science of using trees to sequester carbon – and the subsequent long-term management of **forests** – is highly controversial. Tree planting has become less popular as an offset route.

Any offset project must demonstrate reliably that the amount of carbon 'saved' is verifiable and permanent. Most importantly, it needs to show that the money paid by the offsetting company does actually create carbon savings in addition to what would have occurred anyway.

These concerns have not prevented rapid growth of offset projects and intermediaries offering the service. A big question remains: if lots more companies wanted to buy offsets, could the world meet the demand?



# A Climate Change glossary

## Aa

### **Adaptation (to climate change):**

Giving up on stopping climate change. Advocated on the grounds that it is cheaper to move people from low-lying areas than to stop the water rising.

### **Additionality:**

Describes action which actually reduces carbon emissions. Important, especially in the context of **carbon offsets**, to distinguish from action that makes no difference because the emission reduction would have happened anyway.

**Aerosol:** A gaseous suspension of fine particles (solid or liquid), in the atmosphere. See **global cooling**.

### **Anthropogenic climate**

**impacts:** Changes due to human activity rather than nature. For example, factory emissions or **deforestation**, rather than a smoking volcano.

### **AOSIS (Alliance of Small Island States):**

What it says on the label – the point being that they are low-lying coastal nations and are therefore in danger of disappearing as ocean levels rise.

## Bb

**BINGOs:** Big International Non-Governmental Organisations (eg Friends of the Earth, WWF, Greenpeace) that may be expected to be active in global policy issues such as the climate

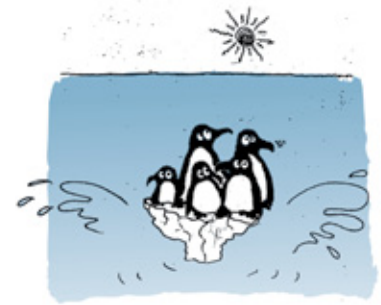
change debate, and are included in bodies such as **UNFCCC**, or

### **Business and Industry**

**Groups:** like the above, they may be expected to be active in global policy issues such as the climate change debate, and are included in bodies such as **UNFCCC**.

**Biofuel:** Fuel from organic matter such as wood, alcohol and vegetable oil. Advocates suggest that if we can produce biofuels sustainably (ie grow them as fast as we burn them), we are not increasing overall levels of CO<sub>2</sub> in the atmosphere and they therefore make a great renewable source of energy. Critics say it needs a lot of farmland, it's a bad use of food products, and farming uses a lot of energy and pesticides.

**Biomass:** Plant material, vegetation, or agricultural waste. Can be used as a fuel or energy source (see **biofuel**) as an alternative to **fossil fuel**. Don't confuse with **farting cows** or there could be all kinds of trouble.



**BRICs:** Now a generic term for newly industrialised countries, derived from its original reference to Brazil, Russia, India and China.

### **Building regulations:**

Potentially a way to reduce energy use in buildings (for heating, cooling, lighting) which typically accounts for around 40% of CO<sub>2</sub> emissions in developed countries. Tend to be resisted by the building industry because they raise costs.

## Cc

**Cap and trade:** An approach to controlling GHG emissions which combines the market with regulation. An overall limit (cap) is set for a specific time period. Individual parties receive permits to produce a set amount of emissions. Those with low

emissions may sell unused permits. Others buy them to help meet their quota.

**Carbon:** One of the building blocks of life, central to all living things and currently an essential part of fuel. When the fuel burns, the carbon combines with oxygen to become **carbon dioxide** or **carbon monoxide**.

#### **Banking and borrowing:**

Mechanisms in a **cap and trade** market. For example, parties which gain emissions credits beyond their quota may save them for later use (banking). But they cannot be lent to other parties for future payback (borrowing).

**Branding:** An example of business-focused **adaptation** to climate change: a company calculates the GHG emissions attached to a specific product, offsets these emissions and can then label the product **carbon neutral**, hopefully achieving competitive advantage over unbranded competitors, as well as environmental benefits.

