

Chapter 3

Lessons unlearned



In which carbon trading, contrary to slogans about the universal effectiveness of markets in dealing with environmental and social problems, is shown to be ill-suited to addressing climate change. The experience of the US in pollution trading is demonstrated to be an argument not for, but rather against, making carbon markets the centrepiece of action on global warming.

Introduction

Pollution trading, the last chapter has pointed out, is a US invention now at the centre of efforts to address climate change worldwide. It's being enthusiastically pushed by governments, international organisations, business and even many NGOs.

The rest of this special report will argue that this approach isn't working, and even threatens to derail more constructive movements to address global warming. The US experience with pollution trading is an argument not for, but rather against, greenhouse-gas trading programmes such as the Kyoto Protocol and the European Union Emissions Trading Scheme.

But I thought pollution trading was a huge success in the US!

That's what carbon trading proponents often say. The reality is more complicated. US pollution trading schemes have produced no more reductions, and spurred less innovation, than traditional regulation, to say nothing of other possible programmes for cutting emissions. US pollution trading schemes have cut only short-term costs, and only for some actors, have raised many questions of equity, and in many ways have distracted attention from fundamental issues.

Equally importantly, the conditions that made possible the best-designed US emissions trading scheme – the US's sulphur dioxide programme – are simply not present in global regimes for controlling greenhouse gases.

I don't understand. What could be wrong with trading? Isn't trading always the most efficient way of reaching a given goal?

Carbon trading's claim to be 'efficient' is certainly its main attraction – together with its claim to be able to stimulate change in a relatively politically 'easy' way. But to decide whether such claims are true, you need to look carefully at specific cases.²

Trading's 'efficiencies' tend to conceal a lot of 'inefficient' stage-setting: arranging infrastructure, working up a legal framework, and so forth. Global trade in paper pulp, for instance, becomes 'efficient' only after subsidies or violence have gone into building roads and ports; securing large-scale, contiguous areas for producing raw material; finding ways of convincing people that local land is of 'greater economic value' when under tree plantations than when treated as a commons; hiring and training police; ensuring sustained high demand; and so on.³

At the same time, trading is often a singularly *inefficient* way of attaining goals that require sweeping structural changes in society, or that place local rights before accumulation. It's also inefficient when the necessary conditions for trading – measurement instruments, legal institutions and so forth – are inadequate.

Where pollution trading is possible at all, it can get in the way of achieving changes of the kind required for breaking industrialised societies' addiction to fossil fuels. Its cost savings, while often real, tend to fall only to some members of society. In addition, it can exacerbate political conflict. Pollution trading, in short, only makes harder the difficult job of broad-based political organising required for coping with global warming. To put it another way, the 'efficiency' that is fostered by trading is often not *effective*.

Why is that?

Broadly, there are five reasons, and they are what this chapter is about.

First, in order to work, greenhouse gas trading has to create a special system of property rights in the earth's carbon-cycling capacity. This system sets up deep political conflicts and makes effective climate action exceedingly difficult. *Second*, pollution trading is a poor mechanism for stimulating the social and technical changes needed to address global warming. *Third*, the attempt to build new carbon-cycling capacity is interfering with genuine climate action. *Fourth*, global trading systems for greenhouse gases can't work without much better global enforcement regimes than are likely in the near future. And *fifth*, building a trading system reduces the political space available for education, movement-building and planning around the needed fair transition away from fossil fuels.

'Emissions trading derives from economic theory and a small amount of empirical evidence from US practice, untested on a global scale, and certainly untested in the various economies in which these mechanisms must work.'

Ruth Greenspan Bell,
Resources for the
Future, 2006

Property rights and privatisation

In any trading system, traders need to own what they sell. Pollution traders are no exception.

The very ‘basis of emissions trading,’ says former World Bank chief economist Sir Nicholas Stern, ‘is assigning property rights to emitters, and then allowing these to be traded’.⁴ As University of Texas Law School property specialist Gerald Torres explains, in emissions trading systems ‘an emitter is not only legally obligated to reduce emissions down to the limit specified on its permit; it is also legally entitled to emit up to that amount’.⁵ As a result, ‘legal instruments providing evidence of ownership’⁶ are a universal requirement of all tradable permit systems.

Who gets these property rights? And how do they get them?

That depends.

Under a scheme advocated by many economists, they are sold to polluters by government. Under a scheme backed by many environmentalists, they are given to a trust which sells them to polluters at intervals and distributes the revenue to citizens. But under most real-world trading schemes, including US pollution trading programmes, the Kyoto Protocol and the EU Emissions Trading Scheme, they are given to a selection of historical polluters – wealthy countries and companies – for free.

The US acid rain programme, for instance, handed out sulphur dioxide emissions rights free of charge to several hundred large industrial polluters – companies such as Illinois Power and Commonwealth Edison. The Kyoto Protocol dispensed greenhouse gas emissions rights to 38 industrialised countries who were polluting the most already. Although the South was allowed to continue emitting greenhouse gases unimpeded for time being, it got no allowances to trade. The first phase of the European Union Emissions Trading Scheme, which got under way in 2005, donated carbon dioxide emissions rights to 11,428 industrial installations, mostly in the high-emitting private sector.⁷

In other words, like rights to many other things that have become valuable – oil fields, mining concessions, the broadcast spectrum – rights to the earth’s carbon-cycling capacity are gravitating into the hands of those who have the most power to appropriate them and the most financial interest in doing so.

Whoa, whoa, whoa! I don't believe it. The United Nations would never give away a public good to rich nations. European governments would never give away rights to the global carbon dump to its own corporations. Who would allow such a thing to happen?

It's already happened. The Kyoto Protocol gives Germany, France, Sweden and the rest of the European Union formal, transferable rights to emit, in 2012, 92 per cent of what they were emitting in 1990. Japan and Canada get 94 per cent, Russia 100 per cent, Norway 101 per cent, Iceland 110 per cent. Under the EU Emissions Trading System, the UK government alone hands out free, transferable global carbon dump assets worth around €4 billion yearly (at June 2006 prices) to approximately a thousand installations responsible for around 46 per cent of the country's emissions (see table 2, p. 89). Saleable rights to emit 145.3 million tonnes of carbon dioxide per year were given out to power generators, 23.3 million tonnes to iron and steel manufacturers, and so forth.

*'The road to the free market [had to be] opened and kept open by an enormous increase in continuous, centrally-organised and controlled interventionism... laissez-faire economy was the product of deliberate state action.'*¹⁵

Karl Polanyi (1944)

But surely this is a misunderstanding. These emissions trading programmes are giving out 'allowances', not rights to pollute. The Marrakech Accords – the 'rule book' for the Kyoto Protocol – states clearly that the Protocol 'has not created or bestowed any right, title or entitlement to emissions of any kind on Parties included in Annex I'.⁸ The EU ETS creates discrete permits under a regulation, not property rights. And the US Clean Air Act Amendments of 1990 are likewise careful to specify that a sulphur dioxide allowance 'does not constitute a property right',⁹ while a proposed US law setting up a greenhouse gas trading scheme also stipulates that 'tradeable allowances are not a property right'.¹⁰ So relax! No one's giving anything away to polluters. The world's capacity to recycle carbon is not being privatised.

If only it were so! In fact, things are more complicated – and more disturbing. When governments say they are not giving out property rights, what they mean is that they are not giving out a particular *kind* of property rights. But they are giving out property rights of another kind – ones which do contribute to the privatisation of a global good.

You'd better explain what you mean.

Let's begin by acknowledging that there are good reasons why governments are afraid to mention the words 'property' and 'rights' in laws and treaties governing emissions trading.

An emissions trading system has to cut emissions and prove it is doing so.¹¹ It can do that only if it reduces the amount of pollution allowances in circulation. Governments have to be able to confiscate some

of the emissions allowances they gave out previously. And they have to be able to confiscate them without compensating their holders.¹²

Why?

Imagine what would happen if the government had to compensate permit-holders every time it tightened an emissions ‘cap’ by taking away some of their allowances. Taxpayers would have to pick up the bill for every emissions reduction that corporations made, and the bill would be ‘prohibitively high’.¹³

In a housing market, homeowners need to know that the government can’t simply take their rights to their houses away from them without compensation and sell the houses, pocketing the proceeds itself. But in an emissions market, it’s essential that the government *does* have the power to take away some of the rights to pollute it has given or sold to companies or individuals. The property rights in an emissions market, in other words, must be less ‘absolute’ than the property rights in a car market. And in the case of carbon trading, it’s especially important that governments be tough about taking away allowances.

Why?

Because they’re going to have to take away so many in order to forestall climate chaos.

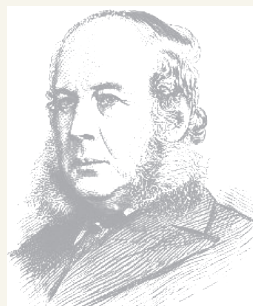
In the first phase of the Kyoto Protocol, governments have handed out, to industrialised countries alone, several times more rights to the world’s carbon cycling capacity than are available if global temperatures are not to rise by more than, say, 2 degrees Celsius.¹⁴ Having given a temporary stamp of approval to this huge overflow, governments will have to commit themselves to taking away an especially large proportion of those rights in the future.

Unfortunately, the rightsholders in question – powerful Northern governments and their heavy industries – are not going to give them up without a fight. In fact, the fight has already started (see below). So the job of dispossessing them of their carbon emissions permits not only carries much higher stakes, but will also be politically much harder for the UN and world governments to carry out, than the job the US government faced in taking away sulphur dioxide permits.

That means governments will have to make it especially clear in the case of global warming that emissions allowances are only temporary.

Exactly! And if allowances are temporary, they’re not property rights. Therefore nothing is being given to Northern countries, or their polluting industries.

Sir Henry Maine and the Right to Pollute



In order to use, defend, steal or appropriate the things they want and need, people have invented property rights of many different kinds. Today, there are property rights governing everything from land and water to birds' nests, ideas and DNA. There are rights to exclude, to use, to benefit from, to inherit, to manage, to transfer. There are rights that are held by communities, rights that are held by individuals, and rights that are held by the state. There are permanent rights and temporary rights. There are freeholds, leaseholds, licenses, patents, easements, quotas, copyrights, concessions, and usufructs. There are formal rights and informal rights, written and unwritten. There are hundreds of kinds of commons rights. Such systems of rights overlap and even interpenetrate. A single plot of land may be seen as private, public and common property by different groups. Private property is guaranteed by but subject to the authority of the state and the public; individual user rights of commoners tend to be granted at the will of the community.

A century and a half ago, the British jurist Sir Henry Maine recognised something of this diversity and complexity when he compared different kinds of property systems to different 'bundles of sticks.' Some bundles include the right to pass on the good in question to your heirs, some do not. Some bundles include the right to buy

and sell, some do not. And there are many other rights, or 'sticks', as well, each of which may or may not be in any particular bundle: rights to use, to have access to, to manage, to exclude, and so forth. The number of possible 'bundles' is dizzying. And some may have few or no sticks in common with other bundles. As political scientist Elinor Ostrom notes, 'None of these rights is strictly necessary... Even if one or more sticks are missing, someone may still be said to "own" property... one must... specify just what rights and corresponding duties [a] regime would entail.'¹⁶

Tradeable pollution allowances and credits fit easily into this conception of property. They are

- 'Enforceable claims to use something'¹⁷ – to pour carbon dioxide into the oceans, soil and vegetation;
- 'Enforceable rights to benefit from something'¹⁸ – to make money through trading allowances, for example, or to gain a competitive advantage through access to free carbon dump space that others have to pay for;

Pollution allowances and credits also contain other 'sticks' such as

- Tradability;
- Excludability – for example, Scottish Power cannot use Ineos Fluor's allowances or credits.¹⁹

So when a law says that emissions allowances are not property rights – meaning merely that they are not permanent – it should not be taken literally.

It's not so simple. Just because something is temporary doesn't mean it's not a property right.

Property rights come in many shapes and sizes (see box: 'Sir Henry Maine and the Right to Pollute', opposite). A lot of property rights *are* temporary. Think of monthly or yearly leases. Think of mining, logging or grazing concessions that governments give out to corporations for 30 years or 75 years. Think of copyrights, trademarks, and licenses. Think of fishing quotas or seed, gene or drug patents, all of which expire after a certain length of time.

All of these temporary property rights have been used to privatise or enclose various goods. All have been used to make billions for private companies. And all have been used to transfer wealth and power to the rich, sometimes igniting bitter conflict over democracy and how human beings' environments are to be treated.

Emissions allowances are no different. Industry, economists, governments and legal scholars all agree that, in giving away these allowances, emissions trading schemes do give away something quite substantial.

As the International Accounting Standards Board notes with regard to the EU ETS, allowances are 'assets...owned by the company concerned...and as such represent a significant and immediate creation of value to companies'. They should be seen as a 'government grant, and accounted for as such, i.e. treated as deferred income in the balance sheet and recognised as income on a systematic basis'.²⁰ Temporary or not, emissions permits constitute a 'major input factor to production'.²¹

Allowances aren't valuable just because they enable polluters to avoid having to spend money on pollution control. They also enable corporations to borrow money more easily and give them a better share price. And they set a precedent for granting them further entitlements. They can also be bought and sold for clear profit. They have market value. It matters who they are given to.

I still don't understand. How can you have rights over something as intangible as the earth's carbon-cycling capacity?

Companies have legal rights over all sorts of intangible things. Drug companies own genes. The Disney Company owns the Winnie-the-Pooh story. General Electric and Rupert Murdoch hold temporary rights over parts of the broadcast spectrum – rights that they are now trying to make permanent.²² Other companies own new ideas for their production lines.

What's Property Got to Do with It?

Transforming the earth's capacity to maintain a liveable climate into formal property has practical consequences. As the Canadian political scientist C. B. Macpherson once put it, a property right is a 'right in the sense of an enforceable claim to some use or benefit from something'.

That word 'enforceable' is crucial. Rights give access; rights give power. Property is not a relation between an individual and a thing, but, crudely speaking, between people and people. Individuals hold objects only through the sanction of some community or government. The law may or may not be involved, but realising property rights depends on a whole raft of social factors that include trust, access to authority and knowledge, and perhaps also access to markets, capital, measurement technology, records, accounts, labour and identity.

So when systems of private property are introduced in a good like land or the earth's carbon-cycling capacity, the changes are not abstract. They involve the physical mobilisation of lawmakers, accountants, lawyers, surveyors, consultants, journalists, engineers, police, banks and all the associated paraphernalia of offices, maps, calculators and so on. In the process, new means of persuasion and coercion become possible. New groups or professions gain new powers and privileges. Power and knowledge are redistributed. Some gain, others lose.

Take the system of private property for land introduced in Egypt in the 1850s. The system recognised existing claims to the land under Ottoman and local law,

but added new courts, property registers, mechanisms of enforcement, institutions making possible acquisition and transfer, and sources of credit for those who wished to use their property as collateral.²³ European capital poured into the country. Local landowners and European entrepreneurs invested in new irrigation schemes and land reclamation in the countryside and housing and modern infrastructure in the cities. By the turn of the twentieth century the Egyptian stock market, whose largest share holdings were in mortgage companies and property development, was one of the most active in the world. Meanwhile, small farmers faced rapidly rising prices. Tax payments increased sharply, to cover mortgage payments on the estates of the ruling family. To obtain loans to survive crises such as cattle epidemics, farmers now had to mortgage their own land, giving creditors the power to seize the fields, animals, ploughs and houses of those unable to keep up debt payments. Farmers described the courts that enforced foreclosure decisions as 'a machine for transferring the land' from small farmers to the wealthy.²⁴

The machinery of debt provided leverage for colonial occupation. When a global depression struck in 1874, the Ottoman viceroy in Cairo was forced to foreclose on his large cotton and sugar cane estates. British and French banking houses established a Debt Commission in Cairo, which took control of the country's finances and used the new courts to take possession of the viceroy's estates. When he resisted the takeover, the British and French governments installed his son in

his place. The subsequent rise of a constitutionalist movement led by junior army officers and disaffected notables provoked a British invasion in 1882 that reasserted European control over both finances and mortgaged property, including the extensive viceregal estates.²⁵ The private property system was further consolidated with a land survey more comprehensive than anything known at that time in Britain.²⁶ Despite belated attempts to slow down the rate at which villagers were losing their land and their homes to creditors, by the 1920s it was estimated that more than one third of the agricultural population in the Nile Delta had become landless.²⁷

For Egyptian villagers, private property meshed with and modified existing power relations in ways that benefited some and harmed others. The same is true of the early ages of enclosure of commons in Europe's colonies and in Europe itself. And it remains true today. A World Bank-supported programme that issued 8.7 million land titles in Thailand beginning in 1984 paved the way for corrupt acquisitions of land by speculators, undermining villagers' tenure security and causing widespread rural conflict.²⁸ In Thatcherite Britain, privatisation of social housing ultimately turned 'working class housing estates into centres of intense gentrification' while producing 'homelessness and social anomie in many urban neighbourhoods.'

Privatisation of utilities redistributed assets in a way that 'increasingly favoured the upper rather than the lower classes'. Argentinian privatisation resulted in a 'huge inflow of overaccumulated capital and a substantial boom in asset values, followed by a collapse into massive impoverishment.'²⁹ Not long after the Mexican government passed a reform law in 1991 that both permitted and encouraged privatisation of the *ejido* lands, 'divesting itself of its responsibilities to maintain the basis' for indigenous security, the Zapatista rebellion broke out. Extending intellectual private property rights over biological assets to communities whose 'political resources are not commensurate with their new-found economic resources'³⁰ may wind up damaging, not improving, livelihoods.

So it is only to be expected that current moves to turn the earth's carbon-cycling capacity into a tradable asset are viewed cautiously by many groups, out of concern for their practical effects. To bring the world's carbon-cycling capacity under a new system of property sparks social change and shifts the political character of the atmosphere and the earth's ability to regulate its climate. It has already transformed or reinforced a wide range of power relations – by, for example, creating new institutions to quantify, handle, regulate, distribute and police the new assets that are being given away.

The new carbon commodity is ghostly only in the sense that it's up to governments and governments alone to decide – on whatever grounds they choose, scientific or not – how scarce it is, and how much can be distributed, bought, sold and used. Tradable permits to pollute are what law professor and pollution trading advocate Richard Stewart calls 'hybrid property' – property conjured up by regulation and thus

dependent, even more than ordinary private property is, on a centralised, complex system of government control.³¹

One reason why talking about ownership is important is that some of the devastating climate dilemmas that governments and the UN are now caught in are a result of the property system that emissions trading requires.

A matter of realism

How's that?

For the market to work at all, 'interests in allowances must be sufficiently protected to protect investment'.³² Indeed, guaranteeing that 'property rights can be assigned and enforced to ensure that trades can

Rent-Seeking and Carbon Trading

Rent-seeking, a phenomenon first named by economists Gordon Tullock and Anne Krueger, is the process by which a firm seeks to extract 'uncompensated value from others through manipulation of the economic environment rather than through trade and the production of added wealth'.³⁵



Gordon
Tullock
and
Anne
Krueger

Lobbying for favourable economic regulation is one way of rent-seeking, especially when the regulator must rely on private firms for knowledge about the market.

If firms can calculate the cost of lobbying, bribing or otherwise causing the government to enact favourable regulation, then it can compare this cost with that needed to gain similar benefits through capital improvements or increased efficiency. If 'buying' a favourable regulatory environ-

ment is cheaper than improving production lines, then firms may reap uncompensated income. Spending money on influence-peddlers instead of improved business practice slows down growth in productivity.³⁶

Rent-seeking is therefore often considered an example of corruption or the undue influence of special interests.

Carbon-trading programmes such as the EU ETS, in which pollution rights are given to private companies depending on how much they say they have been polluting in the past, are fertile grounds for rent-seeking. The notorious horse-trading over the allocation of pollution rights to national governments under the Kyoto Protocol is an analogous case.

As financial journalist John Kay writes in the *Financial Times*, 'When a market is created through political action rather than emerging spontaneously from the needs of buyers and sellers, business will seek to influence market design for commercial advantage.'³⁷

‘The creation of formal legal title and property registration becomes a machinery for transferring property from small owners and concentrating it into larger and larger hands.’³⁹

Timothy Mitchell, 2002

take place in an ordered fashion and with a high degree of certainty’ is *the* ‘key role of the policy system’ in an emissions trading scheme.³³ Nobody who holds emissions allowances, or is thinking of buying or selling them – whether polluter, broker, banker or investor – is going to want anybody to be able to take them away arbitrarily.

So just as corporations lobby for exemption from pollution regulations, they lobby to make sure emissions allowances amount to secure property rights and to get as many as they can. As ‘semi-permanent property rights,’ in the words of David Victor of the US Council on Foreign Relations, emissions permits are ‘assets that, like other property rights, owners will fight to protect’.³⁴

Luckily for corporations, their privileged access to legislators enables them to secure carbon dump commodity for themselves merely by lobbying and pressure politics. Just as systems of private property in land give new moneymaking powers to surveyors, officials and firms with access to titling and licensing mechanisms, the property systems of pollution trading schemes give new commercial powers to those with access to legislators.

As economists Peter Cramton and Suzi Kerr point out, the ‘enormous rents’ at stake ‘mean that interest groups will continue to seek changes in the allocation over time’:

Firms may end up putting as much effort into rent capture as into finding efficient ways to reduce carbon usage. Investments may be delayed in the hope that high observed marginal costs would lead to more generous allowance allocations as compensation. The increased complexity of the programme... may lead some groups to seek exemptions or bonus allowances... [I]nterest groups will fight bitterly for a share of annual rents. This fight will lead to direct costs during the design of the policy. Groups will invest in lawyers, government lobbying, and public relations campaigns. Government officials will spend enormous amounts of time preparing and analysing options and in negotiations. This will lead to high administrative costs and probably considerable delays in implementation.³⁸

Governments eager to placate industry are almost sure to give out too many emissions rights. This in turn will make future cuts even more difficult, while increasing pressures to reduce emissions in sectors that have not been awarded rights (for example, domestic households, the transport sector and the state).

But hang on a minute. Regulators can be influenced into handing out resources to big companies even without environmental trading schemes. You can’t pin that problem on emissions markets.

No, of course not. Under any kind of regulation, regulators can be ‘captured’ by those they are regulating.⁴⁰ But emissions trading adds new complications. In extreme cases, governments under heavy corporate pressure to hand out large numbers of emissions permits may wind up creating too little scarcity even to make a market possible.

Of course, some governments may be able to resist more short-sighted types of business pressure and, bit by bit, cut the amount of property rights granted to the private sector. But questions about equality will remain, since whatever rights are left will still be in the hands of business and will now be worth even more in monetary terms. As Massachusetts Institute of Technology economist and cap-and-trade enthusiast A. Danny Ellerman admits, ‘there is likely to be agreement on the creation of the scarcity only as there is agreement on the allocation of the rents thereby created’.⁴¹

Already, environmentalists are facing a battle to stop governments from giving out too many property rights much like the battles they’ve faced to organise movements for stricter conventional regulation. Emissions markets are no less ‘political’ a form of climate action than any other.

It sounds like you’re suggesting that governments setting up emissions trading schemes are caught in a difficult bind. Any desire they might have to reduce emissions in line with scientific knowledge and the public interest pulls trading systems one way – toward giving regulators a free hand to modify allowances. Governments’ need to reassure traders that they will not be expropriated unfairly pulls another way – towards protecting allowances against government modification and making them as much like full title as possible.

Yes. As legal scholar David M. Driesen of Syracuse University’s School of Law puts it, there is a ‘tradeoff’ between the ‘need to protect the public properly from environmental harms that may grow over time’ and ‘stability to encourage cost-decreasing trades’.⁴⁶

How do governments handle this dilemma?

With difficulty. Take the US Clean Air Act Amendments of 1990, which launched the sulphur dioxide trading programme. In order to keep from having to pay legal penalties to corporations for making them reduce their emissions, the government had to find a way around the so-called ‘takings clause’ of the Fifth Amendment of the US Constitution, which prohibits ‘private property’ from being ‘taken for public use, without just compensation’.

Yet to deny that emissions permits were property, as the law specified, worried members of Congress concerned to defend corporate privilege in a working market. A stable market, they said, depended on trust that

'Temporary' Property Rights that Become Permanent

In many circumstances, government-granted open-ended 'temporary' property rights become permanent in all but name. In countries around the world, 'temporary' commercial mining and logging concessions, leases and licenses – valid on paper for, say, 20, 30, 40 years or more – have frequently in effect resulted in handing over public or community lands to the private sector for good.⁴² In Indonesia, for instance, wealthy interests have often held on to their vast timber leaseholds by converting them to plantation crops or exploiting their minerals, often using old logging roads and dispossessing hundreds of thousands of local residents who have little access to the judicial system.

The US example of grazing permits offers another illustration of how distribution of permits that the government nominally retains 'control' over can in effect privatise a resource.

