

SPECIAL REPORT

Climate credits

Why change your lifestyle when you can pay a company to save your greenhouse-gas emissions for you? **Quirin Schiermeier** investigates whether carbon offsetting can really save the planet.

J. DECROW/AP

The 2006 World Cup in Germany will be remembered for France's Zinedine Zidane head-butting Italy's Marco Materazzi in the final. But in another sense, the largest sports event ever has passed without a trace: it has supposedly left no mark on the planet's atmosphere.

The international football association FIFA says it has met its 'Green Goal' to wipe out the World Cup's carbon footprint. It's estimated that the millions of fans who travelled to Germany to watch the matches generated around 100,000 tonnes of carbon dioxide. So local organizers collected €1.2 million (US\$1.6 million) from sponsors and used it to buy credits worth that amount on the voluntary emission market. The money will be invested in renewable-energy projects in developing countries.

Such voluntary carbon offsetting is becoming ever more fashionable: the 2012 Olympic Games in London will be labelled carbon neutral, and bands from Pink Floyd to Pearl Jam claim to rock carbon-free. British diplomats and government members jet around the world in a supposedly climate-friendly manner, as do many bankers and insurance brokers. Nicholas Stern, chief author of a recent report on the costs of climate change (see *Nature* 444, 6–7; 2006), is offsetting the CO₂ produced by his current promotional tour.

Offsetting is also becoming more popular among households, air travellers and car owners. There are currently around 40 retailers in Europe, Australia and North America that offer to save emissions on customers' behalf. And many travel companies allow customers to fund environmental projects worldwide.

It seems easy: for a small sum we can assuage our climate guilt — without changing our lifestyles. But does such offsetting really save the carbon emissions it promises? And can we really counter climate change by paying for carbon-saving projects elsewhere?

The projects on offer vary hugely. The first



Pearl Jam: aiming to be carbon neutral.

problem is simply calculating the amount of carbon that needs to be offset. For example, the British Carbon Neutral Company calculates a return flight from London to Bangkok, Thailand, at 2.1 tonnes of CO₂ per passenger, which it charges around €30 to offset. Swiss-based myclimate arrives at 3.6 tonnes and €86 for the same flight, and the German Atmosfair

reckons 6.9 tonnes and €139.

The figures differ because the Carbon Neutral Company calculates only the extra CO₂ emitted per passenger on a given route. Other providers multiply that impact by a factor of 2–3. This is because aircraft emissions, including nitric oxide, nitrogen dioxide and planes' vapour trails, have a more complex effect on clouds, ozone and climate than do those from earthbound polluters.

Hot air?

And if it's difficult to measure an individual's carbon footprint, it's almost impossible for big companies and events to decide which activities to include and where to draw the line between necessary and avoidable emissions, says Martin Cames, an emissions-trading expert with the Öko-Institut in Berlin. This means that extra emissions are often underestimated. For example, the Öko-Institut worked out the carbon footprint of the World Cup for FIFA, but simplified the calculation by counting only



the extra flights caused by the event.

Another issue is the choice of project. The cost of offsetting one tonne of CO₂ currently ranges from €3 to €30, and the projects on offer vary in type, scale and quality, from small fuel-switching projects to large-scale changes in land use and forest growth (see 'Setting off').

Buyers, private or corporate, need to make sure that the emission cuts that they pay for would not otherwise occur. If, for example, a measure is already required by law, the 'additionality' of a project, compared with business as usual, is not guaranteed. Sascha Lafeld, of the Frankfurt-based company Climate Change Consulting (3C), says the key is to check that the projects on offer require the external funding.

Setting off

Some of the ways consumers and companies are pegging back their emissions.

TerraPass

Offsetting agency that allows customers to offset emissions from cars, flights and homes. Money is ploughed into renewables and energy-

efficiency projects; customers can even exchange their old mobile phone for credit.

myclimate

By investing in projects from solar greenhouses in the Himalayas to methane power in South Africa, this agency is helping clients produce

carbon-neutral products, from cut flowers to fruit smoothies.