#### **Carbon:**

##### **Capture and Storage (CCS):**

Plants do this naturally through photosynthesis. The aim is to prevent CO<sub>2</sub> entering the atmosphere by trapping and storing it. We could hide it under the deep ocean, in old oil and gas fields, or as solid carbon.

**Credits:** A new currency, with fluctuating value based on supply and demand as in any market. A carbon credit represents an amount of carbon (or CO<sub>2</sub>) that can be traded.

**Cycle:** The sequence which sees carbon moving between the atmosphere, oceans and land. Human activities such as **deforestation** and the burning of **fossil fuels** contribute to the cycle and can disrupt it if left unchecked.

**Dioxide:** What everyone's talking about: CO<sub>2</sub>, the most famous of the **greenhouse gases**. It occurs naturally at about 0.036% of the Earth's atmosphere and at these levels

#### **Carbon:**

is essential to life on Earth. But since industrialisation, CO<sub>2</sub> levels in the atmosphere have increased dramatically, largely due to burning **fossil fuels** and forest clearance.

**Footprint:** The amount of carbon emissions associated with an activity or organisation. Like the dirty marks left by filthy boots.

**Intensity:** The quantity of CO<sub>2</sub> emissions relative to units of energy used, or units of economic output. Reducing intensity can achieve lower emissions while expanding economic activity.

**Monoxide:** CO, rather than CO<sub>2</sub>. It is not a greenhouse gas, but you wouldn't want it in your greenhouse because it is poisonous. It occurs when carbon is not fully burned, for example in faulty gas appliances and car exhausts.

**Neutral:** It means **offsetting** CO<sub>2</sub> emissions so the net effect is zero. Can be applied



#### **Carbon:**

to a product, part or all of a company.

**Offset:** Buying and 'retiring' (rather than selling on) an emission reduction that has been achieved or will be achieved by a third party. This compensates for emissions. Companies can buy offsets through carbon trading, or investing in a specific project.

**Positive:** Although it sounds somewhat medical, this relatively new term refers to organisations that go beyond carbon neutrality. A carbon positive company would actively drive new carbon markets and develop climate-friendly products or services, effectively achieving negative emissions in a positive way.

**Carbon:**

**Sequestration:** The same as capture and storage, except that sequestration is sometimes only applied to storage on land.

**Sinks:** A natural or manmade reservoir (but not for providing drinking water) capable of absorbing more CO<sub>2</sub> than it releases. An important part of the **carbon cycle**; common examples are soil, trees and oceans.

**Tax:** A tax on carbon emissions based on the carbon content of the fuel. Designed to encourage emission reductions, but business always suspects governments of using it as an excuse to raise extra cash.

**Trading:** A market-based approach which allows traders to buy and sell **carbon credits**. This can help organisations to reach emissions targets in a **cap and trade** scheme, but is also an excuse for complicated trading as in any financial market.

**CDM (Clean Development**

**Mechanism):** One of the mechanisms of the **Kyoto Protocol**, allowing developed countries (or companies within them) to invest in emission-reduction projects in developing countries. [cdm.unfccc.int](http://cdm.unfccc.int)

**CERs (Certified Emissions Reductions):** A specific reduction in greenhouse gas emissions resulting from a **Clean Development Mechanism** (CDM) project, certified and approved under the rules created in the **Kyoto Protocol**.

**CFCs (chlorofluorocarbons):** Man-made gases responsible for **ozone-depletion**, but also greenhouse gases. The 1987 Montreal Protocol has led to CFCs being replaced by HCFCs and **HFCs**, both of which are also powerful greenhouse gases.

**Climate:** The average pattern of **weather** over a period for a particular region, including aspects such as rainfall, temperature and humidity.