Under the Taylor Grazing Act of 1934, grazing permits were given to those who were already the biggest users of rangeland – just as today's Kyoto Protocol and EU ETS allowances are given to those who are the biggest users of the atmospheric carbon dump. Like today's pollution allowances, too, grazing permits could be both limited and revoked. And like today's pollution allowances, they were explicitly claimed not to amount to 'rights, title, interest or es-

tate in or to lands'. They were not protected against being taken away by government without compensation. Congress viewed them as mere privileges, not rights, and wanted the Department of the Interior to regulate the rangelands by adjusting the number of permits periodically.



Yet in the end, the permits 'essentially privatised the public ranges'. What they created was 'an odd species of property', 'less than a right but more than a mere revocable privilege'.⁴³ Ranchers' political clout meant that the Bureau of Land Management 'acquiesced in the creation of *de facto* private rights in the public rangelands while neglecting to improve range condition'.⁴⁴ Rather than hastening, tightening, streamlining and economising on environmental protection, the permits merely resulted in a different dynamic between regulators and regulated,⁴⁵ in which those to be regulated gained some new and different powers.

the government would not interfere with 'the property interest', which must be allowed to have recourse to the courts.⁴⁷ The Environmental Protection Agency's power to 'terminate or limit authorisation' of an allowance undermined 'the very concept of allowance trading'⁴⁸ and would make investment in excess allowances too risky.

What did the US lawmakers do about this contradiction?

They wished it away. On the one hand, they dutifully specified in the Clean Air Act Amendments that an emissions allowance ‘does not constitute a property right’ and can be ‘terminated’ or ‘limited’ by the government without compensation being due.⁴⁹

Yet at the same time, they went out of their way to reassure polluters and utility investors that they ‘should expect that allowances will partake of durable economic value and that commercial and other relevant law will apply to allowances and function to protect their value’.⁵⁰ A senator inserted an explanation into the record stating that allowances were commodities.⁵¹ The Environmental Protection Agency expressed its ‘intention to treat emissions allowances as if they were absolute property rights, except in exigent circumstances’.⁵²

As economist A. Danny Ellerman and colleagues note,

For [most] intents and purposes, the allowances are treated as [homogeneous and valuable] property rights. They are freely tradable, there are a variety of market mechanisms that mediate transactions, and the Environmental Protection Agency consciously allocated allowances to eligible parties for years beyond 2010 to provide confidence that they would be treated essentially as property rights. All this will clearly make it difficult politically to alter allowance allocations in the future.⁵³

After all, as Ellerman and company explain, ‘whenever valuable property rights are created by legislation, the associated allocation decisions are likely to be highly politicised in much the same way as is tax legislation or appropriations bills.’⁵⁴ In the US, Congress used up most of the time it spent debating the sulphur dioxide trading programme not on discussing environmental targets but on ‘allocating valuable private property rights created under the scheme among clamouring interest groups ... dividing up the pork’.⁵⁵ Once these ‘liquid, federally-created intangible property right[s]’⁵⁶ had been distributed, as economist Dallas Burtraw notes, they appeared in company accounts as gifts amounting to USD 2 billion in zero-cost assets yearly.

Companies were prevented from charging customers for something they had received for free, but they were allowed to pass through to customers costs of reducing emissions and of any extra allowances they had to buy to comply with the law. And they were allowed to make money by selling them; as Burtraw observes, ‘if you discover oil on your property, you’re not going to give it away for free’.⁵⁷

No surprise, then, that squabbles over allowances early on led to civil litigation and other disputes.⁵⁸ At one point, the Wisconsin Public

Utility Commission had to rule that profits from sales of allowances should go to ratepayers, not stockholders.⁵⁹ Sulphur dioxide levels in the US actually increased by 4 per cent in 2003 as a result of the programme's banking mechanisms.⁶⁰

Similarly for Los Angeles's Regional Clean Air Incentives Market (RECLAIM). Emboldened by economic theory and the Clean Air Act Amendments of 1990 authorising states and local air districts to develop market incentive programs, Los Angeles industry successfully lobbied local government to replace existing and proposed air quality regulations with a trading programme.

The South Coast Air Quality Management District (SCAQMD) allocated pollution allowances to 370 big polluters including oil refineries, power plants, aerospace companies, asphalt batch plants, chemical plants and cement plants. In response to industry pressure, the aggregate number of pollution permits issued was generously set equal to the amount of total pollution that would enter the air during periods of peak production and economic boom, when emissions were highest. Over 40,000 tonnes more permits to pollute with nitrogen oxides (NO_x) and sulphur dioxide were allocated in the first year than there was actual pollution.

As a result, reducing the number of credits in circulation at first didn't actually reduce emissions. In the first three years of the programme, the 'cap' was tightened by 30 per cent, but actual industrial NO_x emissions declined by at most 3 per cent, compared to a 13 per cent decline in the preceding three-year period. In 1999, ambient levels of NO_x actually increased, following a decade of consecutive reductions. RECLAIM arguably wound up reducing pollution more slowly than previous regulations that assigned control technologies or emissions levels for particular firms would have done if they had been continued. For example, RECLAIM allocations for NO_x were greater in most years of the program than the comparable allocations from the 1991 Air Quality Management Plan that RECLAIM replaced. Dismantling the previous regulatory regime also took time, costing lives.⁶¹

Emissions trading has also slowed down reductions elsewhere. For example, the US required 23 years to eliminate leaded gasoline through a trading programme, a task that took China three and Japan 10, without trading.⁶² Even in the short term, the US lead trading programme can be said to have slowed the phase-out of lead in gasoline. Lead trading allowed refiners that banked purchased lead credits to continue exceeding lead limits through 1987, whereas the previous regulation had required refiners to meet the standard by 1986.⁶³

OK, so maybe RECLAIM and other schemes may have slowed down pollution control a bit and given away a lot of assets in the atmosphere to big private companies. But didn't they work in the end?

They worked in the sense that they were part of a programme that reduced pollution. But continuing and strengthening previous regulation would have worked, too – and perhaps in a way that would have been less costly for society as a whole in the long term.

For example, lead could have also been virtually eliminated from petrol through conventional performance-standard regulation. And it might have been eliminated faster. The question is not only whether pollution control methods work, but how, how effectively, and for whose advantage.

History repeats itself

And you're suggesting that a history of problems with property rights in US pollution markets is being repeated with greenhouse gas emissions trading schemes?

Unfortunately, yes. Following in the footsteps of the US, parties to the UNFCCC have tried to paper over the dilemma that pits environmental effectiveness against the market's need for secure property rights. While wanting to give away rights to the global carbon sink, many signatories to the Kyoto Protocol are worried about being held liable for the resulting damages.

All along, too, the UNFCCC has had to fend off objections Southern governments and critical environmentalists have made to the give-away of atmospheric assets to big polluters. One example was India's belated, quixotic 1999 demand for assurances that the Kyoto Protocol 'has not created any asset, goods or commodity for exchange'.⁶⁴ Some are also concerned that governments' gifts of allowances to business may amount to subsidies actionable under the World Trade Organisation.⁶⁵

Governments know, in other words, that admitting openly that they're giving billions of dollars in assets to the worst greenhouse gas polluters could be both legal and political poison. That's why, in the 2001 Marrakech Accords, the parties to the UNFCCC were driven to stipulate that the 'Kyoto Protocol has not created or bestowed any right, title or entitlement to emissions of any kind on Parties included in Annex I'.⁶⁶

But – just as in the US – the pretence is hard to maintain. Outside UN meeting halls, nearly every institution involved in carbon

trading, including the World Bank and the EU, acknowledges that both the EU Emissions Trading Scheme and various programmes created by the parties to the UNFCCC under the Kyoto Protocol have in fact created rights and assets worth billions of dollars.⁶⁷ Price-WaterhouseCoopers, in an analysis of the tax implications of the EU ETS, has observed that ‘trade in CO₂ [carbon dioxide] emissions is equated with the transfer of similar rights such as copyrights, patents, licensing rights and commercial and industrial trademarks’.⁶⁸ In 2005, a Dutch banker involved in carbon trading noted his satisfaction that European Union emissions allowances had become ‘real property’ in that governments had to compensate corporations in case of default.

Both the EU ETS and various trading-related institutions brought into being by the Kyoto Protocol are therefore arguably in breach of the Marrakech Accords, although no court case has yet been brought.

So carbon dioxide emissions trading schemes are putting more and more rights – and more and more power over climate – in private polluters’ hands.

‘The allocation of marketable pollution permits constitutes a form of limited privatisation’, Indiana University law professor Daniel Cole observes, ‘as the government conveys to private parties limited entitlements to use the public’s atmosphere.’⁶⁹

The politics is playing out exactly as it did in US pollution trading schemes. The Kyoto Protocol’s effectiveness, for instance, has long been acknowledged to have been undermined by the granting of large amounts of excess allowances to countries like Russia for political reasons.¹³⁷ Giving huge amounts of rights to industrialised countries as a whole has meanwhile entrenched their expectations for further privileges – expectations that Southern countries are bound to upset if they ever agree to similar emissions limitations under a trading scheme.⁷⁰

The EU Emissions Trading Scheme is plagued by similar problems. In April 2006, it became clear that corporate participants in the EU ETS had been granted around 10 per cent more allowances than they needed to cover their 2005 emissions. That translated to between 44 and 150 million tonnes of surplus carbon permits,⁷¹ or, at €13 per tonne, up to ‘€1.8bn of free money’.⁷²

In the UK, when environment secretary Margaret Beckett published her draft EU ETS allocations for British industry in May 2004, they added up to a total of 736 million tonnes of carbon dioxide for the next three years. The plan called for no emissions cuts whatsoever: industry had won tradable rights to emit yearly at least as much carbon dioxide as it had annually emitted *de facto* between 1998 and 2003.

Even so, ‘intense lobbying by industry followed, apparently supported by industry minister Patricia Hewitt, and in October 2004, the expected business-as-usual emissions were substantially increased, and the permitted emissions *raised* to 756 million tonnes’.⁷³ This led to a prolonged legal row with the European Union which ended only in May 2006 with a British defeat.

In 2004, only a minority of companies believed that the EU ETS would result in any reduction in emissions at all.⁷⁴ By 2005, climate economist Michael Grubb was warning that the huge number of allowances being donated to industry would render them almost worthless, destroying any incentive for cleaning up.⁷⁵ By April 2006, Grubb’s prediction looked to have some chance of coming true. As surplus emissions rights flooded the market, prices crashed 60 per cent within a week, from a high of around €30 per tonne of carbon dioxide to €11. Traders began to express the fear that the emissions price would drop to zero and that the first phase of the market ‘would die’.⁷⁶ A European Commission representative refused to comment on whether member governments had ‘allowed companies to wilfully overstate historical emissions when they were compiling their... national allocation plans, in order to receive more free allowances’.⁷⁷

‘The obvious thing to say now’, observed one market analyst in May 2006, ‘is that the caps must be corrected in the second phase, but what has happened recently makes us realise that if regulators are off with their estimates, prices will be either very high or very low. I am not sure that something with such an inherently unstable price is an incentive for people to invest. It is a fundamental flaw in the scheme’.⁷⁸

With so many allowances being given out, even factors such as the fluctuations in fossil fuel use associated with yearly variations in weather are now playing havoc with demand, putting future prices in doubt. And prices may well stay volatile, especially since no European government wants to be the first to reduce radically the number of allowances granted to industry. All the signs are that EU governments are going to be pressured into handing out too many allowances in the second phase of the scheme, just as they did in the first.⁷⁹

Table 2. Quasi-Privatisation of the Existing Global Carbon Dump by the UK National Yearly Allocation under the EU Emissions Trading Scheme, 2005

Industrial Sector (UK Only)	Annual Gift of Emissions Rights (Million Tonnes of CO ₂)	Increase/ Decrease from Actual Average Emissions 1998–2003	Fraction of 'Available' World Above- ground Carbon Dump ^a	Approx. Annual Value at €16/tonne of CO ₂ ^b
Power Generators	145.3	-6%	1.5–3.0%	€2.325b
Iron and Steel	23.3	+16%	0.2–0.5%	373m
Refineries	19.8	+11%	0.2–0.4%	317m
Offshore Oil and Gas	19.1	+14%	0.2–0.4%	306m
Cement	10.7	+18%	0.1–0.2%	171m
Chemicals	10.1	+12%	0.1–0.2%	162m
Pulp and Paper	4.7	+18%	0.0–0.1%	75m
Food and Drink	3.9	+26%	0.0–0.1%	62m
Other Industries	15.1	+16%	0.2–0.3%	242m
Total	252.0	+2%	2.6–5.1%	€4.032b

^aFigures in this column are not based on any attempt to estimate the earth's capacity to recycle transfers of fossil carbon with no remainder, which, even if initial assumptions could be agreed on, would probably be impossible in technical terms. Rather, they take as a point of reference the Intergovernmental Panel on Climate Change finding that anthropogenic CO₂ emissions from fossil fuel combustion and flaring must be reduced by 60–80 per cent from current levels of 24,533 million metric tonnes/year to achieve eventual stabilization of CO₂ levels at twice Industrial Revolution levels.

^bApproximate price in early June 2006. For every tonne of uncompensated-for CO₂ emitted above the limit, companies face a fine of €40, rising to €100 from 2008 onwards. Columns may not add up due to rounding.

Sources: UK Department of Environment, Food and Rural Affairs, *Carbon Market News*.

But if emissions caps are ever tightened, companies will need either to make reductions or to pay up, won't they? And surely eventually it is the biggest polluters who will lose out at that point, no?

Yes, many corporations are sooner or later probably going to have to give something up. But emissions trading encourages them to treat global warming not as a social and environmental problem to be solved but as a business and public relations problem to be kept out of ordinary people's hands and to be managed at the least possible relative financial and market loss to themselves. And it gives them the means to make sure caps are not tightened very much or very swiftly. Far-sighted companies treat the carbon trading as an opportunity to gain *new* property rights, assets and openings for capital accumulation, even if climate change is accelerated in the process.

But isn't it the South and other parties currently not included in emissions trading schemes that will reap more benefits, financially speaking, as long as they don't have to pay for allowances?

As of now, the biggest polluters are granted the maximum possible advantages relative to smaller polluters. It is they who hold rights to the global carbon dump – not renewable energy system manufacturers, not non-polluting firms, not communities, not trusts, not campaigners who have prevented hydrocarbon development in their regions, not socially-responsible actors who have kept their societies on existing low-carbon paths, not (in Europe) the state sector, and not ordinary members of the public, North or South.

If emissions caps are tightened, moreover, when will they be tightened, and by how much? Politicians like to say that 'market approaches' like emissions trading will prevent the pain of other kinds of regulation. But if there isn't enough political pressure to reduce emissions in the first place, the result will be merely a gaming of the system and continual over-allocation of pollution rights. Carbon trading does not offer a way around the tough political decisions.

But surely some day the necessary political movement will come into being. And surely it will some day become more costly to emit carbon dioxide. And when it does, renewable energy companies will win out, because demand for their products will rise.

It's going to be a tough slog for renewable energy companies in the meantime, as long as they are deprived not only of the large subsidies and research and development money that continue to go into 'sunset' fossil fuel and nuclear technologies, but also of any assets handed out under emissions trading schemes.⁸⁰

Well, all right. But I still can't get my head around the idea that the Kyoto Protocol and the EU ETS are simply 'polluter earns' programmes. After all, it's not as if European utilities, oil companies and steel manufacturers are just being handed free cash to do whatever they want with. They have to use their allowances to cover their emissions, no? They're not making any money out of them.

Well, it's funny you should mention that, because, actually, many of them are. As Garth Edwards of Shell explains, the 'opportunity cost of allowances is incorporated into the power price in countries with liberalised energy markets...'. The largely free allocation of allowances means that power generators receive a windfall profit since their compliance costs are far less than their revenue increase⁸¹ from increased consumer prices.

While most assets given to companies under the EUETS do go toward covering emissions, their sheer volume guarantees new profit-making opportunities as well. Costs of buying extra pollution permits are being passed on to consumers without any incentives for systemic change being created, generating new profits for utilities and other corporations. Let's look at the facts:

- The big six UK electricity generators are getting around USD 1.2 billion per year in windfall profits from the EU ETS – even more than the GBP 500 million per year the UK Parliament's Environmental Audit Committee had earlier estimated.⁸² None of this 'valuable income on their balance sheets'⁸³ need be spent on a structural transition away from fossil fuels.⁸⁴ 'A combination of free allocation to power stations and full pass-through of marginal costs to consumers has led to a massive increase in the electricity industry's profitability,' consultants IPA Energy noted recently.
- In the UK, oil companies BP, Esso and Shell have made millions of pounds by selling off surplus free EU ETS allowances, while National Health Service hospitals have had to pay tens of thousands of pounds to buy extra allowances.⁸⁵
- In Germany, where power prices rose from €30 to €47 per megawatt-hour from 2005 to 2006, heavily-polluting power companies are being accused of profiteering off carbon trading. Major utility RWE is alone said to have made €1.8 billion in windfall profits in one year by adding the current market value of the EU allowances it had received for free to its customers' bills.⁸⁶
- In Belgium, France and the Netherlands, some 40 to 70 per cent of the cost of freely-allocated EU ETS allowances is passed through to large and small consumers. Contrary to the stated objective of emissions trading, the system is stimulating investments in carbon dioxide-intensive power plants, according to the Energy Research Centre of the Netherlands.⁸⁷
- In the Czech Republic, the electricity giant CEZ received one-third of the 97.6 million metric tonnes of carbon dioxide emission allowances issued to the country. (Only around 90 million tonnes of carbon dioxide were produced yearly in the country before 2005.) This will enable the company to make as much as USD 187 million from trading in carbon credits between 2005 and 2007, according to an analyst at Atlantik Financní trhy. After having made profits off carbon allowance sales in 2005 when prices were high, the company is looking to buy them back now that prices have dropped. As a result, 'we've also launched more coal production,' said Chief Executive Officer Martin Roman.⁸⁸

- According to UBS Investment Research, the first phase of the EU ETS ‘has probably contributed to €10–20/megawatt-hour higher power prices with a very significant redistribution of value from consumers to producers and between companies.’ In May 2006, Estonian Energy declared a €74 million pre-tax profit from net sales of emissions rights in 2005, more than a third of its total profits. Based on the company’s own environmental reporting, only €6–9 million can be explained by ‘real emissions reductions’.⁸⁹
- In the very first publicised spot trade of EU allowances in February 2005, Danish power utility Energi E2 was able to sell a block of rights it had been granted free by its government to Shell simply because a spell of mild temperatures had happened to keep the utility’s carbon emissions slightly below expected levels.⁹⁰ The following year, Norway’s Fortum Corporation bagged USD 25 million from selling carbon dioxide allowances due to the fact that the reservoirs behind its hydropower dams happened to be exceptionally full in 2005.⁹¹
- In Australia, New South Wales taxpayers are being charged millions of dollars by a state government trading scheme that ‘aims to cut greenhouse gases but has done little other than provide windfall gains for some of Australia’s dirtiest power stations’.⁹²

None of this should have been a surprise. Under Los Angeles’s RECLAIM pollution trading scheme as well, high prices of nitrogen oxides (NO_x) credits contributed to large increases in wholesale electricity prices.⁹³ Liberalised energy markets made the US sulphur dioxide programme vulnerable to a similar problem. Looking further back, members of the Organisation of Petroleum Exporting Countries garnered windfall profits by limiting carbon extraction in the 1970s.

But don’t power utilities have to buy at least a few permits in order to continue business as usual?

Often they do – particularly utilities dependent on coal. But, as IPA Energy consultants found in a detailed report done for the UK government, large utilities are being allowed to ‘over-recover carbon costs’ by charging customers for the extra emissions permits that would be needed if their ‘baseline’ generating capacity were carbon-intensive coal plants rather than the less polluting mixture of technologies they actually use. (Coal’s ratio of carbon content to heat production in kilogrammes of carbon dioxide to million British Thermal Units is 94, as opposed to oil’s 78 and natural gas’s 53. Production of carbon dioxide per megawatt-hour is 698–975 kilogrammes for coal, 470–820 for oil,

and 290–545 for gas, depending on the technology used.)⁹⁴ Last year the carbon price added about GBP 3.50 per megawatt-hour to wholesale electricity prices in the UK. To halt this gravy train for polluting power companies, their allocations of allowances would have to be cut by two-thirds, IPA concludes.⁹⁵

At present, the EU ETS is unlikely to do anything for the climate other than affect the timing of the transition to more gas generation capacity. (Gas-fired power is less carbon-intensive than coal, although still a ‘sunset’ industry, since it too will have to be phased out soon.) By 2015, IPA suggests, ‘the UK’s electricity system will look remarkably similar regardless of assumptions on how the EU ETS plays out’.⁹⁶

In fact, the EU ETS is rendering even the switch to gas doubtful. Uncertainty about how many allowances will be available in the future – resulting, again, from EU governments’ policy of leaving decisions on allocations largely to a process of corporate rent-seeking – combined with current high gas prices, is causing utilities to delay investment in gas rather than coal. And if the government doesn’t give out even more free rights to the global carbon dump to new entrants in the industry, then investment in new plant will be further deferred, raising emissions even more.

All in all, the EU ETS is likely to have helped *delay* reductions in annual UK power sector emissions to anything below 120 million tonnes of carbon dioxide for 15 years, just as the RECLAIM and lead trading schemes slowed pollution control in the US.

It may be slowing action on climate change in other sectors as well. In all member states except The Netherlands, governments withdraw companies’ pollution permits if they close dirty plants. This creates an incentive to keep such installations open. Yet continuing to grant such companies pollution rights after they close such plants would hardly make their competitors happy.⁹⁷ The large cement firm Holcim complains that large emitters are not being given incentives to invest in more efficient installations.⁹⁸ Dutch nitric acid plant operators have meanwhile made it known that they want to delay making cuts in their nitrous oxide emissions in order to be in a better position to gain from the EU ETS from 2008.⁹⁹

The practical outcome of the EU ETS is so clearly the opposite of what was advertised that even financial analysts state baldly that the ‘competitive advantages’ bestowed by handouts of assets under the EU Emissions Trading System simply ‘cannot be justified from a climate policy point of view.’¹⁰⁰ As Citigroup Smith Barney and other analysts predicted as early as 2003,¹⁰¹ governments are beginning to

have to think about stepping in to prevent the EU ETS from handing out enormous windfalls to the worst polluters. Even the investment bank UBS Warburg – not normally noted for its environmentalist enthusiasms – has questioned the wisdom of providing a multi-billion-dollar windfall to EU energy utilities, asking ‘whatever happened to the principle of “polluter pays”?’¹⁰² In May 2006, Tony Ward, energy director at Ernst and Young, stated flatly that the EU ETS ‘has not encouraged meaningful investment in carbon-reducing technologies’.¹⁰³

Unfortunately, this is only the beginning of the contradictions that result from the attempt to traffic in property rights to carbon dumps.

Uh-oh. What else is there?

A question of quantification

One of the most difficult problems is measurement. Property rights require quantification. Land titles require that territory be demarcated, mapped and surveyed. Fishing quotas require that catches be monitored and populations checked. Broadcast spectrum rights presuppose the ability to quantify frequencies, and permits to dump hazardous chemicals won’t work unless the authorities are strict about amounts.

That’s why, as Yale University property specialist Carol Rose points out, it is only recent ‘[g]overnmental advances in measurement, record-keeping, and legal enforcement’ that have made possible the ‘dramatic turn in the “propertisation” of what might seem to be “un-ownable” diffuse resources or *res communes* in the tangible world’. And it is this ‘propertisation’ that has enabled the rise of tradable pollution permit systems.¹⁰⁴

For instance, the US sulphur dioxide trading scheme on which the Kyoto Protocol is based, as Daniel Cole of Indiana University has pointed out, would never have been possible before particular bits of high-tech measuring equipment called continuous emissions monitoring systems came into existence in the 1980s and 1990s.

The problem is that the fad for tradable permit systems has now far outstripped measurement ability, at least as far as greenhouse gases go. The level of quantification technology that made the sulphur dioxide programme in the US possible isn’t available for greenhouse gases. Here again, the US model should have provided more discouragement than encouragement to the project to frame a market-oriented Kyoto Protocol.

What do you mean?

If the US can offer any model at all for pollution control schemes relevant to global warming, it should not be the 1990 Act which launched the sulphur dioxide trading programme, but rather the original US Clean Air Act of 1970.

Although the theory of tradable permits had been formulated by the late 1960s, the US's pioneer 1970 Act had no provisions for pollution trading. And it was a good thing that it didn't, at least with respect to sulphur dioxide. In 1970, there would have been no way of making a sulphur dioxide market work, because at the time there was no way of measuring how much sulphur dioxide each firm was releasing at any particular time. As one specialist noted, 'emission measurement technology is presently inadequate to meet the requirement that a regulatory agency be able to determine with some precision just how much an individual polluter is contributing to the atmospheric burden'.¹⁰⁵ In 1970, there were only 86 ambient sulphur dioxide monitors in the entire US, and those were only crudely accurate.¹⁰⁶ Monitoring at the point of emission was in an even more primitive state.