Ecoinsurance

Besides insuring British motorists, this company pledges to offset 20% of each customer's emissions by investing in renewable energy schemes.

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Up in the air: different companies give hugely varying estimates of the cost of offsetting a flight.

DPA/EMPICS

Also important is ensuring that offset projects are not counted more than once. This might happen if the same credit is sold to more than one buyer, or if voluntary reductions are counted against mandatory national targets.

And even if a project looks good on paper, such deals are risky. Most are located in developing countries, which don't have emission targets set by the Kyoto Protocol. But credits are usually sold upfront, with a promise that the money will be put into future projects, so there is a significant risk that the projects could fail to deliver reductions, or to materialize at all.

Bull market

The market's main weakness is a lack of standards and verification procedures. But guidelines are available from the UK Carbon Trust and the Clean Air-Cool Planet initiative in the United States. And the UK government's Environmental Audit Committee launched an inquiry last week into the issues surrounding voluntary offsetting. One key question is whether such schemes should require official accreditation.

The most widely recognized certification so far, called the Gold Standard, is owned and

supported by 42 non-governmental environmental organizations. It accepts only projects with proven additionality, and that have social and environmental benefits for local communities. Afforestation and reforestation projects are excluded, mainly because there is no guarantee that a forest will be permanent. When trees die, they release all the CO₂ they absorbed during their lives.

So, if we can calculate our emissions and invest in the right schemes, could offsetting save the planet? Right now we are far from that goal. Around ten million tonnes of carbon dioxide were voluntarily offset in 2005 — less than 1% of the volume and value of transactions in mandatory carbon markets. And 25 billion tonnes of CO₂ entered the atmosphere.

But the voluntary offset market is likely to grow exponentially. The German 3C, which handled the market transactions for FIFA's Green Goal, expects that its project-based transactions, currently 600,000 tonnes of CO₂, will double in 2007. Worldwide, the voluntary market could grow by 40 times by 2010,

according to a recent analysis by ICF, a London-based climate consultancy.

Russ George, founder and president of the offsetting company Planktos, based in Foster City, California, is one of those thinking big. He plans a 10,000-hectare 'climate park' in Hungary. Plant ecologists with the Hungarian Academy of Sciences have conducted a feasibility study of the environmental impact and permanence of the project, and planting is to begin in 2007. Planktos is also offering credits for its controversial ocean eco-restoration projects, which involve fertilizing plankton growth with iron.

Bottom line

George believes voluntary offsetting could solve the problem of climate change. "We're expecting to save the world and make a little money on the side," he says. "In that order."

Most experts agree that voluntary carbon offsetting could be part of a global strategy against climate change. But, they warn, most voluntary offsetting companies use small projects in developing countries, which together could account for only 3–5% of carbon emitted.

Worse, overselling offsetting might persuade consumers that no other action is needed.

"There's really nothing you can say against offsetting unavoidable emissions with truly permanent projects," says Olav Hohmeyer, an economist and renewable-energy expert at the University of Flensburg in Germany. "More importantly, however, consumers must question their behaviour."

"The symbolic value is certainly high," adds Ottmar Edenhofer, an economist at the Potsdam Institute for Climate Impact Research in Germany. "But it's nonsense to believe that a little bit of goodwill is all it takes to solve the problem."

Offsetting can deal with remaining emissions once avoidable energy consumption has

been eliminated, he says. But most experts agree that the incentive to reduce consumption will come only when all sectors of business and industry are included in mandatory emissions-trading schemes.

If they were, industry would have to reduce emissions, and

consumers would change their behaviour as the price of carbon rose. For example, Edenhofer estimates that including aviation in EU emissions-trading schemes would make flights 50–80% more expensive. Only such a move would force people to reconsider flying, he says: "Carbon dioxide must have a price — full stop."

Additional reporting by Michael Hopkin.

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