**Climate:**

**Change:** Changes in temperature, rainfall and other aspects of climate, with potentially disastrous effects for many people. Partly natural, partly **anthropogenic** – the relationship between the two having been subject to huge debate over the past two decades. What to do about it being the big question. See also **global warming**.

**Council:** A notoriously secretive US-based industry lobby group working on **climate change**. The Council recognises climate change as a serious problem but opposes the Kyoto Protocol and has lobbied against most US government action on climate change.

**Group:** UK-based non-profit organisation, The Climate Group operates internationally in an attempt to advocate business and government leadership on climate change. [www.theclimategroup.org](http://www.theclimategroup.org)

**Climate:**

**Models:** Nothing to do with weather girls, and hopefully more accurate. These are quantitative, computer-based models designed to simulate global climate and **weather** patterns.

**Combined Heat and Power (CHP) or Co-generation:**

Production of two useful forms of energy from the same process or source, usually heat and electricity. Traditional power stations waste the heat.

**Conference of the Parties**

**(COP):** The supreme body of the **UNFCCC**, comprising governments which have ratified the UNFCCC. Its main role is to review the implementation

of the UNFCCC and take appropriate actions.

## Ee

**Emissions:** Gases that are emitted to the atmosphere.

**Absolute:** The weight of emissions, eg in tonnes.

**Boundary:** The notional line between direct and indirect emissions (although this can also apply to defining emissions from different countries, projects or operational installations).

**Direct:** Emissions directly from the facilities, plants and owned transport fleets of a company or organisation. See **indirect emissions**.

**Indirect:** Emissions associated with the activities of a company or organisation, but released from the facilities, plants or transport fleets of a third party. These may arise from the generation of bought electricity or the use of products by customers.

**Normalised:** Linking emissions to a level of activity, such as company turnover. Not to be confused with **absolute** emissions.

**Energy efficiency:** The relationship between the amount used and what you get out of it. Improving efficiency means changing building and process designs or switching technologies, but also behaviour change to stop wasting energy, eg by switching off unused lighting. Efficiency brings economic and environmental benefits.

**ERUs (Emission Reduction Units):** A specific reduction in **greenhouse gas** emissions resulting from a **Joint Implementation** (JI) project, certified and approved under the rules created in the **Kyoto Protocol**.

## Ff

**Farting cows:** Apart from the obvious unpleasantness, this is also a **climate change** issue.

Livestock are **greenhouse gas** machines – they produce large amounts of **methane** through belching and farting. Scientists are divided; some believe it's a real issue, others think it's just hot air.

**Flex mex:** Not the latest in middle-American cuisine, actually short for flexibility mechanisms (also called Kyoto Mechanisms). These include **CDM**, **JI** and emissions trading mechanisms which allow developed countries to meet their reduction targets by investing in projects in poorer countries. Sometimes criticised for allowing richer countries to buy their way out of trouble.

**Forests:** One of the major **carbon sinks**. There are a variety of definitions based on tree height and so on, and one very specific definition under the **Kyoto Protocol**. A few variations on a theme:

**Afforestation:** Planting trees where there haven't been any.



**Forests:**

**Deforestation:** Felling trees where there were some, usually so the land can be used for something else (eg farming, houses, roads, industry...).

**Reforestation:** Planting trees in deforested areas.

**Fossil fuel:** Deposits in the earth made up of hydrocarbons (**hydrogen** and carbon) in the form of coal, oil or natural gas. When burned they produce **carbon dioxide...** you know the rest (see **global warming**).

**Fuel cell:** A kind of battery, starting to be used in some vehicles in a bid to reduce emissions, but still very much in development. Fuel cells produce electricity, heat and water by

combining hydrogen and oxygen – no harmful emissions if the fuel source is **hydrogen**.

## Gg

**Gore, Al:** Former US vice president and long-time environmental campaigner. Now the darling of environmentalists for successfully alerting the US public to the threat of climate change.