But that means there would have been no way of either verifying independently what each firm's original emissions level was or monitoring emissions afterwards to find out how much they were exceeding or falling short of their quotas.

Exactly. And even if firms had been allocated quotas, they would have had no means of finding out whether their emissions were in line with them, nor any incentive to do so. So there would have been no point in allocating different amounts of atmospheric 'dump space' to each firm to put its sulphur dioxide emissions in.

Still less would there have been any ability or incentive on the part of firms buying quotas to verify what they were buying. As David Driesen notes,

Polluters purchasing emissions allowances have no interest in the quality of the goods. Buyers of blue jeans care about whether they wear out; buyers of pollution reduction credits only care about whether regulators will accept them in lieu of local compliance.¹⁰⁷

In short, debits, credits and trading would have been impossible at the time – as would have been taxes.

How did the 1970 law reduce emissions, then?

The 1970 Act worked only because it took a different, directly regulatory approach. Instead of trying to monitor each firm's emissions,

it insisted that each firm install technology of a certain standard. As long as each firm did so, the government could be assured that some emissions reductions were being made, even if it could not precisely measure them, because officials could easily visit each installation and see whether the right technology was in place. In the early 1970s, for instance, the Los Angeles County Air Pollution Control District managed to inspect the technology at every major source once a month, at a time when it would not have been possible for it to monitor point-source emissions for all regulated pollutants at finite cost.¹⁰⁸

Pollution trading theorists might assume that this approach was necessarily less efficient in achieving the Act's goals than trading would have been. But, in context, it was *more* efficient, given the state of pollution measurement at the time.¹⁰⁹ Trying to trade would have been, in effect, infinitely costly, due to the lack of the necessary measurement technology.¹¹⁰ With technology-based regulation, on the other hand, the technology itself was the monitoring device. As Michael T. Maloney and Bruce Yandle explain, 'If the approved technique was in place, and working order documented, emission control was being accomplished.'¹¹¹ Similarly, the Corporate Average Fuel Economy regulation enacted by the US Congress in 1975, which doubled auto efficiency, did not prove either 'costly, inefficient or unsafe'.¹¹²

This points up a general lesson summarised by Daniel Cole: '[The] comparative efficiency of alternative environmental instruments cannot be determined in isolation from the institutional and technological circumstances in which they operate.'¹¹³ Trading systems are 'quantification-heavy'. They can't reduce the costs of achieving an emissions reduction goal except in the presence of an extensive, far-



Oil extraction
in the US.

reaching, uniform and accurate system of measurement and monitoring. Although, as Marc Roberts observes, '[w]hen economists discuss such matters as emissions trading they sometimes talk as if monitoring devices were widely available to cheaply and reliably record the amount of all pollution emissions',¹¹⁴ such devices can't be taken for granted. If they are not available, giving polluters pollution quotas makes little sense.

So this is one of those cases in which emissions trading would have been inefficient, not efficient.

Yes. Although measurement technologies improved (there were six times as many ambient concentration monitors in 1977 as in 1970, and they were more reliable), they weren't good enough or cheap enough to support an efficient trading system (or taxes) until much later. The first continuous emissions monitoring systems (CEMs) became available only in 1975, and it was only the succeeding two decades of further technological development that made sulphur dioxide trading possible in the 1990s. Today, CEMs used by major SO₂ sources are capable of collecting data every fifteen minutes, and real-time data from every plant are sent via computer to Environmental Protection Agency headquarters in Washington.¹¹⁵ The whole process is fully automated, minimising opportunities for cheating. On-site inspections are also made periodically.¹¹⁶

In sum, the sulphur dioxide market was less a matter of Congress suddenly grasping the economic theory of tradeable permits than of a change in the technological and institutional conditions that made a market possible.¹¹⁷

With respect to measurement of production and absorption of carbon dioxide and other greenhouse gases, the United Nations today is in a position similar to that the US was in 1970 with sulphur dioxide – only worse.

Like Marc Roberts's naïve economic theorists, the framers of the Kyoto Protocol 'simply presumed that a trading system would provide a lower cost mechanism than traditional command and control for meeting the Protocol's goal'¹¹⁸ without looking carefully at whether the conditions for such a market – and thus for such savings – existed. As quickly became clear, the measurement systems required for the Kyoto market were simply not there.

In fact, the prospects of a quantification system robust enough to support property rights in a market are even less promising for the Kyoto Protocol than they were for a sulphur dioxide trading system in the US in 1970.

Why?

With respect to trading in emissions themselves, the problem is deficient direct pollution measurement and monitoring systems. Many countries – and not just Southern countries – lack the technical and institutional capability to quantify and monitor industrial greenhouse gas emissions precisely and regularly. Uncertainties about the quantity of greenhouse gases being emitted by national energy systems ‘are in the range of plus or minus 10–30 per cent,’ according to one survey.¹¹⁹ Another survey puts uncertainties about overall greenhouse gas emissions in selected industrialised countries between 4 to 21 per cent.¹²⁰ Either figure is inadequate for the purpose of detecting the small reduction signal needed to demonstrate compliance with Kyoto. IPCC country inventory guidelines calculate that uncertainties come to 10 per cent for electricity generation, 10 per cent for industrial processes including cement and fertiliser production and 60 per cent for land-use change and forestry. For methane, the figures are even higher: 100 per cent for biomass burning, 60 per cent for oil and natural gas activities, 60 per cent for coal-mining and handling, and greater than 60 per cent for rice cultivation, waste, animals and animal waste. For nitrogen dioxide, they are 50 per cent for industrial processes, 100 per cent for biomass burning, and two orders of magnitude for agricultural soils.¹²¹ In 2004, one author foresaw a ten-year delay prior to the establishment of adequate biotic carbon national monitoring systems in industrialised countries such as the US.¹²²

In addition, in most countries, data on industrial emissions is provided by polluting companies themselves, not by an impartial authority, often calling the figures into question. In Los Angeles’s RECLAIM scheme, companies’ widespread use of emission factors developed by the Western States Petroleum Association instead of measurements of actual emissions allowed margins of error in reporting ranging from 50–100 per cent. Oil companies underreported their tanker emissions by factors between 10 and 1000¹²³ – one of several problems with the programme discovered only through a time-consuming investigation by an NGO, Communities for a Better Environment.¹²⁴ In March 2002, Anne Scholtz, architect of RECLAIM and Chief Executive Officer of the emissions broker ACE, was issued citations for filing false trading reports.¹²⁵

In England and Wales, the Integrated Pollution Prevention and Control System that monitors and controls industrial emissions relies heavily on emitters taking samples of their emissions and reporting the results to the British Environment Agency. A report from the Agency suggested that 40 per cent of sites did not have satisfactory monitoring procedures in place. Yet from 2001 to 2005, the level of independent

monitoring of industrial sites' emissions dropped by three-quarters.¹²⁶ California's Environmental Protection Agency noted in late 2005, meanwhile, that the state simply did not yet have the 'accurate inventory of greenhouse gas emissions' required for a cap-and-trade programme.¹²⁷ BP, for its part, has acknowledged an uncertainty of 30–40 per cent in the 1990 baseline it uses in determining whether it has reached the 10 per cent reduction target of its in-house emissions trading programme, and the margin of uncertainty of its operations' current emissions, it admits, is still 5 per cent.¹²⁸

Trading expert Ruth Greenspan Bell of the Washington think tank Resources for the Future observes that 'many highly industrialised countries such as China, Russia, and many of the other countries of the former Soviet Bloc do not have adequate monitoring equipment to detect what pollutants, and in what amounts, particular factories and power plants are releasing into the atmosphere. They have weak environmental enforcement systems and cannot really say whether particular plants comply with environmental requirements.'¹²⁹ Southern countries, Greenspan Bell says, are 'not the right places to insert theories that have only been tested in models and in the minds of the people who thought of them, where confounding facts and poor conditions can be assumed away.'¹³⁰

Also, there are more carbon dioxide sources to watch over than there ever were sulphur dioxide sources, aren't there?

A lot more.¹³¹ So many more, in fact, that one businessman with successful experience in brokering US sulphur dioxide trading allotments, John Henry, Chief Executive Officer of Power Navigator in Washington, DC, is concerned that international carbon trading – given the lack of ability to monitor so many source points and the absence of a national regulatory enforcement mechanism – will 'give the mechanism of emissions trading a bad name.'¹³² In the US alone, hundreds of thousands of industrial sources would have to be monitored in a comprehensive carbon trading system, compared to a few thousand in the sulphur dioxide programme.¹³³

'This is not a problem that will be solved like acid rain,' agrees Phil Clapp of the US National Environmental Trust. 'Acid rain dealt with a specific number of facilities in one industry that was already regulated...Global warming is not an issue that will be resolved by the passage of one statute. This is nothing short of the beginning of an effort to transform the world energy economy.'¹³⁴

Technicians' ability to measure releases from the millions of biotic sources scattered over the surface of the planet is also constantly being

called into question. One recent example of many is the unexpected discovery in 2005 that the carbon content of British soils has been dropping steeply since 1978. Annual releases, scientists were surprised to find, were higher than the entire reduction in greenhouse gas emissions the UK has achieved between 1990 and 2002 as part of its commitment to the Kyoto Protocol – some 12.7 million tonnes annually.¹³⁵

And it's not only carbon dioxide that needs to be measured, is it?

No, and that makes measurement even harder for schemes that have to measure half a dozen greenhouse gases at once. Each gas affects the climate in different ways, to different degrees, for different time periods. Although scientists try to aggregate all the gases into one omnibus category of 'carbon dioxide equivalent', their noncomparability is widely acknowledged. The lack of an adequate measurement system can only exacerbate the opportunities for cheating that are already inherent in emissions trading systems, where both buyers and sellers have strong incentives to conceal whether reductions have actually been made.

Some of these problems might be avoided with an 'upstream' rather than a 'downstream' system of monitoring – that is, one that measured the amounts of fossil fuels coming out of the ground rather than the amounts being burned.¹³⁶ And measurement technology is bound to improve over time. But there is 'no reason to expect that countries will reduce their greenhouse gas emissions to comply with quotas that cannot be effectively monitored and enforced'.¹³⁷

That seems a decisive objection to greenhouse gas emissions trading of any kind. But if specialists in the IPCC and elsewhere knew about this, why didn't the message get across in the UN and the EU? And how could the US be so cynical as to cite its own permit trading systems as models for the Kyoto Protocol?

These are important questions, and ones that should perhaps be subjects of a special inquiry. The answers aren't completely clear, although the phrase 'wishful thinking' comes to mind, along with less charitable expressions. As in every aspect of carbon trading, the tail of free-market ideology is wagging the dog of science, political common sense, and technical possibility.

Still, isn't it true that if we could put the necessary measuring instruments and bureaucracies in place, emissions trading could help reduce greenhouse gas emissions more efficiently? Isn't the US sulphur dioxide programme regarded as having saved money and been more efficient than conventional regulation?

Yes. But that brings up a difficulty best dealt with in the next section – the meaning and value of ‘efficiency’ when set against the need for effective strategies to reduce and ultimately halt the use of fossil fuels.

Emissions trading vs. structural change

Carbon trading is often said to be a ‘more efficient’ way of reaching environmental goals. The trouble with terms like ‘more efficient’, though, is that they’re vague. Efficient in what? And for whom?

Well, efficient in providing good things for all of us, no?

That’s the theory. But you have to go through a lot of steps to get there, and each of those steps can be challenged.

For example, in the US sulphur dioxide case, most experts say with some confidence that trading saved the energy sector money, or ought to have done. To reformulate the example from the last chapter, a utility in North Carolina might use coal with a pound of sulphur in each tonne, and one in Indiana coal with three times that amount. So a scrubber installed at the Indiana plant would remove a lot more sulphur per dollar invested than the same scrubber in North Carolina. It might cost the North Carolina company USD 300 to collect a ton of sulphur, but the Indiana generator only USD 100. As a result, the Indiana operation could sell its North Carolina counterpart allowances at USD 200 per tonne, making USD 100 for itself and at the same time saving its sister plant USD 100. In this way, US sulphur dioxide trading, together with emissions banking, is widely held to have halved the cost of keeping emissions down to the target 9 million tonne level,¹³⁸ a saving of many billions of dollars for the firms involved.

In reality, it’s unlikely that trading and banking alone made this saving. Emissions were already falling during the decade before the programme began. Twenty per cent of the emissions reductions often said to be due to the trading scheme were in fact achieved between 1980 and 1990, before it began,¹³⁹ and were due to such factors as increased availability of low sulphur coal and a shift of population toward areas in which it was easily available. In addition, a number of experts argue that it was factors such as the ability to take advantage of fuel-switching technologies, the fortuitous drop in prices of low sulphur coal in many areas since 1985 due to lower rail shipping costs, and the similarly fortuitous

elimination of a legal requirement for redundant scrubbers, that were the main source of subsequent cost reductions.¹⁴⁰

In the late 1980s, too, officials and experts had often overestimated the cost of cutting future emissions, which made a lot of what happened afterwards seem like a ‘saving’ even if it wasn’t. The American Electric Power Company assumed in 1981 that scrubbers would cost USD 500 per tonne of sulphur dioxide removed. The Tennessee Valley Authority thought USD 155 was closer to the mark; the department of energy USD 153–273, the Office of Technology Assessment USD 116–313. Most estimates didn’t anticipate the historical accident of cheaper coal from the Powder River area.¹⁴¹ As economist Dallas Burtraw points out, this price reduction, together with fuel switching cost reductions and other such factors that ‘have caused marginal abatement costs to fall would also have lowered the costs of achieving the SO₂ emissions cap via some form of command and control policies’.¹⁴²

Once the trading scheme got under way, in addition, a lot of installations managed to cut emissions without trading at all. Most of those who did trade traded only within their own firm. Inter-firm trading amounted to only two per cent of total emissions.¹⁴³

But no one denies that emissions trading did save the private sector at least some money, right?

No, that’s fairly uncontroversial. The question is what the impacts were on others – and on society and its environment in the long term.

What do you mean? Surely if the programme saved energy producers money, then everybody who used electricity benefited. Society as a whole was enabled to produce goods more efficiently, no?

It’s not so simple. Sure, such schemes save specific companies money. And in doing so they are supposed to maximise what the grandfather of emissions trading, Ronald Coase, called ‘total product’ (read GDP), and thereby benefit society as a whole (see Chapter 2).

But they do so only by lumping together emissions with other economic goods. For a Coasean economist, the ability of the earth to keep temperatures within liveable limits has to find a market value just like wheat or silver. It must be translated into an ‘abstract’, calculable, alienable form that can live what globalisation guru Hernando de Soto pictures as an ‘invisible, parallel life’¹⁴⁴ alongside its physical existence.

Thus creating ‘efficiencies’ in emissions reductions, like creating most other ‘efficiencies’, is a political process of morphing apples and

oranges into a single new fruit. In the case of carbon dumps, this becomes possible only by misreading the radical uncertainties, scales and irreversibilities connected with the climate system and confusing survival with economic benefit (see Chapter 1). As a result, it's going to be harder to make sense of using greenhouse gas emissions trading to create 'efficiencies' in abating climate change, even under ideal conditions, than it was to make sense of using sulphur dioxide trading to create 'efficiencies' in attaining a given numerical emissions target.

Emissions trading becomes 'efficient' in addition, only by commensurating emissions at one place or time with emissions at another place or time, shifting emissions cuts around over a wide area and extended time period so that they can be made wherever and whenever they are cheapest. It makes one place equivalent to another place and one time equivalent to another time.

So? What's the problem? That's a virtue, isn't it? The earth's carbon dump straddles all political and geographical borders. The atmosphere is constantly mixing on a global scale. Whether you cut emissions in Tomsk or Toledo, the atmospheric results are the same. Assuming we can perform the measurements, emissions trading is one way of recognising this reality. The climate doesn't care where we make our cuts, as long as we make them.

No, actually, that's wrong. It does matter to the climate where cuts are made.

What are you talking about? A one-tonne CO₂ cut in Tomsk has the same climatic effect as a one-tonne CO₂ cut in Toledo. A tonne is a tonne is a tonne. That's just basic science, isn't it?

Of course. But widen your vision a bit. Doing what is necessary to cut one tonne in Tomsk tomorrow may result in different *future* emissions than doing what is necessary to cut one tonne in Toledo tomorrow. The cut made in Tomsk may be the result of a radical new renewable energy technology or way of organising social life that will lead to vastly multiplied future cuts, whereas the equal cut made in Toledo may be a routine efficiency improvement that should have been made long ago and leads to nothing else. Where – and when – cuts are made is likely to have knock-on effects. How cuts are made now will have an influence on how much can be cut in the future.

Precisely because it treats all one-tonne cuts as the same no matter where and how they occur, and results in the cheapest cuts being made first, emissions trading runs the risk of delaying progress in dealing with global warming. Instead of encouraging the type of

Not All Emissions are the Same

If not all cuts in carbon dioxide emissions are technologically the same (see main text), neither are they the same politically.

Sunita Narain and the late Anil Agarwal of India's Centre for Science and Environment are famous for the distinction they made in the early 1990s between 'survival emissions' – what people emit to subsist – and 'luxury emissions'.



Centre for Science
and Environment

Trading away a society's 'survival CO₂' – if that ever became possible in a carbon market – would be politically different from trading away its 'luxury CO₂', even if, tonne for tonne, the carbon market as-

signed both the same price. And that difference would have climatic effects if it translated into political conflict and the failure of official programmes for tackling global warming.

The distinction is analogous to that between 'survival water' and 'luxury water'. One reason water privatisation has failed in countries such as Bolivia, Tanzania, the US and the Philippines is that the water market, in aggregating all water across different locations and contexts, makes no distinction between the two. When the water ordinary people need to pursue a dignified and healthy life is priced out of their reach, they resist.

A privatisation of the world's carbon-cycling capacity that set survival emissions equivalent to luxury emissions would have the same shortcoming.

innovations, long-term investments and broad restructuring that are crucial to speeding the transition to a society that doesn't use fossil fuels, it discourages them in favour of scattered stopgap measures that may ultimately be very costly. 'Optimising components in isolation', in the words of energy experts Amory Lovins and colleagues, 'tends to pessimise the whole system – and hence the bottom line'.¹⁴⁵

This is another case in which what is typically called 'efficiency' is not *effective*.

Emissions trading and innovation

That doesn't make any sense to me at all. What you're saying seems to go against what economics teaches us: that markets give people incentives to invent useful things so they can make money.

Say what you like about the problems of emissions trading, the great achievement of projects like the Kyoto Protocol and the EU Emissions Trading Scheme is that they have given carbon a price. Maybe the measurements can't be made

yet, maybe no one agrees yet on who owns the rights, maybe big polluters are still being rewarded, maybe the price isn't high enough yet, maybe there are all sorts of other problems. But at least having a price is better than having no price, isn't it? Emissions trading promises to make it impossible for a lot of people to release greenhouse gases for free, or use the world's carbon dump as if it had no value.

Having to pay a price gives industry a new incentive to clean up and stop using so much fossil fuel. The more allowances that industry has to pay for, the more it will need to shift toward more efficient, renewable and low-carbon technologies, which will direct more capital toward green energy suppliers and creative technology development. The result, as the EC says, is to promote 'global innovation to combat climate change'.¹⁴⁶

Markets in pollution allowances also spurs innovation by providing polluters with incentives to compete to do even better than they are required to do by law. Sure, conventional regulation can force the private sector to improve technology. But trading encourages even more change, since companies can make money by 'overshooting' the minimum requirement and selling the resulting credits to firms less willing or able to reduce emissions or banking them for their own future use.¹⁴⁷ How can emissions trading be slowing down action on global warming?

There are all sorts of problems with this argument. But let's start with the idea that giving carbon a price is a royal road to structural change in energy use.

You're right that prices can provide incentives for change. In fact, there are plenty of ways that, under better regulatory systems, prices could lead to more efficient uses of energy *without* carbon trading schemes. This is particularly true in highly energy-wasteful countries such as the US. Indeed, according to many analysts, even after a century of entrenchment of carbon-intensive technologies in the US, non-carbon or reduced-carbon energy generally lowers costs rather than raising them, for corporations, consumers and countries alike.¹⁴⁸ Similarly, according to the Intergovernmental Panel on Climate Change's (IPCC's) conservative Working Group III, using known and currently available technologies could reduce global greenhouse emissions below year 2000 levels by 2010 at zero net costs, with at least half of this achievable at a profit.¹⁴⁹

But the question here is whether emissions trading schemes, particularly as they are currently designed, add any incentives for the particular kinds of change most needed to combat global warming. Are they, as many governments, businesses and large environmental NGOs claim, the 'best option for the world to make a transition to a low-carbon economy'?¹⁵⁰

One problem is that while emissions trading provides financial incentives for *some* polluters to seek ways of reducing emissions, it simultaneously provides financial incentives for *other* polluters *not* to reduce emissions. That is, it gives incentives to industries that can make pollution-reducing technological changes cheaply and easily to make the most of their advantage, but also gives incentives to industries that find it harder and more expensive to make such changes to cut emissions *less* than they would have to do under conventional regulation.¹⁵¹

The overall effect is to discriminate against costlier types of innovation. What's more, rational sellers will not bother to generate credits unless they cost less to produce than prospective buyers have to lay out in pollution control, and are also competitive with credits produced by other sellers.¹⁵² Emissions trading provides 'equal measure of under-compliance and over-compliance incentives, inducing less innovation than a performance-based standard to which everyone has an incentive to comply.'¹⁵³

But in most pollution trading systems, the number of available permits is supposed to be gradually ratcheted down over time, isn't it? As allowances become scarcer and the price goes up, so do incentives for companies to reduce pollution themselves rather than buy credits from others. So eventually there are incentives to undertake more expensive or difficult types of technological change.

That's right. However, the number of allowances available is not reduced by trading, but by the ratcheted-down 'cap' imposed by the state, sometimes through international agreement. Whatever environmental benefits result depend in the end not on trading but on government action: how strict a cap the government imposes, how strictly it ratchets it down, whether it is committed to continue challenging industry to make improvements, and so forth. The US sulphur dioxide trading scheme, for example, is 'no more than a technique to increase the economic efficiency of a classic command-and-control regulatory program'.¹⁵⁴

OK, so trading favours cheaper kinds of innovation. What's wrong with that?

Whether anything's wrong with it depends what kind of change you need. What the climate crisis requires is the fastest, most radical cuts and the most sustainable and environmentally desirable results (see Chapter 1).

But will the prospect of having to spend a lot of money spur corporations to innovation of a more relevant sort than the prospect of having to spend little?

*'Trading is nothing more than a tool to reach an independently established and enforced regulatory objective. Focusing only on the trade is like giving credit for a good haircut to the scissors rather than the barber... [C]redit for pollution reductions properly goes to the... cap, not the trade... The prevailing wisdom is that greenhouse gas emissions can be controlled by instituting an incentive system based on emissions trading, rather than focusing on regulatory basics. But this is a step entirely in the wrong direction.'*¹⁵⁵

Ruth Greenspan Bell,
2006

It's hard to generalise, but the old saw 'necessity is the mother of invention' suggests that it should. So does what economists call the 'induced innovation hypothesis', according to which the lower costs associated with pollution trading schemes should result in less innovation, not more.

Many policymakers and businesses are aware of this. In 2005, the leaders of two dozen of the world's most prominent corporations convened at a G8 Climate Change roundtable acknowledged openly that emissions trading schemes are 'less likely to stimulate major technological change or breakthroughs' than to promote mere 'efficiencies in energy use or manufacturing processes', and that other 'public and private sector programmes' were necessary to 'stimulate the development and commercialisation of new low carbon technologies'.¹⁵⁶

What this means is that emissions trading may favour emissions reductions that are lower-cost and more 'efficient' over a short time yet militate against approaches that are 'efficient' over a longer period.

Could you give some examples?

Suppose a company can reduce carbon dioxide emissions by installing an end-of-pipe technology that requires an initial outlay of USD 100,000 and USD 1,000 a year in operational costs thereafter. But also suppose that for USD 200,000 the company could reengineer its whole industrial process in a way that cut back on its need for fossil fuels, generating a USD 1,000 in cost savings every year.

The more expensive solution would be better for the climate. Over the long term, it would also be more 'efficient'. The cumulative cost of the reengineering solution would decline over time, while that of the end-of-pipe solution would only increase. No matter how high the discount rate was set, the reengineering solution would at some point begin to save the company money.

