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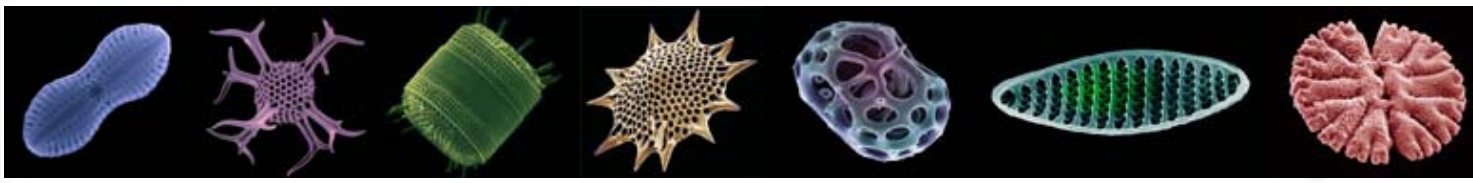

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Nature - Climate Credits

Nature 444, 976-977 (21 December 2006) | doi:10.1038/444976a; Published online 21 December 2006

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.

Russ George, founder and president of the offsetting company Planktos, based in Foster City, California, is one 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."

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 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 thecarbon 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, a the projects on offer vary in type, scale and quality, from small fuel-switching projects to large-scale changes i 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 Consultin (3C), says the key is to check that the projects on offer require the external funding.

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 fro 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 hav 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 — le 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, aLondon-based climate consultancy.

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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," sa 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 Clima 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 a 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.

Planktos Response 12/30/06

To the Editor

SIR -- As a carbon credit funded ecorestoration firm, we at Planktos were greatly interested by Quirin Schiermeier's recent Special Report on Climate Credits (Nature 444, 976-977; 2006) and gratified by his mentio of our own thoughts and work. However, we believe the public--Nature readers above all-- should also be informed of the critical ecological back story that motivates many of us in this field and makes biological offsets far more than a feel good numbers game.

Although global warming has monopolized most public concern with our escalating CO2 surplus, this caustic superfluity is having many more devastating and immediate effects upon vital ecosystems in the sea. The combined impact of rising temperature, carbonic acidity and a steep decline in pelagic iron deposition has literally decimated the blue ocean's plankton populations in the last quarter century and, according to the UK Royal Society, threatens them with mass extinctions in another 50 years. Considering these unsung aquatic heroes generate most of our planet's oxygen, remove an equivalent fraction of our CO2, and feed all higher ocean species, this is astonishingly bad news. It is also an excellent reason to examine ecorestoration offsets with a slightly wider lens.

NASA, NOAA, and the other researchers who documented the current 10%+/- plankton decline strongly correlate it with the recent global shortfall in iron-rich Aeolian dust, which historically delivered this essential micronutrient from arid lands to plant life in the open seas. This critical iron supply has declined by over 30% in the last three decades, but can be inexpensively replenished from ships with extremely high efficiency. Indeed each molecule of iron restored can catalyze the photosynthetic fixation of hundreds of thousands of CO2 molecules, allowing us to deep water sequester CO2 for centuries or more for less that €5/tonne.

In other words, by just restoring phytoplankton numbers and photosynthetic capacity to known 1980 levels of health, we can revive vast quantities of nourishing biomass to recharge the marine food chain, significantly buffer ocean acidity, and cost-effectively remove 3~5 billion tonnes of atmospheric CO2 each year. Since our annual anthropogenic CO2 emissions are now reported to be 6.5~7.5 billion tonnes, a full scale plankton restoration effort could take us a long way past the Kyoto Protocol toward the actual 70% reductions that many scientists say we really need, but no one knows how to achieve or afford.

We of course also support large source reductions, alternative energies and lifestyle reforms, but our species is facing a high stakes emergency and we have some fast triage decisions to make. We personally believe that saving the most vital ecosystems on the planet in the shortest span of time is patently the wisest course, and th conscientious offset clients now willing to help underwrite this rescue effort seem to share this belief as well.

Although Mr. Schiermeier offhandedly labels this approach as "controversial," we fail to see how simply restorin the biosphere-sustaining victims of our excesses can be viewed as anything but obligatory healing or restitution or just merciful common sense.

Sincerely,
Russ George
Planktos, Inc. 1151 Triton Drive, Foster City, California 94404, USA

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