### **Global Climate Coalition:**

A US-based industry lobby group financed primarily by the energy industries. It vigorously opposed the **Kyoto Protocol**, arguing for **technofixes** instead. BP famously resigned in 1997, signalling the beginning of the Coalition's demise (in 2002).

**Global cooling:** An average decrease in temperature of the Earth's atmosphere and oceans. Although not happening on a global scale (which is probably good, as this would suggest another ice age is upon us), the **IPCC** concluded that relative cooling does occur near some

industrial areas because of high **aerosol** concentrations.

**Global dimming:** Sounds like dumbing down, but really a reduction in the amount of sunlight reaching the Earth. The cooling effect of global dimming is thought by some to have obscured the effects of **global warming** in recent decades.

There was roughly a 5% reduction in sunlight from the 1960s to 1990s, but this trend seems to have reversed during the 1990s.

**Global warming:** An increase in the temperature of the Earth (near the surface, not inside). It can occur naturally, but the term generally refers to the effect of increased **greenhouse gases**, which the **IPCC** has concluded are causing warming.

**Global Warming Potential:** A measure of how much a unit of greenhouse gas contributes to global warming. Some gases are more 'powerful' than others and therefore have a greater potential to warm.

**Greenhouse effect:** Just like in the garden greenhouse, the Earth's atmosphere traps some radiation, which causes warming. This is a natural process and we wouldn't be here without it. But increasing concentrations of **greenhouse gases** increase this effect, making the world warmer.

### **Greenhouse gases (GHGs):**

The gases that make up and add to the 'blanket' which causes the greenhouse effect. Despite the high profile of **carbon dioxide** (CO<sub>2</sub>), water vapour is actually the most abundant GHG – but CO<sub>2</sub> concentrations are growing fast. Others include **methane**, nitrous oxide, and the **CFC** family.

### **Greenhouse Gas Protocol:**

An initiative from the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD) designed to support credible reporting (see page 26) and accounting for GHG emissions. [www.ghgprotocol.org](http://www.ghgprotocol.org)



## Hh

### **HFCs (hydrofluorocarbons):**

A man-made **greenhouse gas**. They are used in refrigeration and insulating foam as a substitute for **CFCs** and **HCFCs**, because they don't damage the ozone layer.

**Hydrogen:** The simplest of elements, and potentially part of the solution to **climate change**. Hydrogen is a potential fuel, with water the only emission when it is burned. But the hydrogen must first be separated (from water), which requires energy. So there would be little benefit if that separation was powered by **fossil fuels**. Hydrogen farms – which use renewable energy to produce the gas – are being developed.

## Ii

### ICCP (International Climate Change Partnership):

Not to be confused with the **IPCC**. This is a global industry lobby group, primarily with US membership. It accepts that climate change is a problem, but believes market-based mechanisms are the way forward, and that action must not impede continued economic growth.

### Ice:

show that current **carbon dioxide** levels are higher than they have been for 440,000 years.

**-Sheets:** Large glaciers covering an area larger than 50,000 km<sup>2</sup> (so can also be applied to large enough ice caps). Currently only two in the world (Antarctica and Greenland), both of which seem to be reducing in size.

### IPCC (Intergovernmental Panel on Climate Change):

Established in 1988 by the World Meteorological Organisation and the **United Nations Environment Programme**. The IPCC gathers a range of experts to prepare reports and assessments on all aspects of climate change. Its 4th Assessment is published in 2007. [www.ipcc.ch](http://www.ipcc.ch)



## Jj

### Joint implementation (JI):

Another of the flexible mechanisms of the **Kyoto Protocol**. JI allows developed countries (or companies within them) to co-operate on emission reduction projects and share the resultant **ERUs**. JI projects do not generate new ERUs, unlike **CDM** projects. [ji.unfccc.int](http://ji.unfccc.int)