Yet it would be companies that chose the end-of-pipe solution that would benefit most from an emissions trading system. They could sell allowances more cheaply during the first years of the market than companies that undertook reengineering. They would be the winners of the short-term 'efficiency' sweepstakes.¹⁷¹

In a sense, a whole multitude of non-carbon technologies, no matter how expensive, will in the long term prove more 'efficient' than carbon-intensive technologies – insofar as they help prevent a climate catastrophe. Yet emissions trading cannot select for this 'efficiency' over the conventional efficiencies enabled by short-term tweaks that merely reinforce an entrenched fossil fuel-intensive technological

Emissions Trading vs. Innovation: A Lesson Not Yet Learned

In the US, pollution trading schemes, with their bias toward cheaper reductions, have been unfriendly to more interesting, radical and sustainable types of technological change that require long-term, broad-ranging efforts.

Even the better-designed US pollution markets, while encouraging certain technological adjustments, have provided fewer incentives for fruitful innovation than, say, performance standard programmes of identical stringency with no trading. By lowering rather than raising the cost of obeying pollution laws, they have tended to take advantage of differences among technologies that already exist for a particular purpose more than to stimulate the development of new or more broadly effective technologies. They improve current state-of-the-art technology rather than lead to a new state of the art.

The US sulphur dioxide programme instituted in 1990, for instance, produced only one or two main technological responses. These involved old technologies. One was scrubbers – a standard end-of-pipe approach. The program did produce some innovations in scrubber design. But so had previous regulation, so these cannot be attributed to any special innovation-producing power of trading.¹⁵⁷ Another technological change was the wider use of low-sulphur coal. But in addition to not being a real innovation, this change probably came about as a result of railroad deregulation, not trading.¹⁵⁸

The conclusions of Margaret Taylor of the Goldman School of Public Policy at the University of California, Berkeley and her colleagues are unambiguous:

‘... the weight of evidence of the history of innovation in SO₂ control technology does not support the superiority of the 1990 Clean Air Act (CAA) – the world’s biggest national experiment with emissions trading – as an inducement for environmental technological innovation, as compared with the effects of traditional environmental policy approaches... . In addition, traditional environmental policy instruments had supported innovation in alternative technologies, such as dry flue-gas desulphurisation (FGD) and sorbent injection systems, which the 1990 CAA provided a *disincentive* for, as they were not as cost-effective in meeting its provisions as low-sulphur coal combined with limited wet FGD application.’¹⁵⁹

There was some tweaking of operating procedures – for instance, plants might run their less-polluting units more frequently than their highly-polluting units in order to generate saleable credits.¹⁶⁰ But there were no radical innovations addressed at, say, supplanting coal-fired capacity or reducing demand and no innovation in technologies such as wind turbines, or conservation programmes that can reduce many different pollutants simultaneously. What the market encouraged, at most, was shrewd use of existing technology to save money to meet an isolated standard for one substance, not the opening of new environmental horizons for society.¹⁶¹

The fact that the US’s sulphur dioxide programme overshot its modest target in 1995 may seem to show that trading stimulated innovation. In fact, what happened was that companies wanted to ‘bank’ credits for future use in the next, more demanding phase of the programme.¹⁶² Little trading was in

fact involved¹⁶³ and even less innovation. In addition, the overachievement was small in absolute terms. The US programme is expected to cut sulphur dioxide emissions by only about 35 per cent by its 20th anniversary in 2010. In contrast, Germany cut power plant emissions by 90 per cent from the first proposal in 1982 to completion of its programme in 1998, without trading.¹⁶⁴

Trading does not seem to have encouraged the development of innovative technologies under the US's less well-designed pollution programmes, either. Southern California's RECLAIM market, for instance, appears to have sidelined the development of fuel cells, low-emitting burners and turbines, and so forth, whose development had previously been subsidised by a percentage of car registration fees. At least one innovative entrepreneur making low-NO_x burners, Alzeta, probably lost rather than gained sales as a result of the programme.¹⁶⁵ An emerging method of reducing NO_x, SCONO_x, was also thwarted. SCONO_x is more expensive than the dominant selective catalytic reduction method, but arguably could have penetrated the market if there had been stringent regulation generating less 'spatial flexibility' about where reductions were made.

Innovations under the 'bubbles' of early US pollution trading programs also tended merely to be rearrangements of conventional technologies rather than the invention, development or commercialisation of the non-obvious technologies necessary for achieving a longer-term social or environmental goal.¹⁶⁶

Similar lessons can be drawn from the internal system of emissions trading instituted in 2000 by the Anglo-American oil firm BP Amoco, which committed its business units collectively to shaving 10 per cent off their 1990s greenhouse gas emissions by 2010. (The emissions resulting from sales of the hydrocarbons the company extracted and refined were not counted, although they of course are hundreds of times greater than the firm's in-house releases.)¹⁶⁷

BP Amoco's trading system did help the company make the easy one-third of the cuts required more cheaply. These cuts were mostly in obvious areas like process efficiencies – finding and shutting down spare turbine generators, minimising downtime by cleaning machinery without shutting it down, steam and power cogeneration, and so forth.

But in attempting to make the rest of the cuts, company divisions were able to avoid more radical change simply by looking 'outside [BP's] operations [to] see what can be done by working with others' – for example, by setting up cheap, low-tech, 'offsite carbon reduction' schemes like allegedly carbon dioxide-absorbing tree plantations in distant locations.¹⁶⁸ By 2002, the company expected half of its so-called 'emissions reductions' to come from credits bought in from outside.¹⁶⁹ At no point was there any move toward genuinely innovative technology.

regime. It fails to register the rising and ultimately overwhelming, but incalculable, costs of continued reliance on fossil fuels to all enterprise and indeed most livelihoods (see Chapter 1). Emissions trading may coax a bit more out of the fossil economy, but it is not going to help the world get past it.

Why is that?

Partly because of what is known as ‘lock-in’, or ‘path-dependence.’

What’s ‘lock-in’?

A simple example is the order of letters on an English-language computer keyboard. From the upper left, the keyboard reads ‘Q,W,E,R,T,Y’. The reason why the letters were put in this fairly awkward order is that when typewriters were first invented, the keys would often jam and it was advantageous to slow down the speed of typing. Of course, jamming keys are not a problem on modern computers. Yet despite the fact that the QWERTY letter order slows down typing, society is ‘locked in’ to using the system.



‘We ought not reflexively to assume that the cheapest method is always the best method. For some environmental problems, we may want to give initially expensive technological transformation more priority than cost-effectiveness.’¹⁷⁰

*David M. Driesen,
Syracuse University
College of Law, 2006*

An awkward letter arrangement on English-language keyboards has become too entrenched to change easily.

In general, technologies become ‘locked in’ when, for whatever reason, they gain a historical head start on other technologies and become entrenched in far-reaching technological, political and cultural webs. These webs give them the advantage of economies of scale, synergies with other industries, access to policymakers, accumulated specialist expertise, and subsidies of various kinds. Locked-in systems tend to be able to absorb or deflect incremental attempts to institute

'Locking in' Fossil Fuels in the US

The US is so thoroughly organised, technologically and politically, around a high level of fossil fuel use that even President George W. Bush has acknowledged an 'addiction' that needs to be 'broken.'

By triumphing in early political and cultural struggles, US fossil-dependent technologies got first crack at economies of scale; were able to begin building a base of skills, research and resources that guaranteed rapid development; managed to integrate themselves first into transport, production, consumption and other cultural systems, building up a rich web of new habits and lifestyles; starved competing technologies of research and resources; helped build and ensure demand; and ultimately won adherents in subsidy-providing state bureaucracies.

Petroleum-fuelled internal combustion engines, for instance, were considered the least promising source of automobile propulsion in 1885. But chance events such as the closing of horse troughs used to supply steam vehicles led one manufacturer to shift to petrol engines, providing a mass production base that drove prices down, improved performance, and locked in dominance.

At around the same time, alternating-current (AC) electricity technology, which allowed long-distance transmission and centralised generation close to large fossil-fuel sources, closed out more efficient direct-current technology because it won judicial, political and public relations battles and was more attractive to aspiring monopolists. AC's advantage then snowballed into technological and economic hegemony.

Through such processes, fossil fuels became 'locked in' to the US's transport and electricity generation sectors. Together, these sectors today account for approximately two-thirds of global carbon emissions.¹⁷⁴

A set of subsidised structures engineered for high fossil fuel use – interstate highway systems, automobile industries, refineries, suburban sprawl, centralised power plants, supermarket-centred food systems and so forth – became inextricable from the livelihoods of millions of people, while a subsidised extraction network employing many more, ranging from military machines to lobbyists to university geology departments,¹⁷⁵ emerged to locate, secure and exploit fossil fuel fields around the world.¹⁷⁶

It was only as a result of such political and social processes, which included far-reaching changes in both individual and societal goals, that it became possible to talk about fossil-fuelled technologies as cheaper or 'more efficient' than certain other alternatives. Orthodox economics hides this history.

In this situation, higher energy prices are more likely to spur a search for more oil and gas than a search for better sources of energy. And even though the search for more fossil fuels is likely to yield smaller and smaller returns, the market still won't provide enough incentives to lay the groundwork for structural change in the energy sector. On the other hand, if, in response to inflation, interest rates are put up and demand falls, the resulting drop in prices may well only lead to renewed consumption of fossil fuels.

‘Lock-in’ is one reason why addressing the climate crisis requires not just clever inventions that use carbon more efficiently or even get the carbon out of energy entirely, but also political movements that get energy companies out of fossil fuel deposits,

Northern military establishments out of oil-rich regions, oil and car manufacturers’ lobbyists out of positions of political power in Washington, and Northern agribusiness out of Southern lands needed for basic local requirements.

broader change because they constrain ‘available’ choices. ‘Very seldom does optimising each component in isolation ... optimise the system as a whole’.¹⁷² An inertia takes hold that is difficult to break.

Fossil fuel-based energy systems are no different. They weren’t chosen because they were a rational, low-cost, efficient means of meeting pre-existing ends, but for other reasons (see box, above: Locking in Fossil Fuels in the US). ‘Timing, strategy and historic circumstance, as much as optimality, determined the winner’¹⁷³ of the competition to determine what energy system would be used.

Lock-in is as much social as technological. In the UK, for instance, transport has become locked into what energy consultant Roger Levett describes as a complex ‘vicious circle’ involving habits and community structure as much as fuels and engines (see Figure 3).¹⁷⁷ Without this locked-in structure, Levett estimates that fuel use in the UK could be cut by 87 per cent and carbon-based fuels eliminated altogether using *existing* technologies. Similar assessments have come from the US and elsewhere.¹⁷⁸

In sum, ‘locked-in’ technologies and social structures – including fossil-dependent energy and transport systems – are likely to be difficult to change in the short term even when they were not originally adopted for efficiency reasons and are economic dead ends in the long term. Conversely, alternative technologies may be expensive or difficult to develop in the short term even when they promise to be cheaper in the long term; many success stories have failed early efficiency tests.¹⁷⁹

Even when they can provide starting points toward restructuring society away from fossil fuel dependence, they are penalised by being deprived of economies of scale, synergies and political and cultural entrenchment. The economic calculations characteristic of emissions trading work best within a given social and technological regime, and don’t provide good incentives for changing that regime.

‘Entrepreneurial discovery consists not in achieving efficiency in dealing with a given situation but in alertness to the possibility that the true situation (with respect to which efficiency would be worth pursuing) is in fact different from the situation that had been assumed to be given.’¹⁸⁰

Israel M. Kirzner, 1985

Figure 3. A Vicious Circle in UK Transport

Source: Levett-Therivel Sustainability Consultants



But won't really steep price increases provide enough incentive for changing locked-in technologies?

Not if people are highly dependent on them and no clear alternatives are available. For example, because the 'current vehicle stock and the road infrastructure' in Northern countries 'makes individual car ownership and use very easy'¹⁸¹ and because people still have to go to work, however much it costs, rising petrol prices may leave demand relatively unaffected. According to energy economist Philip Verleger, 'it would take a doubling of petrol prices to reduce American petrol consumption by just 5 per cent'.¹⁸² Citizens in countries such as the US do use less energy when it grows more expensive, but that use changes very slowly.¹⁸³ The other side of this coin is popular protests against petrol price increases of the kind that have swept the UK and the US recently.

Beyond a certain point, systems analyst Gar Lipow suggests, commodity prices – including the prices of pollution permits – can't play much of a role in the North's transition to a lower-carbon economy. Public investment and regulation are needed to facilitate better individual choices:

Look at the U.S. – where automobile efficiency more than doubled from around 14 to around 25 miles per gallon when [government] standards were imposed – then stopped rising when trade decisions, congressional actions, and light truck loopholes stalled standards.

Again, look at home insulation in most states; generally average levels of attic insulation hover around the minimum state regulations require; a few people may get more, a few are [allowed to make do with] less; but within a few percentage points, regulatory minimums are a fair predictor of actual insulation. In European Union nations, regulation and public spending (especially on rail) are better predictors of carbon efficiency than price policies. Again, this is not to say that raising the price of energy does not reduce use; merely that regulation and public works do so more quickly, more efficiently and with fewer unintended consequences.¹⁸⁴

In the EU ETS, prices for emissions allowances are currently being driven by increases in the price of natural gas, or, more fundamentally, the cost of shifting from coal to natural gas – and also by weather.¹⁸⁵ Even relatively high allowance prices can do little more than provide a moderate disincentive to shift from gas to coal in response to high gas prices. The UK firm Enviros says that even carbon permit prices of €50 per tonne are unlikely to ‘provide the stimulus necessary’ for firms to invest ‘to drive down greenhouse gases’.¹⁸⁶

One weakness of carbon permit prices as drivers of change is that they are likely to be ‘extremely volatile because of the complete inelasticity of supply of permits’ along with ‘inelastic demand for permits in the short run’.¹⁸⁷ In the US, ‘sulphur dioxide trading prices have varied from a low of USD 70 per ton in 1996 to USD 1500 per ton in late 2005. Sulphur dioxide allowances have a monthly volatility of 10 percent and an annual volatility of 43 percent over the last decade’. In Los Angeles’s RECLAIM trading scheme, NO_x prices suddenly went through the roof in 2001 due to industry procrastination, a hot summer, and a cutoff of supplies of electricity purchased from out-of-state. The price of the right to emit one pound of nitrogen oxide zoomed from USD 0.13 in 1999 to USD 37 in July 2001, before settling back to USD 13 in September 2001.¹⁸⁸ In 2005 and 2006, EU ETS prices for carbon dioxide jiggled over a wide range between €7 and €30 before crashing to €9 in May 2006. According to Vincent de Rivaz, Chief Executive of EDF Energy in the UK, ‘the long-term price of tradable emissions allowances is too uncertain to be a driver of systemic technological change in an industry whose generating capacity investments must be planned over 30-year periods’.¹⁸⁹

Yale University economist William D. Nordhaus warns that such volatility might make trading ‘extremely unpopular with market participants and economic policymakers’ if it caused ‘significant changes in inflation rates, energy prices, and import and export values’. An analogy would be the volatile prices associated with the ‘peaking’ of oil production, which are not expected to provide signals that could

Climate and the Price Signal

According to economists, prices send out 'signals'. But what exactly do they contribute to the conversation about climate change?

Prices are notorious for the strange things they say about irreversible events, unknowns and the long term. Even the most orthodox economists' estimates of the costs and benefits of doing something about global warming differ by many hundreds of billions of dollars per year, depending on variations in the assumptions plugged into conventional economic models.¹⁹²

Sometimes prices are positively tongue-tied. 'The carbon market is not going to be able to put sustainable development and everything else into one price,' says Jack Cogen, president of Natsource, the largest private buyer of carbon credits. 'The carbon market doesn't care about sustainable development.'¹⁹³ Cogen's view is reinforced by many other carbon businesspeople, who acknowledge privately that their incipient market actually has little or nothing to do with climate.

There are other ways, too, in which prices tend to keep to themselves the information needed to make climate-friendly choices, even in as mundane a matter as home-buying. Says activist and systems analyst Gar Lipow:

'Levels of insulation that pay for themselves in four months to three years will seem a good deal when buying a house on a 30- or 15-year mortgage, given energy savings alone. But a problem arises when most homes don't offer that level of insulation. After all, there are more important considerations than energy costs. Is the house close to work, schools and shops? Also, there are the questions of layout, and appearance. If all homebuilders were required to offer this level of insulation they could easily recover their costs and a significant profit besides at a price that would still lower overall cost of ownership to buyers. But in the absence of regulation requiring this, homebuilders may offer homes without such features. So long as most homes don't offer them, they suffer little loss in bargaining power. The odds are homes with a similar location, layout and appearance won't be available with the added energy conservation features. Without regulation, builders rationally believe they won't gain enough bargaining power in selling their product to make extra insulation worth adding. This is so even though the buyer would get a good deal by paying enough for the added energy savings feature to allow the builder a significant extra profit.'¹⁹⁴

stimulate the development of alternative liquid fuels in time. 'Waiting until world oil production peaks before taking crash program action leaves the world with a significant liquid fuel deficit for more than two decades', which would cause problems 'unlike any yet faced by modern industrial society,' according to one US study.¹⁹⁰

Unless the groundwork for fundamental change is laid beforehand, corporations may simply not respond to high prices. They may redouble their pressure on the government not to reduce its allowance handouts. Or they may just pay the fines for not being able to find enough allowances to cover their emissions. In Los Angeles's RECLAIM programme, many polluters continued operating old equipment, didn't have enough allowances to cover the resulting pollution, and simply incurred multi-million dollar fines.¹⁹¹ In the end, local government had to bring wayward electric generating facilities back under conventional regulation that allowed them to pay a fee per tonne rather than buy credits. Only then was catalytic reduction technology retrofitted into 17 generating facilities. With the trading programme in a shambles, no assessment of whether it had saved money was even attempted.

Emissions trading's blindness to the long term is also damaging in other ways. For example, emissions trading is incapable of taking account of the society-wide economic benefits that can result from letting stiff costs fall on heavily-polluting industrial sectors rather than allowing them to buy cheap pollution permits as a way out. Such costs can lead to savings associated with well-known side benefits of non-fossil technologies, such as relief from the damage caused by pollutants other than greenhouse gases, destruction of land due to oil drilling and coal mining, water pollution, and so forth, but also to innovations that lower the prices of products from cleaner competing sectors.¹⁹⁵ Michael Porter of Harvard Business School argues that innovations spurred by stringent environmental regulation that imposes extra costs in the short term may enhance competitiveness to a greater degree in the long term than merely maximising static efficiency, gaining access to cheaper inputs, or increasing scale.¹⁹⁶

What's more, individual and societal goals are themselves likely to change as costs come down as a result of new technological and social patterns becoming 'locked in'.¹⁹⁷ That could mean less demand for the things that today only fossil fuels can provide. Such a shift in goals is unlikely to occur within the previous locked-in fossil-dependent system. Again, emissions trading can't help select for it.

It sounds as if environmentally superior technologies such as solar power are not going to benefit much from emissions trading.

No. Emissions trading might even slow down their development. Once produced on a large enough scale, photovoltaics would become a far cheaper source of electricity per unit cost than fossil-fuelled technologies,¹⁹⁹ and cheaper still if other parts of the technological and political context were changed – if subsidies were shifted from nuclear

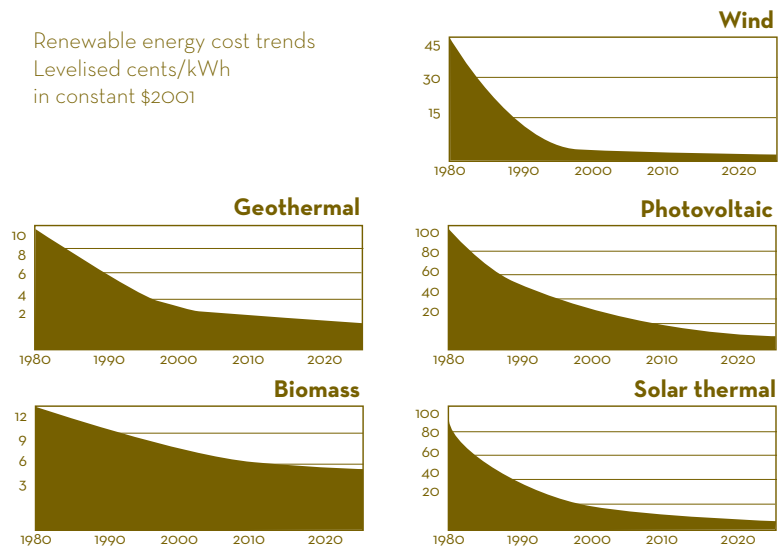
*'Emissions trading does not stimulate competition to maximise environmental performance. It simply authorises some trading around of obligations the government has created.'*¹⁹⁸

David M. Driesen, 2003

power, for instance. Already, costs of various types of non-fossil energy technology are declining. (See Figure 4.) But without opportunities to get ‘locked-in’ through more state-backed research, public investment, economies of scale, and other processes, solar power is still too expensive to get much of a boost from emissions trading.

Figure 4. Renewable Energy Cost Trends, US

Source: Rocky Mountain Institute



So there's no way around it. Emissions markets are structurally biased against the kind of radical change needed to tackle global warming.

That's certainly what the evidence suggests. As the Heinrich Böll Foundation's *Jo'Burg Memo* observes,

[T]he 'polluter pays' principle has been turned into a 'polluter buys his way out' principle. Decarbonisation will not really take place in this manner, since the resource base of Northern economies is not being restructured.²⁰⁰

To sum up the story so far, while trading schemes can in theory

- save *participating private firms* money in
- reducing emissions of *specific substances*
- to a *particular degree*
- over *particular time periods* and
- within a *particular larger technological system*,

the same schemes are unlikely to be the best choice if the objective is to

- save money for *society or industry as a whole*, or
- attain a more *general environmental improvement*, or
- make *more drastic reductions*
- with *long-term* goals in mind, or
- bring about a *change in a larger technological system*.

When trading advocates assert that trading systems are ‘cost-effective’ without specifying for whom, in what, and over what time period, they’re being so vague that they court irrelevance.²⁰¹

But maybe in helping private firms save money on incremental improvements in carbon-intensive technology, emissions trading can help buy time for the research and development that is needed to shift industrialised societies away from dependence on fossil fuels entirely. Maybe the market can help make the world’s fossil fuel technologies state-of-the-art, or moderate their climatic effects, while solar and other renewable technologies are being developed to replace them.

There are several problems with this argument. First, shifts in technological and industrial structure don’t just happen on their own. Solar energy technology, for example, is not ‘advancing’ busily by itself in a bubble independent of politics, funding and society. Its developers struggle continually to develop a network of research and investment against a structure of large competing subsidies and other encouragement still being given to fossil or nuclear energy and other arguably ‘sunset’ technologies. A shift in this pattern of support won’t be delivered by emissions trading.

Second, emissions trading schemes, even the better-designed ones, rather than buying time for governments or corporations to make structural changes, actually slow or block many technological developments by squandering ingenuity and resources on making small refinements that extend the life of an overwhelmingly fossil-oriented energy and transport structure. And in doing so, they make it more likely that

‘Greenhouse gas emissions from aircraft, increasingly implicated in climate change, will continue to grow even if the airlines join Europe’s emissions trading scheme, which is designed to cut them, British Airways’ chief economist admitted yesterday.’²⁰⁴

News item, London Independent, 2006

Does Emissions Trading Reward Efficient Actors?

Emissions trading can help big polluters save short-term emissions-reduction costs. But does it reward companies and countries that are already more efficient, even by conventional standards? Not so far.

Under the EU Emissions Trading Scheme, global public assets which presumably should be used to foster the fastest transition to a non-fossil energy regime worldwide are being handed to the biggest carbon emitters in the most carbon-intensive countries.

So far, these big polluters have responded to the scheme mainly by lobbying for more emissions permits or more advantageous ways of distributing them within their sectors; by massaging baseline figures; by seeking carbon credits from abroad that will help them evade structural change; by looking more closely at gas; and by passing on any costs to customers.

The Kyoto Protocol, meanwhile, awards the most emissions rights per capita to countries that are, even by very conventional economic yardsticks, relatively *inefficient* users of energy.

Australia, for example, is one of the most 'carbon-inefficient' countries in the world. It ranks 109th among 141 nations in its carbon efficiency, or ratio of tonnes of carbon dioxide emitted per US dollar of GDP. Yet under the Kyoto Protocol, Australia, had it signed the treaty, would have been generously granted emissions rights amounting to around 27 tonnes per capita. Other notably carbon-inefficient countries (the Czech Republic, ranked 115th; the US, ranked 100th; Canada, ranked 98th; Finland, ranked 80th; The Netherlands, ranked 78th; Germany, ranked 76th; the UK, ranked 74th) get rights to between approximately 10–17 tonnes of carbon dioxide equivalent per capita.