## Kk

### Kyoto Protocol:

An international agreement drawn up in 1997 in Kyoto, Japan. The Protocol builds on the commitments of the 1992 **UNFCCC** and requires developed countries to meet emission reduction targets by 2012. At July 2006, 161 states had signed and ratified the treaty. Australia and the United States are notable exceptions who have signed but are not intending to ratify. But the big question is: what happens after 2012, when the protocol ends? [unfccc.int](http://unfccc.int)



## Ll

**Legislated market:** A part of the carbon market (see **voluntary market**). Large numbers of parties work towards legislated emission reduction targets, creating opportunities to trade in emission reductions (see **CERs** and **ERUs**). This can be on a global scale (eg **Kyoto Protocol**), a regional scale (eg EU Emissions Trading Scheme) and even on a smaller scale (eg domestic trading or trading between companies).

**Lomborg, Bjørn:** *The Skeptical Environmentalist* (the title of his book, published in 2001). He was named one of the 100 most influential people in the world by *Time* magazine in 2004, and Young Global Leader by the World Economic Forum in 2005.

A controversial figure for arguing that it would be cheaper for the world to adapt to climate change than mitigate it.

**Lovelock, James:** One of the fathers of environmental awareness. Lovelock developed the Gaia theory, which presents Earth as a self-regulated living entity. Now controversial among environmentalists because he favours nuclear energy as part of a solution to climate change.

## Mm

**Melt water:** Water that has melted – from snow or ice – which could be a problem for low-lying coastal areas if the **ice caps** keep shrinking.

**Methane capture:** Methane is a **greenhouse gas** arising from sources such as landfills, animal waste and coal mines. Capturing it stops it entering the atmosphere. Then you burn it to generate heat – which produces **carbon dioxide**, but with a much lower climate impact than the original methane.

## Oo

**Ozone depletion:** Like CO<sub>2</sub>, ozone is a **greenhouse gas**, and at low levels it is a part of smog. At ground level it can harm our health, but in the upper atmosphere it protects us from harmful UV radiation. Gases like **CFCs** break down ozone leading to depletion or holes in the protective ozone layer. Not to be confused with climate change.

## Pp

**Pearlman, Don:** A major international lobbyist who has worked for many years in opposition to the **Kyoto Protocol**. Works for the American law firm Patton, Boggs and Blow and is Executive Director of the **Climate Council**.

**Personal carbon allowances:** Based on the idea that we could all have a set amount of carbon to use or 'spend' each year. We would be able to trade allowances

and limits would be reduced each year.

**Pew Center on Global Climate Change:** An independent US-based non-profit organisation set up in 1998. The Pew Centre provides a forum for experts to share knowledge, further research and develop solutions to climate change, based on a non-partisan approach. [www.pewclimate.org](http://www.pewclimate.org)

### Precautionary Principle:

Often referred to by NGOs that emerged in the 1980s and just means that when in doubt, err on the side of caution. Being an inexact notion, it does not settle many fights.

## Rr

**Renewable energy:** Energy from sources that won't run out. These include wind, the sun, tides, hot rocks and **biofuels**.

**RINGOs (Research and Independent Non-Governmental Organisations):** Not



to be confused with **BINGOs**. A recognised constituency of the UNFCCC. [www.ringos.net](http://www.ringos.net)

## Ss

**Standby:** Leaving electrical equipment on, but 'asleep'. It uses more electricity than you might think, so add up the consumption of thousands of households and you have a big case for mass behaviour change.

**Sunspot cycles:** The sun's acne – a dark blemish normally occurring in clusters on the Sun's surface. It shows an area of relative cooling and numbers vary with the Sun's 11-year cycle. Eastern astronomers used to believe these spots foretold important events and they are now thought by some scientists to be

associated with periods of **global cooling**.

### **SUVs (Sport Utility Vehicles):**

A high-performance four-wheel drive car, tricky to park and hard to miss. Concerns over poor fuel economy and resulting high emissions and have put SUVs in the climate change spotlight – possibly the only vehicle with its own ‘anti’ lobbying group.