At the same time, the world's most carbon-efficient countries (including Namibia, the Lao PDR, Nepal and Bangladesh, ranked 1st, 5th, 18th and 23rd respectively) receive zero tradable rights under the Protocol. Sweden, a moderately carbon-efficient nation (ranked 42nd out of 141), gets only about seven tonnes per capita, around the same as Japan and Spain, ranked 61st and 62nd (see Table 3, next page).²⁰⁷

when governments such as that of the US are finally panicked into taking action on global warming, they will grasp at extreme, technical-fix solutions such as creating new life forms to produce hydrogen, re-engineer hurricane-prone seas, or absorb carbon dioxide; seeding the oceans with nanoparticles to promote plant growth; dispersing nanoparticles in the upper atmosphere to reflect light; or putting continent-sized mirrors into space (see Chapter 2).²⁰²

Third, far from being a quick 'stopgap solution' that can be applied immediately while more difficult measures are prepared, emissions trading is the 'most difficult of the economic instruments'²⁰³ available for environmental protection, and requires an enormous amount of legal, institutional and technological stage-setting to get off the ground, even in a country like the US.

Table 3. 'Carbon-Efficient' and 'Carbon-Inefficient' Nations

Country	Carbon Efficiency (Tonnes of CO ₂ Emissions per US Dollar of GDP)	Carbon Efficiency Rank among 141 Nations
Namibia	0.00	1
Lao PDR	0.14	5
Nepal	0.30	18
Bangladesh	0.36	23
Sweden	0.70	42
Brazil	0.71	43
Norway	0.74	45
Philippines	0.77	47
France	0.78	48
Italy	0.91	57
Spain	1.00	61
Japan	1.00	62
Denmark	1.08	66
Indonesia	1.11	69
UK	1.17	74
NZ	1.19	75
Germany	1.19	76
Netherlands	1.23	78
Finland	1.28	80
India	1.35	85
Egypt	1.45	86
South Korea	1.51	94
Canada	1.69	98
US	1.77	100
China	2.03	107
Australia	2.07	109
Czech R.	2.43	115
South Africa	2.56	119
Saudi Arabia	3.60	129

The Carbon Market as Epicycle

From about the second century onward, the European astronomical model that placed the earth at the centre of the universe had to add more and more squiggles and refinements ('epicycles') in order to account for observations of planetary movements. Only in the 16th century was the whole complex model and all its epicycles finally abandoned in favour of a simpler and more elegant sun-centred model.

The carbon market is like one of the epicycles added to the earth-centred model to preserve it. It helps keeps the obsolete fossil-centred industrial model going at a time when society should already be abandoning it.

No empirical evidence exists that current greenhouse gas trading programmes are functioning as transitional solutions on the way to a fossil carbon-free future. In fact, all the available evidence is on the other side. Major oil corporations such as BP and Shell, both enthusiastic initiators of internal trading schemes, have never voiced any serious intention to curb their main activities of oil exploration or production at any time. Although it has changed its name to 'Beyond Petroleum', BP committed itself in 2002 to expand its oil and gas output by 5.5 per cent per year over the succeeding five years. Its emissions in 2001 were equivalent to almost two years' carbon dioxide emissions from the UK.²⁰⁵ The firm's investment in renewable energy remains at a mere 1 per cent of the USD 8 billion it spends on fossil fuel exploration and production every year.²⁰⁶

Similarly, the World Bank treats its carbon trading wing as what one prominent former staff member scathingly refers to as a mere 'epicycle'²⁰⁸ of an overwhelmingly fossil-oriented approach to energy and transport.

Efficiency and hot spots



Karl Polanyi

There's another problem with the procedure of creating 'efficiencies' by spreading emissions cuts around so that the cheapest can be made first: it tends to harm the weak and benefit the powerful. That means there are going to be political limits – defined by popular resistance, among other things – to the extent that pollution in location A can be made 'the same as' pollution in location B.

Similar problems arise with the privatisation of land, privatisation of health care and the privatisation of biodiversity. As the great economic historian Karl Polanyi pointed out more than 60 years ago, certain vital things such as land, labour, water and medicine are only 'pseudo-commodities'.²⁰⁹ They can never become fully tradable without society as a whole ceasing to exist.

I don't understand.

Take land. From a narrowly economic point of view, land is all the same, wherever it is, just as emissions reductions are said to be the same wherever they are made. Land creates economic value, wherever it is and whatever it is used for, just as, other things being equal, emissions reductions are good for the climate, no matter where or how they are made.

But suppose land became completely interchangeable with anything else, a completely fluid commodity, so that one piece of land could

be exchanged for another, or become the ‘equivalent’ of a certain amount of money, and thus easier to accumulate in large quantities in the hands of whoever had power, regardless of the land needs of others. Suppose *any* land could be bought and accumulated in *any* amount by *anybody* with the money to do so and then used for *any* purpose. Suppose it could be exchanged *for* anything *with* anybody *in* any amount.

In theory, it would then become possible for one person to own all land and everybody else to own none. It would be possible for any piece of land to be destroyed if whatever it was exchanged for were temporarily a source of greater profit. It would be possible for most land to be treated as a speculative instrument without even being used, while people went hungry. It would be possible, in short, for people who owned the land never to see it or know anything about it. It would be possible for them to do anything with their land regardless of the consequences to their neighbours. Framing land as a commodity in such a thoroughgoing way would require suppressing many of the things that makes a piece of land in location A different from a piece of land in location B. If carried too far, this would have fatal results.²¹⁰

But no one would ever carry things that far.

Obviously not. ‘To allow the market mechanism to be the sole director’ of how land is used, Polanyi wrote, ‘would result in the demolition of society.’ That’s why, in the real world, all communities and states possess rules or customs limiting how far land can be exchanged, commodified, or accumulated, what it can be used for, and who can acquire how much of it.²¹¹

Equally obviously, there are social limits to how far you can go with pollution trading. If there were no limits, ‘averaging’ pollution over a large geographical area through a market would mean you could pollute a few places severely while cleaning up everywhere else, and still say you were ‘improving’ society’s well-being. In the words of National Resources Defence Council attorney David Doniger, ‘If all you had was emissions trading, you could pile up all the pollution in one place.’²¹²

This is one thing that critics of pollution trading schemes have always worried about: that if a market makes it easier for companies to put their pollution anywhere they want, it will wind up on the doorsteps of the poor and less powerful. In fact, in the US, as across the world, pollution is already concentrated disproportionately in poor communities or communities of colour. Many people fear that trading will

only make it worse. They fear that the scientific fact that air pollution dumps do not respect political borders is being recruited in the service of economic and physical exploitation. This is the problem of 'hot spots'.

Are you saying this actually happened with US sulphur dioxide trading?

That's a matter of some controversy. Many factors are involved. Some factors in some emissions markets may actually militate against hot spots. For example, it's often easier to generate cheap credits from the worst-polluting plants, meaning that those living around them may see more improvements than others.²¹³ Some researchers say that communities of colour have actually disproportionately benefited from sulphur dioxide trading – except in the US South – although the same researchers add that poor communities have lost out to a small degree.

In geographical terms, though, the effects have clearly been uneven. While sulphur dioxide levels fell in the aggregate during the 1990s, they barely changed in the swath from Columbus, Ohio, to northern West Virginia. Hot spots have persisted east of Erie, Pennsylvania and near Kingston and Oswego, New York and Oak Ridge, Tennessee, according to the National Atmospheric Deposition Program. Since 1995, according to a study by the United States Public Interest Research Group, 300 of the 500 dirtiest plants actually increased sulphur dioxide emissions.²¹⁴ The government's Environmental Protection Agency found that emissions increased in Texas and Alabama, with effects felt in Florida.²¹⁵ In the 1990s, some locations, a large majority of which were poor and predominantly communities of colour, reported increased emissions of sulphur dioxide and resultant toxic co-pollutants such as particulate matter and volatile organic compounds.²¹⁶ This prompted the National Environmental Justice Advisory Council, a government appointed body, to oppose any expansion of pollution trading schemes in the US and called on the US government to address the environmental justice impacts of emissions trading. Government officials point out that many other hot spots have been 'cooled' – as they probably would have been under any reduction scheme – but admit that there have been exceptions.

Proportionally, populated areas have benefited less, because buyers of credits are concentrated in more populated areas. New York state, which is downwind of many power producers, believes that it is disadvantaged by sulphur dioxide trading on a national scale, and has pushed for a regional plan to overcome the dangers of 'averaging' over a large geographical area. In 2000, New York attached a financial penalty to the sale of New York sulphur dioxide credits to 14

upwind states believed to contribute to the state's acid rain problem. This was ruled unconstitutional by a US district court in 2002, setting off a high-level legal battle.²¹⁷

Many critics are concerned, similarly, that when fossil fuel users buy rights to continue polluting their local areas, they are buying the right to release toxic substances in addition to carbon dioxide.

All right. But the problem of 'hot spots' seems pretty minor if it saves big business money in making short-term pollution cuts.

You may think so – provided it isn't your health or environment at stake. But remember that even in the US, airborne particles of sulphur dioxide, together with particles of NO_x, cut short the lives of an estimated 30,000 US residents each year as well as causing acid rain.²¹⁸

Maybe so, but the programme might still have been 'efficient.' You can't tell for sure until you assign an economic value to the lives lost or damaged and do the arithmetic.

The problem is that for such calculations to be possible, you couldn't assign human lives a value so high that it would automatically outweigh almost any economic gains made elsewhere.

Well, sure. Making a market is like making an omelette – you have to break a few eggs. You can't assign an infinite value to unbroken eggs, otherwise you won't get your omelette. The eggs have to have a specific numerical value, and not too high.

And suppose the eggs – er, people – disagree with the statistical value their lives have been assigned? Or suppose they refuse to have any such value attached to their lives at all?²¹⁹

They're not necessarily qualified to discuss it, if they're not economists, are they?

Are you suggesting that they don't know how to value their own lives?

Oops, that doesn't sound very democratic, does it? Let me rephrase that to make it sound better.

I'm not sure that will do any good. The point is that the new market's need for these calculations to be made leads unavoidably to political arguments – like the one we're having now. There's nothing 'neutral' about the project of making emissions reductions 'efficient' through trading schemes.

And probably you won't be surprised to learn that there are still further political difficulties with that project.

Conflicts over ownership

A basic requirement of any trading system is that everybody has to agree who the owners are of the goods to be traded. For a car market to work, for example, everybody has to agree that it is the car company that owns the product to be sold – not auto workers, nor communities near sources of raw materials, nor anyone else. In emissions markets, however, not everyone agrees who owns what. Many people claim that countries or firms are using pollution dump space that belongs to others.

The problem was already evident in the US's sulphur dioxide trading system, which granted pollution allowances only to the biggest-polluting private firms. Some environmentalists argued that it was electricity customers, not power companies, who should get the allowances, and that companies should have to buy them. 'It's the public's air that's being used as a waste dump,' observed attorney David Doniger of Environmental Defence in 2002. 'There's a good argument that you ought to pay to use the dump.'²²⁰

Even deeper and more wide-ranging difficulties about ownership afflict the Kyoto Protocol and the EU Emissions Trading Scheme. As economist Simone Bastianoni and colleagues observe, such programmes require an 'accounting method to create a greenhouse gas inventory which also assigns responsibility for emissions'.²²¹ To put it more briefly: emissions markets need to know who it is exactly that's warming the globe.

Sounds like an easy question.

It's not. It's a little like trying to work out in the courts who is responsible for an industrial accident that takes off a worker's finger. Is it the co-worker who wasn't watching? The manufacturer of the machinery? The contractor who operates it? The person who invented it 50 years ago? The owner of the company hiring the contractor? The owner of the factory site? The government safety board? The worker herself?

Similarly, who's responsible for the burning of fossil fuels in the petrol tank of a particular car? The car owner who drives it? Exxon, who drilled the oil? General Motors, who built the car? The politician who defeated the mass transportation system that would have made the car's purchase unnecessary? The government of the country within whose borders the car is driven? Should countries be held responsible for their

current emissions or for their historical emissions as well?²²² Climatology and economics have no answers to such questions. Different agents will be held responsible in different accounting systems.²²³

Look at what's happened to the EU ETS. The EU decided that private companies burning fossil fuels would be considered, for the purposes of the scheme, the only emitters. These are companies like RWE, Cementa, Scottish Power, Vattenfall, Ineos Fluor and so forth.

That sounds reasonable enough. What was the alternative?

In choosing to give rights to the world carbon dump away to corporations, European governments decided *not* to give rights to others, including ordinary citizens. In choosing to give rights to corporate 'downstream' energy users, it chose *not* to give them to 'upstream' producers of oil, gas and coal.

Was that a problem?

It created a whole nest of them – economic, political and technical. First, the question arose, as in the US, of why assets in what should be a public good are being channelled into private hands. Then there was the expense involved in distributing rights to thousands or hundreds of thousands of 'downstream' energy users rather than a manageable handful of 'upstream' suppliers of fossil fuels. Added to this was the question of arbitrariness.

How so?

For the sake of convenience, only big energy users could be included.²²⁴ The domestic, transport and small-business sectors had to be left out.

Even so, there are so many industrial users that the costs of attempting to monitor and administer the scheme are huge. That does create a lot of lucrative work for financial centres like London and Frankfurt – which may have been one of the attractions of the arrangement. But the public has to foot the bill.²²⁵

Moreover, if the government finds itself too weak to take away the emissions rights it has temporarily granted the big industrial participants in the market, other sectors – transport, individual homeowners, government institutions – will have to bear more of the burden of meeting emissions targets.

In addition to being inefficient and expensive, the decision to make energy users the owners of emissions allowances failed to address the global warming problem closer to its root. As emphasised earlier in this special report, the main current threat to climatic stability is the

flow of fossil carbon out of the ground. It's both more economical and more logical to curb this flow at the relatively few points it occurs than to attempt to impose centralised control over millions of separate users of coal, oil and gas.

Maybe so, but by the same token, isn't it true that putting the point of responsibility closer to where fossil fuel flows out of the ground would run against the immediate interests of influential oil and coal companies?

For sure – unless they were handed a large number of free rights to the world's carbon dump.

But presumably in that case, they would find themselves under fire for capturing unacceptably large rents from the customers to whom they would pass on their costs.²²⁶

I think you're beginning to see why it's not a simple question of expert technique to decide who the owners of emissions rights are going to be. It needs public discussion.

It seems like everybody's going to be in conflict with everybody else.

Conflict has already broken out over rights given out by the EU ETS. In a rerun of some of the squabbles that plagued the US sulphur dioxide trading scheme, for instance, the award of carbon credits to various EU energy and chemical corporations merely for having obeyed

Whose Carbon Dump Is It?

Industrial manufacturers aren't the only people caught up in the new conflicts over ownership of carbon dumping space.

In New Zealand, plantation owners joined battle with the government in 2003 over who owns the carbon in 200,000 hectares of trees planted after 1989, which are eligible under the Kyoto Protocol to count as 'carbon sinks' that soak up the country's industrial emissions. The owners claimed the government was trying to steal NZD 2.6 billion from them with a stroke of the pen, 'possibly the largest private property theft in New Zealand's history.'²³³ They vowed to 'take whatever action is neces-

sary' to ensure just compensation for their purloined property.²³⁴

In the UK, meanwhile, trouble is brewing between firms that sell rights over the carbon-absorbing capacity of trees to the public and some of the local or state organisations that raise the trees. The marketing firms, it's alleged, are manoeuvring the forest-planting organisations into signing contracts relinquishing these rights for a period of 99 years for a pittance. The marketing firms then sell these rights on to the public for a huge mark-up, claiming falsely that they can make consumers' jet flights or home heating 'carbon-neutral'.

government regulations or having received government subsidies prompted protests and even legal action.²²⁷ As metals manufacturers threatened to stomp out of Germany over having to pay for the EU pollution allowances German utilities got from their government for free,²²⁸ the tiny Saxon village of Heuersdorf challenged the award of free rights to the energy and coal-mining firm Vattenfall, whose operations have troubled local residents. The only reason Vattenfall has been able to gain access to this largesse, Heuersdorf claims, is that it was also the beneficiary of government subsidies for brown coal mining in the 1990s that later made it possible for it to take ‘early action’ on carbon emissions.²²⁹

Then the European Commission started making plans to bring aviation into the EU ETS, arguing that state-owned airlines ought to be ‘responsible for emissions...rather than alternatives such as airports and fuel suppliers’.²³⁰ Yet the Commission was uncomfortably aware that giving out emissions rights to state-owned airlines ‘could fall foul of state aid rules’.²³¹ One banker fretted that the continuing debate over the ownership of emissions was becoming ‘increasingly sterile’.²³²

With the Kyoto Protocol, the problems are even more intractable.

How so?

Early on, parties to the UNFCCC and their technical advisers singled out national territories (what University of Wisconsin historian Thongchai Winichakul calls ‘geo-bodies’)²³³ as the relevant emitters, global warming agents and owners of pollution permits. Anything emitted on Mexico’s territory, say, would be considered to be emitted ‘by Mexico’. But this seemingly ‘neutral’ unit of analysis was immediately entangled in disputes over responsibility, history, politics and exploitation. People pointed out that some of the dump space earmarked for emissions originating on one country’s territory would in effect be used by other nations. One country would wind up using dump space that should belong to another.

What do you mean?

Southern negotiators and others argued that ‘inventories should focus on the location of economic demand’ for carbon-intensive practices ‘rather than on the site of production’.²³⁶ Why, for example, should Mexico be held solely responsible for emissions involved in producing goods for the US?

Economists asked why a country should be held responsible for the emissions of (for example) trucks crossing its territory, if it neither produces nor uses the goods that they carry. In extreme cases a country

could even end up being held responsible for high emissions used to produce and transport goods none of which its citizens enjoyed. Yet singling out final consumers as the real emitters might not provide direct incentives for cleaner production.²³⁷

At the same time, environmentalists questioned whether entities called ‘Russia’, ‘Ukraine’ and ‘the UK’ should be credited with post-1990 emissions reductions that are in fact due to post-Soviet economic collapse or the aggressive anti-unionism of Margaret Thatcher, the resulting collapse of the coal industry and the rise of less-polluting natural gas as a fuel.

Indigenous movements, meanwhile, argued that it is they, not national governments, that have reduced emissions by opposing oil drilling on their territories.²³⁸

Other activists insisted that colonial history and patterns of imposed development were also relevant to negotiating who the agents were to be in the new carbon emissions market. For example, oil imperialism shaped Saudi Arabia and other Middle Eastern nations as oil-dependent societies, while colonialism shaped Uruguay as a beef producer. Should today’s Saudis or Uruguayans be held responsible for carbon dioxide emissions from gas flares or methane emissions from cattle?

I see. But in the end didn’t everyone sweep aside all these arguments and agree that nation-states were responsible for emissions within their borders and would be the designated owners of emissions permits?

The Kyoto Protocol did try to sweep these arguments under the rug, yes. But they’ve never gone away. In fact, controversies over who the owners of rights to the earth’s carbon dump should be – and how many rights they should have – have only increased.

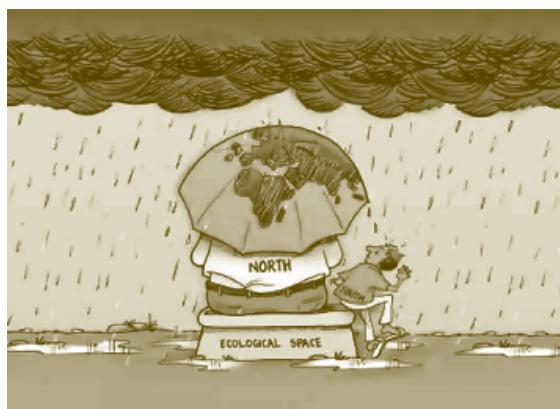
How’s that?

Well, take, for example, the UK component of the EU ETS. As shown in Table 2 (on page 89), UK industry, mainly heavy industry, is being granted monetisable access to between approximately two and a half to five per cent of what might be called the ‘available’ world carbon dump (the figure for the EU corporate sector as a whole comes to between 23–45 per cent). UK population, by contrast, comes to only one per cent of the world total.

The dump space granted to the UK, moreover, does not fall, geographically or otherwise, under UK legal jurisdiction as conventionally understood, but is used by all of the earth’s inhabitants. The UK

government has given away to its private corporations something that is not its to give.

The injustice involved is not abstract. It's bound to have concrete political results. Southern countries are just as unlikely to sit still while the new 'resource' of carbon-cycling capacity is given away to Northern industry as Northern countries are unlikely to sit still for proposals for a fairer system.



Centre for Science
and Environment

But wait a minute. Is it really all that unfair to award the lion's share of emissions rights to big business in the North? After all, Northern countries and big business didn't know any better when they got into the habit of using so much of the world's carbon dump following the first decades of the industrial revolution. Sure, they know now that their actions are causing global warming. But they didn't know then. You can't hold them responsible.

Maybe not. But they have benefited from using this capacity, and they continue to benefit today, while everyone is going to pay the price.²³⁹

But aren't these big fossil users performing a valuable public service? It's a common belief among US citizens, for instance, that their country's disproportionate use of world resources is justified because the country's economy and foreign assistance programmes benefit the whole world. If that's the case, then perhaps it's a good thing that the US and other industrialised countries be given the lion's share of emissions rights.

This argument echoes the one usually made for making corporations the beneficiaries of handouts of property rights: that the public gets something in return. For example, when railroads were given land grants by the US government to use or sell in the 19th century, it was expected that they would provide transportation in the public interest. And when mining companies are given free or low-cost concessions, it is expected that society will benefit from the metals made available.

But how much has the South benefited from the North's overuse of the global carbon dump? Most people would argue the benefits have been relatively small and uneven, compared to the harm the South has absorbed in the past and is likely to suffer in the future. As Peter Singer puts it, 'many of the world's poorest people, whose shares of the atmosphere have been appropriated by the industrialised nations, are not able to partake in the benefits of [the resulting] increased productivity in the industrialised nations – they cannot afford to buy its products – and if rising sea levels inundate their farmlands, or cyclones destroy their homes, they will be much worse off than they would otherwise have been'.²⁴⁰

Fixing the market?

But maybe the market can be made fairer. The government could allocate emissions rights to itself and then auction them off to the highest bidders.

They would still end up in the hands of big polluters.

Or fees or profits from the sale or lease of emissions rights could be distributed through a trust to ordinary citizens, or communities, or producers of renewable energy.²⁴¹ Or, better, they could be distributed directly to individuals or nations, eventually on a basis of per capita equality.²⁴² Each Southerner would ultimately get the same assets as everybody else, solving the justice problem at a stroke.

This is the popular 'Contraction and Convergence' proposal put forward by the Global Commons Institute. Property rights in global carbon-cycling capacity would be distributed to nation-states and their distribution gradually equalised so that, by a certain date, every country would hold an amount corresponding to its population, or, alternatively, every individual would hold an equal amount.

These rights would be traded either by individuals themselves or by the state apparatuses of the countries in which the individuals lived. At the same time, the global 'cap' on emissions would shrink drastically to a level deemed sustainable by the international community. Today's large-emitting countries, after being granted the lion's share of newly-created assets, would thus find their property holdings dwindling over time, as they were redistributed to the world's poor and the total amount of rights was reduced.

Various versions of Contraction and Convergence already have the backing of most governments in the South and many non-government organisations, prominent public figures and political parties in the North.²⁴³

Sounds great!

It does, doesn't it? But the assumption that equity will be furthered in the current economic and political environment by commodification and systems of private property – and that states will be conscientious guardians of the public welfare – looks risky to many observers with experience of similar schemes. (See box: 'Little' People and 'Big' Resources.)

To what extent would Southern governments come under pressure to use their surplus citizens' allowances to attract dirty industries?²⁴⁴ Would an equal per capita carbon allowance economy be any more successful in fostering equity than Nigeria's oil economy, Mali's cotton economy or the uranium economy of northern Canada or Australia? What scale of reform of local power structures would be necessary to prevent abuses in a system that granted lucrative assets to every local villager? Whose hands would the pollution rights eventually wind up in? A nominally equal-per-capita scheme that encouraged a state to subsidise the development of a high-carbon industrial structure would also pose new problems for citizens fighting fossil-fuel developments in their local areas. Contraction and Convergence's initial grant of a disproportionate chunk of lucrative assets to the rich, in addition, runs into the same difficulties as the Kyoto Protocol and the EU ETS. Under a Contraction and Convergence trading scheme, too, as under every other carbon trading programme, rules aimed at improving integrity and preventing fraud would continuously be threatened by the emergence of new and more ambitious liberalisation initiatives.²⁴⁵

Maybe we just have to abandon the idea that greenhouse gas emissions trading can be made fair.

Emissions trading's most powerful proponents probably never had that idea in the first place. Equality is not what emissions markets are about. Even the 'total product rule' that Ronald Coase relied on in his justification of pollution markets 'serves primarily as a mechanism for redistributing wealth' from poor to rich,²⁴⁷ and from future generations to the present.²⁴⁸

You can go further and say that one of emissions trading schemes' political selling points is that they preserve inequality. And many mainstream environmentalist backers of trading schemes are perfectly willing to sacrifice some 'efficiency' to make them even more unequal.

How can that be? Isn't the main raison d'être of trading to cut the costs of environmental action?

'Little' People and 'Big' Resources

Would giving everyone in the world equal rights on paper to the use of the earth's carbon dump make an egalitarian market possible? Would everyone have the power, the resources and the information to benefit? The question is similar to that of whether giving forest peoples paper rights to the biodiversity in their territories will ensure that they benefit from a biodiversity market. Yale University anthropologist and forester Michael Dove offers the following words of caution.

'[W]henever a resource at the periphery acquires value to the centre, the centre assumes control of it (e.g., by restricting local exploitation, granting exclusive licenses to corporate concessionaires, and establishing restrictive trade associations). The pattern is aptly expressed by a peasant homily from Kalimantan, which states that whenever a 'little' man chances upon a 'big' fortune, he finds only trouble. He is in trouble because his political resources are not commensurate with his new-found economic resources. He does not have the power to protect and exploit great wealth and so, inevitably, it is taken from him...the implication [of the proposal to extend a global system of rights to a new commodity] is that the global system that proposes to

extend these rights, and the indigenous communities that are the intended beneficiaries, are structurally similar members of the same, integrated system. I suggest, rather, that the global system and these indigenous communities are structurally dissimilar members of a more loosely articulated system... inattention to this distinction is a function of a paradoxical tendency among scholars and planners to insist that systems are either all-embracing...or unconnected (e.g., indigenous communities). The concept of a differentiated system, with relations obtaining among dissimilar members, is relatively undeveloped in the international science and development community.'²⁴⁶

The trade in human organs also suggests difficulties with the idea that any equal distribution of tradeable property rights will automatically have egalitarian consequences. No one in the global organ market has ever been allocated any property rights over anyone else's organs. Everyone has an equal right to sell their own organs. Yet it is the poor who wind up selling their kidneys in today's organ-trading schemes, not the rich. 'Free choice' on paper is not the same as 'free choice' in the actually-existing market.

That's what we often hear from government officials and their economic advisers, and we'll continue to evaluate that claim as we go along. But in the meantime, it's important to note that most real-world trading advocates are willing to forget about 'maximising efficiency' if they think that'll help get big business's acquiescence in climate action.

How so?

Many economists who have looked into the matter agree that a pollution trading system will be more efficient – and less regressive – if the rights it creates are auctioned, not given away, and the revenue used to make necessary adjustments in the society.²⁴⁹

This is not what real-world trading schemes do. As noted above, US pollution trading programmes, the Kyoto Protocol and the EU Emissions Trading Scheme all give away pollution rights – and give them away to the worst polluters. So does the Regional Greenhouse Gas Initiative now emerging in the US,²⁵⁰ which, like Kyoto, operates on the ‘polluter earns’ rather than the ‘polluter pays’ principle. This arrangement – known in technical jargon as ‘grandfathering’ – is welcomed by many of the same trading advocates who proclaim themselves to be primarily concerned with ‘efficiency’.

Such trading advocates go along with grandfathered trading schemes less because they are ‘efficient’ than because they imagine that buying off the rich with formal rights to the open-access good that they have been using is necessary to get them to agree to reductions.²⁵¹

This, many trading advocates believe, will obviate the need to undertake the difficult job of supporting and building effective popular movements, public leadership and public education around climate change that business and government will then have to follow. Hence the often-heard slogan that emissions trading is more politically ‘realistic’ than other options: by appealing to the powerful, it will supposedly achieve the same goal as mobilising ordinary people, and more quickly and with a lot less effort.

Let us listen, for example, to economists Robert Hahn and Robert Stavins:

[C]ountries and special interest groups will not accept an agreement that substantially shifts the distribution of wealth or political power. This resistance means that market-based approaches... can facilitate the formation of coalitions of support through the grandfathering of rights.

‘Any market-based approach that is implemented to control greenhouse gases’, Hahn and Stavins go on,

will vary dramatically from the textbook applications of these concepts. There are many reasons why market-based approaches will deviate from their ideal; an important one is politics. However, departure of actual instruments from a theoretical ideal is not enough, on its own, for rejection of the approach.²⁵²

Or the World Resources Institute:

Politically, the issue is not necessarily economic efficiency but how any allocation mechanism will affect the specific interests of a particular participant or stakeholder. Auctions that make regulated sources pay for all allowances are presumably more difficult to implement, due to political resistance. Furthermore, potential new sources that would prefer an auction may not be sufficiently organised (or even exist) to lobby for it. Free historical allocations, or grandfathering, became the norm for the [US] Ozone Transport Commission NO_x Budget presumably because of political resistance to auctioning.²⁵³

Social regressiveness and a form of bribery are commonly built into trading schemes, both within and across nations.

A quick fix?

But maybe regressiveness, inequality and bribery are necessary evils. After all, surely fighting global warming requires working with the economic system that we have, not solving all the world's problems. Our children can't afford for us to wait for a regime of global equality, the overthrow of global capitalism or even just a more cooperative economic system before we move to rein in greenhouse gas emissions. And if that means we have to accept both unfairness and relative inefficiency, then so be it. Surely to deny this is to play into the hands of US President George W. Bush and others who are trying to obstruct genuine climate action.

There are several *non sequiturs* here that need a quick reply.

First, pointing out the obstacles to the economic novelty called emissions trading is not the same as calling for a global revolution against capitalism. Up to now, global capitalism – whatever is meant by the term – has got along quite well without emissions trading.

The fact that emissions trading is about ‘creating a new market’, while (say) commons, conventional regulation, and removal of subsidies are conventionally classified as ‘outside the market’ doesn’t necessarily make emissions trading any more ‘capitalism-friendly’ than, say, conventional regulation or the redirection of subsidies. Most observers would argue that the type of enterprise associated with ‘global capitalism’ since the 19th century has actually been dependent for its survival on such types of state action.²⁵⁴ Some would go even further, urging that no firm boundaries can be drawn between ‘market’ and ‘non-market’, ‘inside the economy’ and ‘outside the economy’, and ‘capitalism’ and a whole raft of supposedly ‘noncapitalistic’ types of

social and environmental control with pedigrees far older than that of emissions trading.²⁵⁵

In short, tackling global warming ‘from within our current economic system’ – whatever meaning is attached to that phrase – does not entail emissions trading. Business itself often points out that climate change can’t be addressed without the sort of long-term targets and direction that can only be provided by forces commonly seen as ‘outside the market’. No self-respecting big capitalists are likely to imagine that their survival depends on emissions trading.

Second, emissions trading, as what Ruth Greenspan Bell calls the ‘most difficult of the economic instruments’, is hardly going to be a good choice for anyone who wants speedy and effective action across the globe. In the classroom, where all the stage-setting and messy political and technical work it requires can be sidelined or ignored, it appeared a neat theory.²⁵⁶ But in the real world, it cannot eliminate the need for hard decisions and hard political organising. Indeed, it makes the decisions and the organising even harder. As trading expert David Driesen writes, ‘Emissions trading, rather than providing an antidote to the problems of complex decision-making that plague traditional regulation, provides a layer of additional complications and occasions for dispute.’²⁵⁷ It is emissions trading itself that is turning out to require the impossible task of ‘solving the world’s problems.’

The evidence suggests, then, that it’s carbon trading advocates, not trading critics, who are allowing the tail of their political wishes to wag the dog of what is practically possible.



The special problems of carbon projects

So far this chapter has explained why current large-scale attempts at setting up a market in allowances to emit greenhouse gases don't constitute an effective approach to climate change.

But – as explained in the last chapter – trading in allowances to emit isn't the only kind of carbon trading. Commerce in credits generated by special pollution-saving projects is also growing fast.

Remind me. What are these projects? How do they work?

From the beginning, private firms, Northern governments and the United Nations have been fretting that big fossil fuel users in rich countries won't be able to afford even the small cuts in fossil fuel use required by emissions trading programmes such as that of the Kyoto Protocol. As a result, they've hunted around for ways of allowing industry to continue to burn fossil fuels while still keeping their emissions under mandated 'caps'.

The main solution private industry and governments have turned to consists of special carbon-saving or carbon-sequestering projects – schemes that capture greenhouse gases, put them out of harm's way, use fossil fuels more efficiently, and so on. Instead of cutting off flows of waste into the overflowing world carbon dump, they've proposed building 'extensions' of the dump to handle the overflow. Acquiring certificates of 'ownership' of such 'dump extensions' entitles big polluters to emit more greenhouse gases than they have emissions allowances for.

It's a classic 'end of pipe' solution to pollution. Instead of cutting flows of a raw material into an industrial process, you fix the problem after the resulting waste is already coming out of the pipe.

How do these new projects fit into the world of trade?

The allowances and the special credits created by carbon-saving projects are all thrown into a big pot and traded one for the other. Everybody is supposed to benefit. Polluters save money by not having to stop polluting, and builders of new carbon dump make money by selling the new dump space they create.

What kind of carbon dump extensions are we talking about?

Two types can be distinguished. The first kind is built on using land, forests, soils, water, even parts of the oceans.

Some of these new dumps are literally holes in the ground. Oil companies are eagerly championing schemes that would allow fossil fuel users to capture their carbon dioxide, liquefy it, and park it in leaky geological formations such as old oil wells (Figure 5).²⁵⁸ Other, even leakier new carbon dumps have been proposed for ocean bottoms (Figure 6).²⁵⁹

Figure 5. Storing carbon dioxide in geological formations. (Source: IPCC)

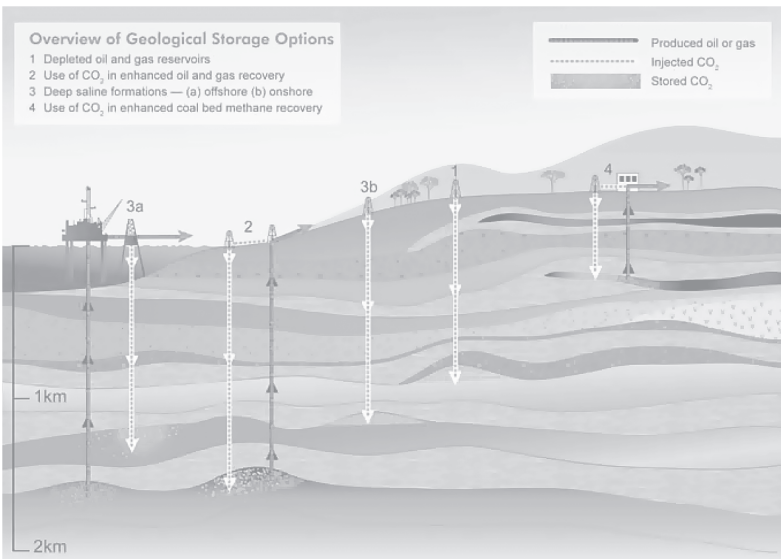
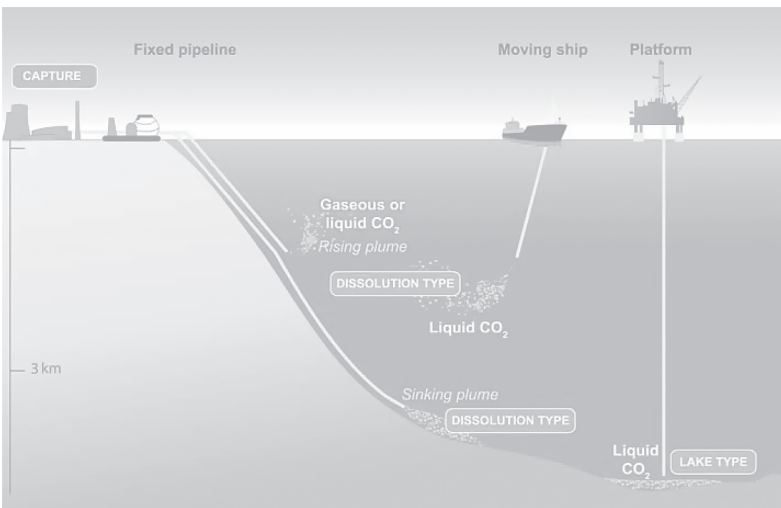


Figure 6. Storing carbon dioxide on ocean bottoms. (Source: IPCC)



Still other dump extensions consist of new trees planted to absorb carbon dioxide²⁶⁰ or soils where tilling has been halted to allow carbon buildup, or stretches of ocean salted with iron to stimulate plant growth.

And the second type of dump extension?



Gas flaring. Companies may soon be able to get carbon credits for using the gas to generate electricity instead.

A second type involves various emissions-saving technologies. For example, companies wanting carbon credits can help refit factories in Korea or India to capture or destroy hydrofluorocarbons such as HFC-23 or other powerful greenhouse gases such as nitrous oxide. Or they can invest in hydroelectric dams in Guatemala or Brazil that ‘replace’ electricity generated by fossil fuels. Or they can set up wind farms to generate green electricity, or institute efficiency projects that distribute energy-frugal light bulbs or rearrange traffic signals. Or they can grow biofuel plantations, which are claimed to provide ‘substitutes’ for fossil fuels. Or they can start up a project to feed supplements to Ugandan cows to reduce their methane flatulence.²⁶¹ They might even try getting credits for cleaning up debris left by the Indian Ocean tsunami.²⁶²

Another target for carbon finance is projects that take methane from, say, waste dumps in South Africa, coal seams in China, pig farms in Chile,²⁶³ or flaring towers in Nigerian oil fields, and use it as a fuel for generating electricity. Many such projects release carbon dioxide, but are said to be relatively ‘good’ for the climate, since releases of unburned methane are even worse for the climate than carbon dioxide.

But wait a minute. Shouldn’t it just be things like energy efficiency measures or solar power – or not building a plant at all – that get carbon money? Aren’t those things all less carbon-intensive than methane combustion?

It doesn’t matter. As long as a project emits less greenhouse gas than ‘business as usual’, it’s in the money.

But who figures out what ‘business as usual’ is?

The project proponent’s private consultants.

Who gives them the power to decide what is business as usual?

The UN does. Private businesses do. Government officials do. Individuals who buy carbon ‘offset’ credits do.

Some of these private consultants have also served on intergovernmental panels providing technical advice to the UN on what can be done about climate change and the carbon accounting methods that should be used for carbon projects.²⁶⁴ That further increases their influence with governments, industry and the UN.

Isn't that a conflict of interest?

Yes. But no one's making a fuss. When challenged, UN officials say that the expert qualifications of these consultants, together with the process of peer review, exempt them from charges of conflict of interest.

But what about the public? Why can't the public have a say over what business as usual should be considered to be?

The public doesn't play much of a part in these discussions – if they are informed what's going on at all.

How do these consultants go about their business?

They identify the 'baseline', or business-as-usual scenario. Then they verify that the existence of the carbon projects is due to the finance generated by the carbon credits they sell. Then they subtract the greenhouse gas emitted under the project scenario from greenhouse gas emitted under the baseline scenario to come up with the emissions 'saved' by the project (see box, p. 61). In claiming that various non-carbon or low-carbon futures are not possible, they are, in a sense, appropriating these futures for their own use.

Let me get this straight. Under this kind of trading, the carbon accounts of, say, Nigeria, show a debit for carbon dioxide released by the gas flaring that the Western oil industry conducts within its borders. At the same time, that same industry (or an industrialised country sponsoring the technology that captures the gas and puts it to good use), can get carbon credits for whatever the 'climatic' difference is between using that technology and releasing unburned methane.

That's correct. Nigeria gets stuck with the responsibility for the emissions of a foreign oil company. Foreigners get the credits for some marginal, and probably profitable, efforts to clean up around the margins – efforts that are mandated by Nigerian law anyway.²⁶⁵ It's a neat way for polluters to earn, while making poorer countries pay. It does no verifiable good for the climate, as we'll see in a moment. And it's all concealed under beautifully complicated accounting mathematics.

Today, dam companies, forestry firms, oil companies and the like are all seeking licenses to sell carbon dumping rights on the ground that their projects result in the emission of less carbon than business-as-usual 'alternatives' identified by experts.

So in theory, these carbon-'saving' projects could license the removal and burning of all the remaining fossil fuel still underground.

Yes.

But doesn't that reduce the whole idea of trading in carbon credits to an absurdity? Because isn't it true that if all the world's remaining fossil fuels are exhausted and burned, the human race is probably finished?

Yes. Carried to its logical extreme, trading in credits from 'offset' projects would result in a world in which all the coal, oil and gas had been burned up.

That calls up the image of a landscape full of wind farms, solar stations, and the carcasses of biofuel plantations and hydroelectric dams, all baking in an atmosphere hot enough to boil water.

Not a very nice picture. But presumably trading in carbon credits would never be carried that far.

No. But no one has ever suggested any ways of stopping it from doing so, either. Or any arguments why credit trading is not incoherent in just the way you've suggested.

So why are the world's governments still pursuing this idea?

No one is organised enough politically yet to call a halt to it. Meanwhile, the idea has great short-term appeal for business and governments.

Like 'pure' emissions trading (or cap and trade), trading that includes credits is supposed to save money by finding 'environmentally equivalent' actions that are in the short run cheaper to undertake. In fact, building or buying new carbon dump extensions is supposed to be even cheaper than buying some of other countries' share of the existing dump (assuming any is available).²⁶⁶



Centre for Science and Environment

In 1999, the World Bank was promising investors in its Prototype Carbon Fund credits at less than USD 5 a tonne – a bargain price that influenced all succeeding price-setting. In 2005, CDM carbon credits were trading at an average of around €6.7 per tonne of carbon dioxide, JI credits at around €5.1,²⁶⁷ two to four times less than EU ETS allowances. Some planners had originally hoped that absorbing carbon dioxide by planting trees in poorer countries could be 'between 50 and 200 times cheaper' than reducing it at source.²⁶⁸ As IPA Energy consultants have recently noted, permitting Northern installations to use Certified Emissions Reductions or CERs (as CDM credits are called) 'effectively constitutes a *second allocation*, at the CER price rather than zero cost'.²⁶⁹

But still, offsets encourage creativity in finding different ways to deal with climate change, don't they? For example, suppose you try to reduce emissions from jet aircraft by taxing short-haul air tickets so that they're USD 25 more expensive.

That might have some impact, but it's unlikely to deter most well-off people from flying. But if you encourage the same airline passengers to 'offset' their flights using that same USD 25, they can invest in all sorts of different climate actions on the ground. For example, a British Airways scheme offers schemes to plant trees or subsidise an energy-efficiency programme in rural India.

The problem is that for such offsets to work, carbon credits have to be climatically equivalent to carbon allowances. In other words, a carbon market that includes credits, like a market that includes only allowances, needs to ensure that the apples and oranges it is trading are climatically equivalent to each other.

Apples and oranges

Except that in the case of offsets, the apples and oranges are even more different from each other than they were with emissions trading.

Exactly. With emissions trading proper, the apples and oranges are, crudely speaking, emissions that come out of pipes in different locations through different processes and contexts. With a market that also involves project credits, the apples and oranges are far more diverse. The credits derived from various 'baseline-and-credit' schemes are different both from each other and from the emissions allowances associated with 'cap and trade' schemes. Destroying the industrial greenhouse gas HFC-23 is not the same as investing in windmills. Making your chemical plant more efficient is not the same as supplying efficient light bulbs to Jamaica. Planting trees is not the same as refraining from flying to the Maldives for a holiday. Yet all of these things need to be verified to be 'climatically equivalent' for credit trading to work.

In fact, the United Nations and other carbon trading advocates go so far as to claim that the carbon projects they are promoting are not only 'equivalent to', or 'compensate for', emissions reductions, but actually *are* emissions reductions. They assert that planting eucalyptus trees, building hydroelectric dams, burning methane or instituting efficiency programmes are 'reducing emissions' just as much as halting the flow of coal into a boiler, even if no emissions are being reduced.

So is there a problem? All these things are in fact climatically equivalent, aren't they?

No. That can't be verified.

So CDM schemes and other carbon projects don't, in fact, 'offset' or 'neutralise' industrial emissions?

No.

So they're not emissions reductions after all?

No. The putative commodity produced by CDM and similar 'carbon-saving' programmes can't be correctly referred to as 'emission reductions', 'carbon' or 'carbon dioxide equivalent', or any similar term. Unlike conventional dumps receiving industrial waste, mine tailings, or nuclear materials, the purported new carbon dumps carved out of the biosphere or the future can't even be verified to be dumps at all.

So in fact no one should be allowed to trade CDM or JI credits for allowances. And British Airways should not be claiming that its passengers can 'neutralise' their flights by giving money to tree-planters or efficiency programmes in India or South Africa.

That's right.

Well, I'm looking forward to hearing how you justify that claim. Because the UN and the IPCC, together with thousands of experts, claim that there are no scientific obstacles to trading credits for allowances.

The claim, unfortunately, is based more on free-market ideology and wishful thinking than scientific reflection. Just as in emissions trading, the 'baseline and credit' market's requirement that so many diverse things be made numerically equivalent has turned out to be its undoing. The difference is that the problems of trading systems that include project-based credits are even more intractable even than the problems of allowance trading alone.

OK, give me the bad news.

Accountants as storytellers

Let's begin with an insoluble quantification problem that's common to all carbon-'saving' projects.

As noted above, all such projects calculate carbon 'saved' by relying on experts' assessments of 'what would have been the case without the project'. The difficulty is that no expert has either the ability or the right to determine a single scenario describing 'what would have happened without the project'.

For instance, no expert can calculate what role CDM projects have in foreclosing or promoting structurally different long-term low-carbon futures. All they can do is calculate the role they might have in making certain more or less arbitrarily chosen ‘business-as-usual’ pathways marginally more carbon-efficient.

You’d better explain that in words of one syllable.

The credits that a carbon project generates are calculated by subtracting the emissions of the world that has the project in it from the emissions of an otherwise-identical possible world that doesn’t. This last world is called the ‘baseline’. Industrialised countries or corporations can then buy credits representing the emissions that are claimed to have been saved over the ‘baseline’ in lieu of reducing their own fossil fuel use.

Right...

To make this work, however, the market needs a single number. You can’t very well say that your wind farm or HFC-23 project generates ‘either 10 tonnes in carbon dioxide equivalent credit or 100,000 tonnes, depending on which baseline you choose.’ That would mean chaos. Sellers wouldn’t know how much of their commodity they were selling. Buyers wouldn’t know how much they were buying. So you can choose only one baseline.

OK, I’m with you so far.

The problem is that it’s impossible to isolate this single baseline and thus fulfil the requirement of a market for a single number. Even many trading proponents acknowledge the ‘impossibility of measuring or even defining savings that are additional to those that would have occurred in the absence of emissions credits.’²⁷⁰

What’s the difficulty?

Many without-project scenarios are always possible. The choice of which one is to be used in calculating carbon credits is a matter of political decision rather than economic or technical prediction.²⁷¹

The evidence usually cited to support claims that various schemes would not have been undertaken without carbon investment, moreover, is riddled with irresolvable uncertainties. One study of six proposed carbon plantation projects in Brazil couldn’t come to any more definite conclusions than that ‘at least one and possibly five’ of the six were ‘non-additional.’ The evidence was ‘completely unreliable’ about which project would be profitable or go forward without

‘Free-rider credits from non-additional CDM projects threaten to undermine the environmental integrity of the Kyoto Protocol. Some CDM regimes could lead global emissions to increase by as much as 600 million tonnes of carbon relative to the Kyoto Protocol target, if credits awarded spuriously to projects that would have happened anyway are used in place of real carbon reductions ... These free riders would amount to a multi-billion dollar cross-subsidy to CDM project participants at the expense of the global environment.’²⁸⁴

Steve Bernow et al., 2000

carbon money. Depending on discount rates, baseline vegetation estimates, carbon accounting systems and expected price variations, calculations of the value of the carbon credits to be generated differed by as much as an order of magnitude.²⁷²

So measuring carbon credits is completely different from measuring emissions.

Yes. While scientists can usually agree about how to read dials, calibrate gas detectors, and perform the other tasks necessary for directly measuring real emissions (assuming the necessary instrumentation is present), no consensus is attainable anywhere about how to isolate one single hypothetical storyline from among many possible storylines and measure the hypothetical emissions associated with it.

So while some scientific basis exists for markets in emissions, none exists for markets in project-based ‘offset’ credits, or markets in which emissions allowances and project-based credits are interchangeable.

So there are likely to be differences of opinion about how many credits any particular project generates, or whether it generates any at all.