## Tt

**Technofixes:** Technological solutions to **climate change**. These may include new equipment or technology (eg wind farms, hydrogen **fuel cells**) or other components such as software and training. Disliked by many environmentalists because they imply there is no need to change behaviour.

## Uu

### **UNEP (United Nations Environment Programme):**

Set up in 1972 to co-ordinate the UN’s environmental activities. Based in Nairobi. [www.unep.org](http://www.unep.org)

### **UNFCCC (United Nations Framework Convention on Climate Change):**

Signed by over 150 countries at the Rio de Janeiro Earth Summit in 1992, this treaty aimed to stabilise **greenhouse gas** concentrations in the atmosphere at a level that would prevent ‘dangerous **anthropogenic** interference with the climate system’. [unfccc.int](http://unfccc.int)

## Vv

**Verified Emission Reductions (VERs):** **Carbon offset** projects that are not covered by legislation, but verified using voluntary guidelines or standards. VERs are the **voluntary market** version of **CERs** and **ERUs** – confused?

**Voluntary market:** The other part of the carbon market (see **legislated market**), generally involving offset of emissions to reach self-imposed reduction targets. Companies invest in offset projects voluntarily, often through a third-party provider who will oversee and/or verify the project (leading to **Verified Emission Reductions**).

## Ww

**Weather:** Specific conditions in the atmosphere at a particular place and time. A subset of climate.

**Wind farm:** Not to be confused with **farting cows**. A wind farm is a collection of wind turbines, or windmills, used to generate electricity. They can be ‘onshore’ or ‘offshore’. See **renewable energy**.



# Context in Context

Context is a consultancy specialising in strategy and communications on corporate responsibility (CR) and citizenship. We work with multinationals in all sectors.

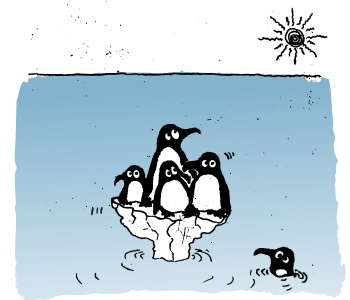
What we do:

- Help companies understand the CR agenda
- Develop CR and sustainability policies and strategies
- Develop and write reports, websites and tailored communications
- Chair and facilitate meetings
- Conduct opinion-leader surveys and stakeholder research
- Maintain a Global Who's Who in CR for use in engagement and communications.

Our core team:

- Peter Knight**, director, a former environment journalist
- Simon Propper**, BSC CHEM ENG (HONS), managing director
- Roger Cowe**, MBA director, a former CR journalist
- Rebecca Herbert**, senior consultant
- Heather Rankin**, senior consultant
- Scarlet McBarnet**, consultant
- Tom Branczik**, consultant
- James Rusby**, consultant
- Katie Loden**, consultant

Penguin movie: make the penguins happy – flip in reverse...



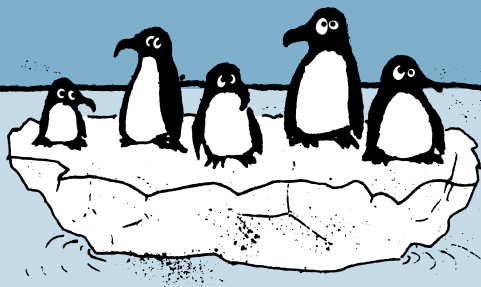
Our illustrations are by Artoonist Michèle Noach, also a cryptic crossword compiler for many years. She exhibits in the UK and US. Michèle recently showed at the UK Natural History Museum and Liverpool Biennial with Cape Farewell: artists and scientists who in 2004 sailed to the High Arctic to investigate climate change.

See [www.capefarewell.com](http://www.capefarewell.com)

## Thank you

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