That’s putting it mildly. Try to imagine, for example, what would have happened without a given tree plantation project in Brazil. Suppose you hire an expert to extrapolate what kind of vegetation would grow on the site without the project over the next 100 years. People are going to disagree with your findings. Suppose you hire someone to find out how the project will affect future investment at the company receiving the carbon credits. People are going to disagree with what you conclude. Suppose you hire someone to find out how the absence of the project would change local carbon use over the next century, looking into things like land speculation and land prices, land reform, road building, logging, soybean production, oil palm markets, changes in inflation rates, the profitability of beef production, alternative investments, prices and times for transport, and so on.²⁷³ People are going to disagree with those findings, too.

Experts who back this market have themselves long admitted that estimates of hypothetical ‘emissions reductions’ for many projects can be expected to differ by hundreds of percent given only small changes in initial assumptions.²⁷⁴ Michael Schlup of the Gold Standard, an organisation that hands out a special certificate to CDM projects it considers of high quality, has claimed that up to 50 per cent of projects are not really ‘additional’ but merely relabelled business as usual. CEE Bankwatch, in a study of a World Bank Prototype Carbon Fund’s JI project supporting small hydropower plants in the Czech Republic, recently argued that only six of the 16 installations involved repre-

sented anything other than business as usual.²⁷⁵ Strife has also broken out in the UN and in the corporate world. Most CDM carbon accounting methodologies proposed to date have been rejected by the CDM methodological panel for having implausible baselines.²⁷⁶ DuPont has accused its rival Ineos Fluor of overstating emissions ‘reductions’ from abatement projects (using a methodology that was approved by the CDM Executive Board) by a factor of three due to inflation of baselines.²⁷⁷ Germany’s Steinbeis Foundation has started a public campaign protesting CDM Executive Board decisions on permissible baselines for municipal waste projects.²⁷⁸ Project certifiers have expressed concern that UN rulebook’s inability to screen out ‘business as usual’ CDM projects makes it hard to calculate carbon credits.

According to Mark Trexler, a carbon businessman with 15 years’ experience, the resolution of the debate about how to decide whether a project would have happened anyway ‘seems as elusive as ever’. ‘There is no technically “correct” answer’, Trexler concedes. ‘Never has so much been said about a topic by so many, without ever agreeing on a common vocabulary, and the goals of the conversation.’²⁷⁹

This lack of verifiability would seem to open up a lot of possibilities for corporations or governments to employ creative accounting in order to claim the maximum number of carbon credits.

You can come up with almost any number you want. Both the incentives and the opportunities are huge.

As trading expert Michael Grubb and colleagues observed years ago, ‘every government and every company’²⁸⁰ wanting carbon credits has an incentive to try to get them for projects that it is already implementing or had planned even before carbon markets came along. All you have to do is hire an expert who is willing to make ‘business as usual’ appear as bad as possible. ‘The more conventional the baseline, the more additional funds or credits... can be recovered’ from your carbon project, note Hermann Ott and Wolfgang Sachs.²⁸¹

The result, as one barrister and banker, James Cameron of Climate Change Capital, notes bluntly, is that many carbon project proponents ‘tell their financial backers that the projects are going to make lots of money’ at the same time they claim to CDM officials ‘that they wouldn’t be financially viable’ without carbon funds.²⁸²

In 2003, for example, the Asian Development Bank funded the proposed Xiaogushan dam in China, portraying it as the cheapest and most economically robust alternative for expanding electricity generation in Gansu province. Construction went ahead without any



Speakers at an event arranged by the International Emissions Trading Association (IETA) during international climate negotiations. IETA is a coalition of private companies including AES, Barclays Capital, ChevronTexaco, ConocoPhillips, DuPont, Ecossecurities, Gaz de France, Goldman Sachs, Gujarat Fluorochemicals, J-Power, KPMG, Lafarge, Lahmeyer, RWE, Shell, Total, Toyota, TransAlta and Vattenfall.

mention being made of the need to secure CDM funding beforehand, and was scheduled to be completed in 2006. Yet in a June 2005 application for Xiaogushan to be considered as a CDM project, the World Bank claims that without CDM support, the dam ‘would not have been able to reach financial closure, mitigate the high project risk, and commence the project constructions’.²⁸³

Similarly, CDM credits are being sought for the Bumbuna hydroelectric project in Sierra Leone on the grounds that the project is unviable without them, although the project was approved for financing by the World Bank in 2005 as the least-cost project for the country’s power sector.²⁸⁵ In one Latin American country, consultants tipped out the name of a hydroelectric dam from a copy of a national development plan in an attempt to show that the dam was not already planned or ‘business as usual’ and therefore was deserving of carbon finance.²⁸⁶

At an event arranged by the International Emissions Trading Association in Milan in 2003, a representative of the Asian Development Bank confided that his institution’s first reaction to the CDM was to go through its existing portfolio to see which projects’ funding might be topped up with carbon finance. No one was under any illusion that carbon money would be used for anything other than what the bank itself acknowledged to be business as usual. (For more examples, see Chapter 4.)

In announcing its withdrawal from CDM projects in 2004, Holcim Cement went as far as to warn that CDM carbon-accounting methodology ‘will create other Enrons and Arthur Andersens’,²⁸⁷ referring to recent accounting scandals at the two firms. A year and a half later, even Einar Telnes, a Det Norske Veritas executive representing the forum of private firms that profit from validating and verifying carbon projects, was publicly fretting that the big differences between how different carbon accountants tallied up credits ‘could lead to a lack of confidence in the market as such... . We don’t want an Enron scandal where excess CERs [CDM carbon credits] are issued without the actual reductions taking place... . It is crucial that those verifying have the necessary knowledge. Many of them don’t’.²⁸⁸

A UK Parliamentary Committee was less guarded, lambasting the experimental UK Emissions Trading Scheme, which had paid more than GBP 100 million to four companies ‘for keeping emissions down to levels they had already achieved’, as ‘bullshit’, ‘stupid’, a ‘mockery’, and an ‘outrageous waste of public money’ that undermined government emissions reduction policies.²⁹⁰

‘The CDM will be prone to fraud and fluctuations beyond control of the developer or the CDM board.’²⁹³

*O.P.R. Van Vliet et al.,
2003*

Baseline accounting procedures also set up perverse incentives for carbon project proponents to emit as much greenhouse gas as possible today in order to make projects appear to be saving as much carbon as possible tomorrow. Why not step up pollution or degrade more forests today in order to make more carbon money later? Throughout the South, the CDM is creating incentives for emissions-related environmental laws not to be enforced, since the greater the ‘baseline’ emissions, the greater the payoffs that can be derived from CDM projects. Even sincere unfavourable predictions about ‘what would happen’ without a CDM project may function as self-fulfilling prophecies.²⁹¹ With a bit of judicious accounting, a company investing in foreign ‘carbon-saving’ projects can increase fossil emissions both at home and abroad while claiming to make reductions in both locations.²⁹² The calculational machinery that would be necessary for a market in CDM credits, in other words, is itself undermining predictability and the possibility of market calculation.

Perhaps understandably, a few years ago, developers, brokers, Northern government ministers, the World Bank and others frustrated by the sluggish pace of carbon project development tried to float the idea that CDM schemes should not even need to show that they would not have happened without carbon investment.²⁹⁴ Other experts suggested that the question of ‘what would have happened without a project’ should simply be decided arbitrarily, to save trouble.²⁹⁵ That was as much as to admit that the carbon credits your project is going to sell can’t be proved to have anything to do with climate. You might as well call them ‘schmarbon credits.’

Do carbon market advocates think that people are really going to pay money for these ‘schmarbon credits’ if they can’t be verified not to be a sham?

You have to remember that in this market it’s in the interests of both buyers and sellers to inflate the number of carbon credits a project generates. So there are a lot of incentives on all sides to keep quiet about what’s going on.

As yet, Northern businesses and ministries don’t need to worry whether the market has anything to do with climate or not. Their job is only to get hold of cheap credits. And many individual consumers buying ‘offset’ credits on the voluntary market tend to rely on carbon traders’ glossy brochures, which are better at salving consciences than providing balanced analysis. There aren’t many checks and balances built into the system.²⁹⁶

In a sense, today’s carbon credit market is about appearances and public relations. At present, it doesn’t matter whether what the project-



CDM carbon-credit accounting ‘will create other ENRONs’, according to one carbon-credit buyer, referring to the accounting fraud that devastated the energy-trading firm. Not surprisingly, perhaps, the disgraced firm was a staunch backer of the Kyoto Protocol’s carbon trading systems.²⁸⁹

based credit market sells is ‘carbon’ or ‘schmarbon.’ Nor does it matter that no one knows what schmarbon is. In this market, image is as saleable as reality.

But if this ‘schmarbon market’ isn’t about climate, then what is it about? Aren’t people eventually going to want to know what is being bought and sold?

Very likely. To survive for very long, the market will ultimately have to deal in something more concrete whose quality can be verified. It won’t be enough of a guarantee of product quality that buyers and sellers agree to label their commodity ‘carbon’ or ‘emissions reductions’, if in fact it’s only schmarbon. To put it another way, sooner or later the quality of the image will have to be measured by the reality.



George Akerlof

At that point, the project-based credit market begins to run the risk of becoming what economist George Akerlof calls a self-destructing ‘lemons market’.²⁹⁸ In such a market, because the quality of goods can’t be proved, buyers can neither locate, nor create demand for, quality products, if any exist at all. ‘Lemons’ are loaded onto the market, and buyers won’t pay the prices demanded by any sellers of higher-quality products. Better projects are penalised and bad ‘free-riders’ subsidised. Transaction volume and quality both decline, further lowering prices and quality in a cumulative process which ultimately destroys the market.

Notes Francis Sullivan of HSBC, the Hong Kong and Shanghai Banking Corporation, ‘there is little incentive for a small company, or even a big business’ to spend a lot of time looking for high-quality carbon credits ‘when there is a risk of losing credibility and wasting money’ due to lack of a credible standard. Sullivan relates that when HSBC put out a tender for carbon credits in the voluntary market, suppliers came forward with credits with a huge price range between USD 3–25 per tonne. ‘If there’s an eight-fold difference in price, you can’t be talking about the same product,’ Sullivan points out.²⁹⁹

Of course, when sellers can’t verify commodity quality any better than buyers, and know it, the situation is even worse. And it’s worse still when not even buyers are concerned about verifiable quality, but only about fulfilling legal commitments at the cheapest possible price.

Yet such are the demands of the market – and the self-defeating determination to ignore logic in order to ‘keep Kyoto going’ – that consultancies, UN bodies and technocratic NGOs such as the World Resources Institute continue relentlessly to try to develop techniques for isolating unique, quantifiable counterfactual baselines.³⁰¹

'Better than the Alternative'

Development professionals have often tried to justify failed projects and policies by claiming that at least they were better than 'what would have happened otherwise'.

World Bank officials consistently used this reasoning to justify their agency's decades-long political intervention in Zaire in sup-

port of the dictator Mobutu Sese Seko, who openly stole hundreds of millions of dollars from his country.³⁰⁰

Justifying climatically-damaging carbon 'offset' projects using the same reasoning is child's play by comparison.

Why didn't the marketeers see this coming? Were the signatories of the Kyoto Protocol asleep? And what's the excuse of the European governments who decided to accept project-based carbon credits in the EU ETS?

Those are all good questions. The impossibility of measuring pollution 'offset' credits was already plain to see in the US's earlier pollution trading programmes.

Oh, no. You mean this is another case of 'lessons unlearned'?

I'm afraid so. In the US, they even had a term for meaningless pollution credits handed out to industry for actions that would have happened anyway. They called them 'anyway tonnes'.

Could you give some examples?

One instance was the Los Angeles Regional Clean Air Incentives Market (RECLAIM) described above. The South Coast Air Quality Management District (SCAQMD) allowed factories and refineries to avoid installing pollution control equipment if they purchased credits generated by licensed car scrappers who destroyed old, high-polluting cars. The idea was that it would be cheaper to reduce overall pollution by buying up and destroying old cars than by forcing stationary sources to make technological changes in their plants. It was an early example of the 'offset' reasoning that's now so prominent in the Kyoto Protocol's carbon market.

*'In all the excitement over the imminent arrival of a fully-fledged carbon market, we may be losing sight of one fundamental question – what, exactly, are we trading in?'*³⁰⁷

Environmental Data
Services Report

In other words, they were claiming that getting rid of cars was just as good for the air as making factories cut down their pollution?

Exactly – and that the two could be traded for each other. Unfortunately, car scrappers often generated fraudulent pollution credits by crushing car bodies without destroying the engines, which they then sold for re-use. More to the point, the pollution credits generated by scrapping cars were based on the assumption that if they were not

scrapped, the cars would be driven 4,000–5,000 miles annually for an additional three years and that their owners would then replace them with automobiles with ‘average’ emissions.

Yet a SCAQMD audit found that many of the cars were at the end of their useful lives, and would have been destroyed through natural attrition. Some 100,000–200,000 old vehicles are scrapped or abandoned in the Los Angeles area annually in this way without the intervention of pollution trading programmes. Most of the 23,000 cars that were destroyed under the pollution trading scheme during its first five years were arguably among those that would have been destroyed even without the programme. After all, why sell your old car for its USD 50 value as scrap metal when you can obtain USD 600 for it through a pollution trading scheme?³⁰²

Moreover, of the cars that were not at the end of their lives, in addition, many were not regularly driven and would not have been driven for another three years. Inoperable cars were often brought to car scrapping facilities and minor repairs made solely for the purpose of obtaining the USD 600 payment from the scrapping program. Such cars were not generating any pollution, but merely collecting dust. Non-existent automobile pollution was transformed, through the market, into real pollution released from oil tankers or other sources. The end result was to increase aggregate emissions across the region.³⁰³

In the ‘bubble’ trading system instituted by the US Environmental Protection Agency, similarly, polluters almost never undertook fresh pollution control projects to satisfy regulations. Instead, they claimed credits for reductions that presumably would have occurred without the regulation. For example, polluters often claimed credits for routine business decisions to slow down production or shut down facilities.³⁰⁵

In the 1970s, states lured new industry by providing firms with ‘offsets’ that the states themselves created – in one case credits for ‘an asphalt substitution process that already was occurring for non-environmental reasons’.³⁰⁶ In the 1980s, similarly, Ashland Oil didn’t want to comply with a requirement that it lower emissions from certain storage tanks. Instead, it petitioned to be allowed to reduce the allowable emission rate from a gasoline truck loading facility from 50.7 to 19.0 tonnes per year – even though the facility was already emitting only 4.4 tonnes per year.³⁰⁷ Not surprisingly, such gambits were heavily criticised by environmentalists.

Nor were such absurdities confined to the US. The Global Environmental Facility, which serves as a financial mechanism for both the UNFCCC and the 1992 UN Convention on Biological Diversity, early on ran into similar accounting problems. The GEF was supposed to fund only that element of a project that resulted directly in the reduction

Communities Fight Back in the Courts

In 2002, two environmental groups, Our Children's Earth and Communities for a Better Environment, sued nine Los Angeles organisations for purchasing pollution 'offset' credits, including the city of Burbank, Southern California Gas and United Airlines. The groups pointed out that the credits had not been approved by the Environmental Protection Agency.

The offset credits – awarded for activities such as replacing standard buses with vehicles fuelled by natural gas – had be-

come particularly attractive when prices for credits from stationary sources climbed as high as USD 62 per pound during the California energy crisis of 2000–01. Prior to the crisis, stationary source credits had cost around USD 1 per pound.

The NGO plaintiffs argued that allowing such credits into the market defeats its fundamental purpose. 'Credits are supposed to become so expensive that it forces some companies to put on controls,' they said. 'We're just enforcing the programme.'³⁰⁴

of greenhouse gas emission and so would yield a 'global environmental benefit'. Under this methodology, a project proponent had to describe what would have happened in the Southern host country 'but for' the GEF investment. Only then could the GEF provide the funding that made the alternative or additional climate-friendly activity possible.

But this approach turned out to be 'fraught with political and methodological difficulties'. For one thing, it 'excluded the participation of recipient country officials in most cases, because of the lack of understanding of the concept and methodologies'.³⁰⁸ For another, it 'tempted governments to lower a domestic environmental baseline to become eligible for a larger GEF grant'. The result was that Northern governments decided that no one could receive GEF funding just by claiming their project was better than 'what would have happened otherwise'. They had to try to show that it was better than what *should* have happened in the project's absence.³⁰⁹

But haven't there been any 'offset' success stories?

The one pollution trading scheme generally cited by carbon trading advocates as a success story – the US's sulphur dioxide trading programme – had the advantage that it *excluded* project-based 'offset' credits.³¹⁰ What were measured and traded were emissions, not purported 'emissions reductions' derived from projects claimed to be improvements on 'business as usual'.

This is in sharp contrast to the Kyoto Protocol (a programme that is supposed to have been inspired by the sulphur dioxide scheme), which has fully embraced 'offset' projects in its trading programme.

Sinks, biophysics and the unknown

Some of the worst trouble that carbon market planners have landed themselves in has come about as a result of credit-generating schemes that purportedly soak up carbon dioxide through tree-planting or other biotic means. There are even more verification problems with these ‘carbon sink’ projects than with other ‘offsets.’

Don't tell me. How could things be any worse?

From the beginning, climate technocrats have been under heavy pressure to try to operate a ‘system of credits and debits wherein emission or sequestration of carbon in the biosphere is equated with emission of carbon from fossil fuels’.³¹¹ They’ve been pushed into trying to prove that a world which closes a certain number of coal mines or oil wells will be climatically equivalent to one which keeps them open but plants more trees, ploughs less soil, fertilises oceans with iron, and so forth.

So the idea is that if you plant enough trees, you can go on mining and burning fossil fuels forever.

Well, not exactly. Even the biggest fans of tree ‘offset’ projects admit that there’s not actually much scope for using tree-planting to deal with the climate crisis.

As Chapter 1 noted, the pool of carbon stored in living biomass is dwarfed by the pool of remaining fossil carbon awaiting exploitation. Under the most favourable assumptions, using trees even to try to ‘compensate’ for current emissions would require protecting impossible continent-sized plantations rigorously for decades.³¹² Trying to counteract a single year’s emissions in the UK would necessitate covering Devon and Cornwall with trees.³¹³ Doing the same for a single year’s global emissions would mean, at a minimum, setting up and protecting industrial plantations on all ‘available’ land in Brazil for the next 40 to 50 years.³¹⁴ Attempting to absorb the carbon dioxide released by the burning of the fossil fuels still in the ground would require additional planets full of trees. As a distinguished group of scientists writing in *Science* concluded:

Prospects of retrieving anthropogenic CO₂ from the atmosphere by enhancing natural sinks are small... There is no natural ‘saviour’ waiting to assimilate all the anthropogenically-produced CO₂ in the coming century.³¹⁵

A similar point applies to projects producing biofuels to replace petroleum. Gigantic plantations would be required just to replace a tiny

fraction of the fossil fuels used for transport. It is estimated, for instance, that even if the entire US maize crop were used for ethanol, it would replace only about 20 per cent of domestic petrol consumption.³¹⁶ To power 10 per cent of the US's cars with home-grown maize-based ethanol, according to the Organisation for Economic Co-operation and Development, would require almost one-third of US farmland.³¹⁷ A study sponsored by the European Environment Agency and the German Environment Ministry doesn't see it as desirable to plan for more than 10 per cent of the EU's transport fuel demand to be met by biofuels.³¹⁸ Biofuels can make up no more than 5 per cent of petrol or diesel consumption in the US and the European Union without causing environmental damage, according to a report from Bank Sarasin.³¹⁹

What's more, there is no guarantee that the huge takeover of land would slow in any way the exploitation of the fossil fuels still remaining underground. Such so-called 'renewable' fuels are not, in fact, going to be renewable if today's industrial, transport and military structures remain locked in place. As columnist George Monbiot explains, 'every year we use four centuries' worth of plants and animals' in the form of coal, oil and gas. 'The idea that we can simply replace this fossil legacy – and the extraordinary power densities it gives us – with ambient energy is the stuff of science fiction. There is simply no substitute for cutting back.'³²⁰ Julia Olmsted of the Land Institute in the US concurs: 'Pushing biofuels at the expense of energy conservation today will only make our problems more severe, and their solutions more painful, tomorrow.'³²¹

But it can't be verified anyway to what extent a tree plantation or other biotic project 'compensates' for fossil fuel use.

Why can't it?

The problem – as described in Chapter 1 – is that above-ground biotic carbon and below-ground fossil carbon are connected to the atmosphere in different ways. Geologically, socially, politically, biologically and climatically, fossil carbon can't be equated with biotic carbon.

These differences are so great that they make nonsense out of the carbon market's claim that tree plantations or similar schemes 'sequester' carbon on the earth's surface in a way that is quantifiably comparable to the way coal and oil 'sequester' carbon underground. 'Sequestering', after all, means separating, and there are many degrees of separation. The carbon in a cigarette, in the fluid in a lighter, in grass or a tree trunk, in furniture or paper, in the top seven inches of soil, in coal deposits a kilometre underground, in carbonate rock dozens of

kilometres beneath the surface – all are separated from the atmosphere, but in different ways, for different average time periods, and with different risks of the carbon being released unexpectedly into the atmosphere. While fossil carbon flows into the biosphere/atmosphere system are pretty much irreversible over non-geological time periods, those from the atmosphere into the biosphere are easily reversible and not so easily controlled. A tonne of carbon in wood is not going to be ‘sequestered’ from the atmosphere as safely, or as long, as a tonne of carbon in an unmined underground coal deposit.

You mean that a tree plantation might burn.

Or it might be made into paper that will wind up in landfill and degenerate into greenhouse gas, or be made into furniture with a lifespan of only 50 years. Or it might be cut and left on the ground to rot by angry local villagers.

But surely carbon traders know this.

Of course. They acknowledge that one tonne of carbon in a tree is climatically not the same as one tonne of carbon in a deep coal deposit. But they hope that fossil carbon and biotic carbon can be made comparable by taking the amount of carbon in wood or soil and multiplying it by some fudge factor that takes into account its impermanence and the complexities of carbon circulation in the above-ground carbon pool.

So, say, five tonnes of carbon to be sequestered in trees by a carbon project established today would be assumed to be ‘climatically equivalent’ to one tonne of carbon left in coal deep underground.

Something like that. There are all sorts of schemes for applying discounting formulas or ‘risk-spreading’ factors to sequestration credits based on how long trees survive. There are all sorts of proposals for making sequestration credits temporary or available only for rental, insuring trees against fire, and so forth. Means have also been suggested for identifying and quantifying precisely how much carbon ‘leaks’ from various kinds of biotic projects (through fires, soil erosion, fossil emissions from transport required for the project, evictions leading to forest encroachment elsewhere, etc.).³²²

None of these methods work, however.

Why not? What’s the problem?

You might remember that Chapter 1 introduced Frank Knight’s distinction between risk – a situation in which the probabilities of

everything that can go wrong actually going wrong are well-known – and uncertainty – in which they aren't.

The trouble with 'carbon sink' projects that attempt to commensurate biotic with fossil carbon is that, to do so, they have to confuse uncertainty with risk – and try to convert the one into the other.

But that's not all. These projects also confuse risk with ignorance – a situation in which not even all the things that can go wrong are known. And, like other carbon-saving projects, they confuse risk with indeterminacy, which applies in situations in which comparison with counterfactual scenarios makes the calculation of probabilities inappropriate.

Hang on a minute. Let's start at the beginning. What do you mean when you say carbon sink projects confuse risk and uncertainty?

In order to derive the single number the market requires, carbon sink accountants have to look at all the things that might result in carbon being released from trees into the atmosphere and calculate their probability. But they can't do this.

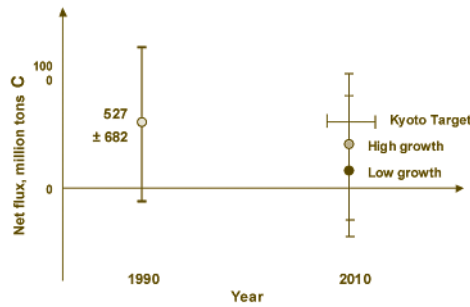
Why not?

Straightforward inadequacy of data is one obstacle. To get an idea of the size of the problem, consider one detailed study done by the respected International Institute for Applied Systems Analysis (IIASA). According to the study, mean net Russian carbon balance in 1990 (including flows into and out of the biosphere) can be pinned down only to the range of minus 155 to plus 1209 million tonnes per year. That swamps probable changes in total Russian carbon flux balance between 1990 and 2010, which are expected to be only 142 to 371 million tonnes (Figure 7).³²³

The IIASA concludes that knowledge of carbon flows among the atmosphere, biosphere and lithosphere is inadequate 'to form the basis for...any viable trading scheme.' That makes the Kyoto Protocol 'completely unverifiable' and a 'cheat's charter'.³²⁴ Climatologist R. A. Houghton, similarly, has suggested carbon errors 'as large as 500 per cent in the forest inventories of northern mid-latitudes'.³²⁵

Figure 7. Possible Range of Carbon Fluxes in Russia

Source: IIASA



By the same token, estimates of carbon sequestration rates in China's forests have recently been found to differ by up to 89 per cent³²⁶ and in a pine forest in The Netherlands by 46 per cent,³²⁷ depending on the method used. In 2006, in addition, it was revealed that pine plantations in the southern US were responsible for large increases in carbon dioxide emissions, since they were replacing hardwood or indigenous pine forests.³²⁸ World methane sources have meanwhile been found to be uncertain by '20 to 150 per cent.'³²⁹ In 2001, the UK's Royal Society cited an 'urgent need' to reduce uncertainties before land carbon sinks are used.³³⁰

Similarly, although some of the mechanisms that will affect the ability of trees to sequester and store carbon as the world warms up are known, the probability that any particular wooded region will maintain any given carbon balance over the next 50 or even 10 years can't be calculated.³³¹

With regard to many such uncertainties, it's possible, to borrow the words of economist Douglass North, to 'acquire more knowledge and therefore convert uncertainty into risk'. When it comes to ignorance, however, 'one not only does not have a probability distribution of outcomes, but (using a Keynesian definition) one may not even know what the possible outcomes are, much less have a probability distribution of them'.³³²

For example?

For example, the past decade of research has provided continual surprises about how carbon in the biosphere affects climate, and vice versa, and how nonlinear and unpredictable relations can be between the two:

- Since the turn of the century, evidence has been emerging that possible climatic ‘tipping events’ such as the rapid release of greenhouse gases from permafrost, peat, ocean floors or dried-out tropical or boreal forests could be as unpredictable in their timing as in their impacts.³³³ Meanwhile an enormous ‘missing sink’ in the biosphere has yet to be definitively located.³³⁴
- In 2000 scientists were startled to learn that the heat absorbed by dark-coloured tree plantations in Northern regions might cancel out their ability to absorb carbon dioxide.³³⁵ A review article in *Science* warned that unanticipated ‘feedback effects between carbon and other biogeochemical and climatological processes will lead to weakened sink strength in the foreseeable future.’³³⁶ The possibility was mooted that that lengthening of dry seasons could abruptly result in catastrophic releases of carbon through fires in Amazon, pushing temperatures up 6–8 °C in 100 years.³³⁷
- In 2002, scientists warned that soils’ or forests’ ability to function as sinks under different conditions is nonlinear and ‘limited.’³³⁸
- In 2004, experiments called into question the effectiveness of increasing the oceans’ uptake of carbon by seeding them with iron, demonstrating that the organic carbon increased by the technique is not transferred efficiently below the permanent thermocline.³³⁹ Global warming was shown to intensify insect infestations that can damage the carbon-storing ability of forests.³⁴⁰
- In 2005, new research suggested that carbon releases from soils in a warming world may ‘be even stronger than predicted by global models.’³⁴¹ It was then revealed that since 1978 there had been huge surprise carbon releases from warmed soils in the UK.³⁴² New research showed that in many circumstances ‘creating carbon offset credits in agricultural soils is not cost effective because reduced tillage practices store little or no carbon.’³⁴³ Reduced-tillage soil carbon sequestration was found to result in unexpected releases of nitrous oxide, a powerful greenhouse gas.³⁴⁴
- Also in 2005, an ensemble of general circulation models assuming a doubling of levels of atmospheric CO₂ and a selection of conditions considered plausible by experts showed that the range of possible warming (and thus effects on carbon-storing ecosystems) was far greater than expected (from less than 2 to more than 11.5 degrees Celsius).³⁴⁵ Unexpected carbon dioxide releases from biological matter in Amazonian rivers were traced for the first time.³⁴⁶

‘It’s a working principle of the Head Bureau that the very possibility of error must be ruled out of account. This ground principle is justified by the consummate organisation of the whole authority, and it is necessary if the maximum speed is to be attained... Is there a Control Authority? There are only control authorities. Frankly it isn’t their function to hunt out errors in the vulgar sense, for errors don’t happen, and even when once in a while an error does happen, as in your case, who can say finally that it’s an error?’

*‘The Superintendent’
in Franz Kafka,
The Castle, 1926*

- In early 2006, climate researchers were stunned when new research revealed terrestrial plants emit methane, a greenhouse gas, under normal growing conditions through mechanisms that are as yet mysterious.³⁴⁷

There's no reason to expect such surprises are over. And any of them could play havoc with the possibility of doing the accounting that a market in credits from sinks projects would require.

Even worse news for the carbon market is the fact that setting up a measurable equivalence among emissions and biological sequestration would require quantification of the effects of social actions and institutions that mediate carbon flows. Carbon transferred from underground to the atmosphere enters not only the biosphere but also social and cultural spheres. Physical actions (for instance, planting biomass for power plants) bring about social effects (for example, resistance among local farmers, diminished interest in energy efficiency among investors or consumers, loss of local power or knowledge), which in turn bring about further physical effects (for instance, migration to cities, increased use of fossil fuels) with carbon or climatic implications. Calculating how much carbon a new tree plantation actually 'offsets' would require not only looking at soils and adjacent plots and streams, but also estimating how much the plantation has delayed the adoption of a technologically different energy-generation path on the part of carbon credit buyers, observing the 'carbon behaviour' of farmers evicted from the plantation site and their descendants for unspecified periods of between 42 and 150 years (estimates of the atmospheric lifetime of carbon dioxide emissions vary),³⁴⁸ and so forth. No basis exists in either physical or social science for deriving numbers for the effects on carbon stocks and flows of such social actions.³⁴⁹ 'Risk' models and what Douglass North calls the 'static theory' of orthodox economics are simply unhelpful in these circumstances 'of continuous change in many dimensions,' including 'change in the social structure and behaviour of human beings'.³⁵⁰

Reality and fantasy

What effect have concerns about the credibility of these carbon-saving projects had?

Carbon sink projects like plantations had a rough ride from the beginning. A majority of environmentalists and NGOs have opposed them strongly in a stream of declarations and position papers,³⁵⁸ and some governments have also been intermittently sceptical. The Verification Research, Training and Information Centre stated unequivocally in 2000 that forestry and land use 'must not be used to meet emissions

Carbon Offsets and the Ghost of Frank Knight



Frank H. Knight (1885–1972), a University of Chicago economist recognised as one of the deepest thinkers in 20th century US social science, is famous for his distinction between *risk* and *uncertainty*.³⁵¹ Although he

could never have anticipated all the ways it could be applied, Knight's 1921 distinction helps explain why it's confused to put any faith in a market for emissions credits generated by carbon-saving projects.

Risk, in Knight's sense, refers to situations in which the probability of something going wrong is well-known. An example is the flip of a coin. There is a 50–50 chance of its being either heads or tails. If you gamble on heads, you risk losing your money if it turns out to be tails. But you know exactly what the odds are.

Uncertainty is different. Here, you know all the things that can go wrong, but can't calculate the probability of a harmful result. For example, scientists know that the use of antibiotics in animal feed induces resistance to antibiotics in humans, but can't be sure what the probabilities are that any particular antibiotic will become useless over the next 10 years.

Still worse, as Knight's successors such as Poul Harremoës and colleagues have pointed out,³⁵² are situations of *ignorance*. Here you don't even know all the things that might go wrong, much less the probability of their causing harm. For example,

before 1974, no one knew that CFCs could cause ozone layer damage. Obviously, this ignorance would have invalidated any attempt, at the time, to calculate the probability of ozone depletion.³⁵³ Here, as with uncertainty, talk of 'margins of error' is inappropriate.

In situations of *indeterminacy*, finally, the probability of a result cannot be calculated because it is not a matter of prediction, but of decision. For example, it might be 'implausible' for subsidies for fossil fuel extraction to be removed within five years, but you can't assign a numerical probability to this result, because whether it happens or not depends on politics. In fact, trying to assign a probability to this outcome can itself affect the likelihood of the outcome. In such contexts, the exercise of prediction can undermine itself.

Problems posed by risk, uncertainty, ignorance and indeterminacy each call for different kinds of precaution. Risk fits easily into economic thinking, because it can be measured easily. Uncertainty, ignorance and indeterminacy, however, call for a more precautionary and flexible, and less numerical, approach.³⁵⁴

Take the carbon credits to be generated by tree plantations. If these credits were threatened by nothing more than risk, calculating techniques associated with insurance or discounting would be enough to create a viable commodity. You could insure carbon credits from a plantation just as you take out fire insurance for a building. If you knew the margin of error associated with a carbon calculation, you could play it safe by applying a discount factor.

But such credits are subject not only to risk, but to uncertainty, ignorance, and indeterminacy as well. For example:

- How long will plantations last before they release the carbon they have stored into the atmosphere again, through being burned down or cut down to make paper or lumber, which themselves ultimately decay? This is not simply a risk, in Knight's sense, but involves uncertainties and ignorance that can't be captured in numbers. For example, it is still not known what precise effects different degrees of global warming will have on the cycling of carbon between different kinds of trees and the atmosphere.
- To what extent will plantations affect the carbon production associated with neighbouring ecosystems, communities, and trade patterns? Again, uncertainty and ignorance, not just risk, stand in the way of answers.

- How many credits should be subtracted from the total generated by plantations to account for the activities that they displace that are more beneficial for the atmosphere in the long term, for example, investment in energy efficiency or ecological farming? No single number can be given in answer to this question, since 'it is inherently impossible to verify what would have happened in the absence of the project'.³⁵⁵ That is, the answer is indeterminate.

Uncertainty, ignorance and indeterminacy are three reasons why it's not ever going to be possible to trade trees for smoke. By mixing up 'the analytically distinct concepts'³⁵⁶ of risk, uncertainty, ignorance and indeterminacy, schemes such as the Clean Development Mechanism and Joint Implementation have blundered into what Knight would have called a 'fatal ambiguity'.³⁵⁷ In this case, the fatality is the very climate commodity that carbon credit markets hoped to deal in.

reductions commitments' since changes to carbon stocks will 'rarely be verifiable'.³⁵⁹ In the end, despite industrialized countries' efforts, credits from forest conservation projects were not allowed into Kyoto Protocol markets³⁶⁰ and carbon sink project credits barred from use in the EU ETS, though they remained prominent in the Protocol.

However, the fundamental impossibilities of carbon-sink credits haven't ever been faced squarely by business, UN specialists, or most governments.

For example, during its deliberations on land use, an Intergovernmental Panel on Climate Change committee³⁶¹ stubbornly professed high confidence in certain global estimates of biotic carbon fluxes despite its being pointed out that estimates of net global terrestrial carbon uptake had a factor-of-five error bar (200 million tonnes give or take a billion tonnes). Similarly, because acknowledging the huge error bars surrounding estimates of tropical deforestation would

have undermined the possibility of generating CDM credits through ‘avoided deforestation’, the existence of the bars was referred to only in a footnote. When delegates discovered that the IPCC panel had changed already-approved estimates regarding sequestration by factors of up to 10 times in a way that made biotic carbon sequestration seem more plausible, panel chair Robert T. Watson offered the excuse of a ‘simple typing mistake’. Throughout, IPCC scientists have been careful to avoid putting themselves in a position in which they might be forced to assess carefully the threat various risks and uncertainties pose to the Kyoto market’s accounting system.³⁶² The carbon-trading tail was wagging the scientific dog.

The wagging has continued. Recently, several European governments, desperate for cheap credits, have let slip that they plan to try to allow carbon sink credits back into the EU ETS. In addition, carbon sink credits continue to be popular in the voluntary market. And there has recently also been a renewed push to include forest conservation projects in the CDM.³⁶³

But maybe these governments and their expert advisers just don’t understand the issues.

It’s unlikely that’s the entire explanation.³⁶⁴ Trading advocates such as Michael Grubb are very clear that it is ‘impossible’ to measure or define the climatic difference between with- and without-project scenarios. It’s just that they later backtrack to the position that it’s merely ‘difficult’.³⁶⁵ In this same way, another expert admitted that carbon savings ‘cannot be measured’ only later to slip into the claim that ‘accurate’ or ‘inaccurate’ measurements can be made.³⁶⁶

Baselines that are at first admitted to be ‘inherently impossible to verify’ are often then treated as merely imprecise, with error bars of, say, ‘45 per cent in either direction’ that can be ‘managed’ by ‘putting in place safeguards and taking a conservative approach’.³⁶⁷ In 2003, carbon project proponents were forced to admit that some projects that had been CDM candidates – and rejected for being business as usual – were indeed going forward without carbon money. The response from some trading proponents was that even if such projects were not business as usual ‘at the time of application,’ perhaps they became so later – or that perhaps it was only initial CDM interest that enabled them to find the finance that allowed them to proceed.

Similarly, many carbon consultants at first denied the need to quantify socially-mediated carbon effects of CDM projects, or protested that it was ‘not their job’ to do so.³⁶⁸ Others tried to float the idea that (for example) the indirect and long-range effects of establishing

‘The Kyoto Protocol to the UN Framework Convention on Climate Change may be the most important economic agreement penned in the 20th century.’

Aaron Cosbey,
Royal Institute of
International Affairs,
London

subtropical carbon plantations on timberland management in temperate regions could be satisfactorily quantified years in advance.³⁶⁹ The IPCC's panel on land use once tied itself in knots trying to figure out how carbon credits might be given out for good conservationist policies. Eventually the panel decided that since 'quantifying the impact of policies themselves is unlikely to be feasible', measurement attempts should confine themselves to the apparently easier task of finding out how much carbon is taken up in specific projects. This, of course, landed them back in trouble, since the emissions baseline of any given project will vary under different policies.

But surely reality must be catching up with these fantasies of quantifying the unquantifiable?

Yes, but it's taking a while. Because the job of measuring the climatic benefits of carbon-saving projects is permanently impossible, the more seriously experts try to carry it out, the more complicated and fanciful – and hard to untangle – their techniques get.³⁷⁰ Like rogue trader Nick Leeson trying to cover his tracks at Barings Bank, carbon consultants pile complexity on complexity in an ultimately fruitless attempt to evade the inevitable reckoning. That, of course, jacks up the 'transaction costs' of doing the projects.³⁷¹

Sequestering Carbon or Fiddling Data?

In 2005, a template document for BioCarbonFund project developers to use to estimate sequestration rates was posted on the World Bank's carbon finance website. Examples were helpfully provided to illustrate how to fill in certain fields.

In the field 'contact (preferably email)' appeared the sample entry
'fred@data_fiddling_Inc.jail.com'.

Small projects lose out

The escalation of transaction costs is one reason that community-friendly renewable-energy carbon projects that generate few credits lose out. Particularly threatened are CDM projects attempting to compensate for less than 50,000 tonnes of CO₂-equivalent emissions per year.³⁷² Transaction costs for some prospective micro-schemes would run to a prohibitive several hundred Euros per tonne of CO₂ equivalent, at a time when the average price of CDM credits is running at less than €7.

As a result of this and other factors, the CDM is dominated by big, non-renewable projects that generate a lot of cheap credits but are not leading to structural change – in particular a handful of schemes to capture and destroy greenhouse gases called HFC-23 and N₂O. HFC-23 (a by-product from the manufacture of HCFC-22 and a substance used in air conditioners and refrigerators) is an extremely potent greenhouse gas estimated to be 11,700 times as climatically damaging as carbon dioxide. N₂O, another very harmful greenhouse gas, is emitted during the industrial production of adipic acid, a raw material for nylon.

Capturing and destroying the two gases is relatively convenient and easy. You do it all in one place – the factories where the gases are generated. The technique is uncomplicated, politically speaking – you just bolt extra bits of machinery onto an existing plant. And, because these HFC-23 and N₂O are so potent climatically, the dividends are huge.

Could you give an example?

The Gujarat HFC-23 project in India, set up to supply credits to Japan, will prevent the emission of only 289 tonnes of HFC-23 annually. Yet because HFC-23 is such a potent greenhouse gas, this single quick fix will yield a whopping 3 million carbon credits per year, more than double the yield of all 20 CDM renewable energy projects registered with the CDM by May 2006. As of the same date, a single HFC-23 decomposition project, the Shandong Dongyue scheme in China, represented 19 per cent of all the credits generated under CDM. A consortium of Japanese, Italian and Chinese partners is meanwhile investigating a project spread across 12 HCFC-22 plants in China that would yield 60 million credits a year from 2008. Just seven of the 265 projects registered by August 2006 accounted for nearly three-quarters of all CDM credits. All were gas capture projects.³⁷³ Renewable energy projects make up only 2 per cent of CDM credits (see Figure 8). The current proportion of world market investment in renewable energy or energy efficiency due to the CDM – also a mere 2 per cent – can only shrink.

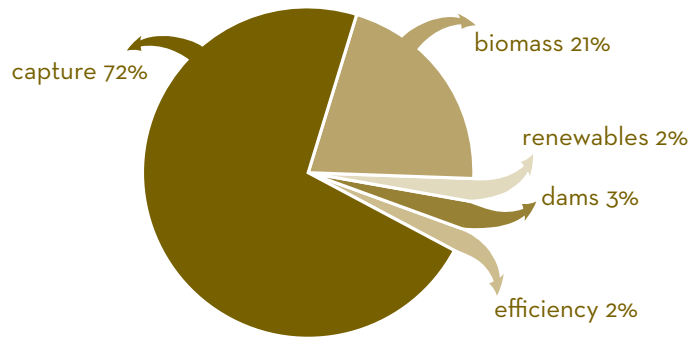
Even so, the cost and inconvenience of having to come up with carbon accounting documents irritates business, Northern governments, and agencies such as the World Bank, who want as many cheap credits to be flowing into the market as fast as possible so that fossil fuels can continue to be burned at their accustomed pace. In 2005, for example, the World Bank pushed for the CDM Executive Board to be sidelined, claiming it was being too meticulous about reviewing methodologies at a time when thousands of projects had to be approved in a hurry. As a result, the pressure is on technocrats and consultants

The Clean Development Mechanism (CDM) 'is not encouraging companies to devote funds to renewable energy sources... to the extent...hoped.'

*Wall Street Journal,
11 August 2005*

Figure 8. Share of Total Registered CDM Credits Generated by Project Type, May 2006

Data analysis by Adam Ma'anit, Carbon Trade Watch



to simplify or streamline carbon accounting procedures as much as possible – for example, to come up with standardised techniques for validating projects *en masse* to save on costs.³⁷⁴

*While 'there were high hopes that the CDM would usher in climate-friendly foreign direct investment...this remains largely to be seen.'*³⁷⁵

*R. A. Alburo Guarin,
Development Bank of the
Philippines*

Organisations attempting to develop higher-quality CDM projects are frustrated for different reasons. Emily Tyler of the South African-based organisation SouthSouthNorth concludes that 'the CDM actually adds little value (indeed, it adds costs) to the very sorts of projects it was designed to encourage'. Tyler claims that what with its credit prices, contract terms, and transaction costs, the CDM adds 'no financial value' to 'the project types which most closely fit the CDM's avowed objectives'. She suggests that good-quality projects will be able to break even only by bypassing the bureaucracy required for quality control at the CDM, seeking extra donor funding, and selling credits on the higher-priced voluntary market to offset emissions from corporate travel, conventions, personal lifestyle and so forth.³⁷⁶

The catch is that the simpler, faster and more standardised carbon accounting procedures get, the less possible it is to justify the claim that the projects have anything to do with climate, and the more 'free-rider' credits are created for companies seeking subsidies for their existing operations.³⁷⁷ It's an irresolvable dilemma – and one which, once again, was already familiar from the US, where attempts to reduce the risk of 'paper credits . . . increased transaction costs to a point where many trades were discouraged'.³⁷⁸

A side issue?

OK, I can see that offsets don't work. But surely offset credits are only a minor part of carbon trading – so minor that we can perhaps just ignore them?

It's not so easy. Some countries have contemplated using carbon credits bought from abroad to cover as much as half their (already minimal) emissions reduction obligations under the Kyoto Protocol. Countries such as Japan, Canada, Spain, The Netherlands, the UK, France, Sweden and Italy are expected to be among the biggest buyers.

In October 2005, one London financial consultant went so far as to proclaim that the EU carbon market was 'betting the house on CDM/JI credits.' So keen is Japan on gaining access to foreign carbon credits, meanwhile, that it is giving Japanese companies 50 per cent of start-up investment costs for CDM projects, as well as 50 per cent of validation and legal documentation costs, together with other subsidies for feasibility studies and design documents. A World Bank official has claimed that Northern countries as a whole will need to find between 750 and 2,200 CDM projects in the next few years, or on the order of 1.4 billion tonnes of credits. Only 265 projects had been officially registered by August 2006, accounting for only about 84 million credits, and Northern governments and corporations alike are desperately pushing for more to be produced.

The fact that offset credits form a large part of the carbon market's volume makes them central to carbon trading's overall problems. Carbon credits contaminate any trading system they are used in by adding another layer of unverifiability to the hybrid commodity being trafficked.

All right, maybe credits from carbon projects are important in the market. But at least you have to admit that carbon sink projects, which surely have the most technical problems of all, are only a trivial part of the market. After all, they constitute less than 10 per cent of the credits from CDM projects. So perhaps we can afford to be relaxed about the fact that they aren't doing any verifiable good for the climate.

Carbon sinks credits may be a small part of the *market*. But, as can be seen in the case studies of the next chapter, they have a disproportionate effect on *land* and people's use of it. Remember how many trees and how much territory is needed in order supposedly to 'offset' a minimal amount of emissions. With sinks, it doesn't take many credits to damage people's lives.

Which perhaps makes this a good time to turn to the topic of the particular property rights conflicts associated with carbon saving projects.

'It is widely recognised that...[the end-of-pipe developments that so far constitute the bulk of CDM projects] have no direct development benefits.'

Holm Olsen, United Nations Environment Programme

Ownership again

I thought we already talked about this.

No, our previous discussion was about the difficulties created by the need of *emissions trading* to create and distribute property rights. Carbon-saving *projects* such as those created under the Clean Development Mechanism raise property rights problems of their own. As the next chapter will document, the new carbon dumps that large polluters need usually have to appropriate someone else's land, someone else's water, or someone else's future. Conflicts over ownership are inevitable.

Some of the easiest examples are carbon projects that involve tree planting.

Jayant Sathaye of the US's Lawrence Berkeley National Laboratory once observed breezily that anxieties about the rich cleansing their emissions by taking over the poor's land for forestry projects could be relieved simply by 'ensuring that the title to the land is separated from the title to carbon.'³⁷⁹ The reality is not so simple. First, most plantations that are candidates for carbon finance are already in the hands of powerful corporations or state bureaucracies. Many of these corporations or bureaucracies are already embroiled in conflict with local people over their takeover of local land and water. In such circumstances carbon finance is likely to be viewed merely as another subsidy for an exploitative status quo. Second, land whose tree and soil carbon has been signed over to a utility is going to be less able to provide livelihood goods to local people.³⁸⁰

Carbon is not some unexploited 'extra' product that is simply lying around unused, waiting to be plucked and sold to fossil fuel users, with no other social effects. Its presence is intimately bound up with other uses of the land. Since, under the CDM, the land in question lies in the South, carbon plantation projects are likely to magnify existing North-South inequalities.

The case of bioenergy plantations presents an interesting case study. Bioenergy schemes are increasingly attracting carbon finance (including over 100 projects registered with the CDM by May 2006). Insofar as they are expected to replace a substantial percentage of the oil or coal used in today's industry and transport systems, however, they foreshadow a future in which vast tracts of land in the South are turned over to producing biofuel for export.

That raises the question of whether such plantations would be any more successful for the countries that establish them than traditional agricultural export monocultures, given familiar problems of

overproduction, declining terms of trade, failure to diversify the production base, land degradation and so on.

Biofuel plantations also raise the question of ownership in a broader and more far-reaching sense. Industrially-produced agricultural commodities such as sugar, soya, rubber, bananas, maize, coffee, cotton, pulpwood and palm oil have already, in a sense, dispossessed millions in the global South. Why should biofuels be any different?

I thought I was supposed to be the one asking the questions.

Examples like biofuels also remind us that carbon projects not only take over land and water, but also stake a claim on the future. They divert not only present but also future resources to licensing and prolonging fossil-fuel use.



Plantation of oilseeds for biofuel.

How does that work?

The UK's Carbon Neutral Company (CNC) presents one clearly documented example. CNC sells carbon credits on the unofficial, 'voluntary' market to consumers, claiming thereby that it can make their activities 'carbon-neutral'. In return for a small amount of extra funding to woodland owners or forestry managers for tree plantings that are taking place already, CNC assumes ownership of the associated carbon rights, which are then sold on to customers at a huge mark-up.

According to one 2001 contract, a forestry enterprise established on public land in North Yorkshire in the UK agreed to 'allocate and assign' to CNC (then called Future Forests) and not 'to anyone else' the 'greenhouse gas absorption capacity of the tree biomass on the land

identified in the plan for 99 years from the date you countersign this letter.’ While the agreement specified that CNC did not thereby acquire ownership of ‘individual trees’, it did ‘entitle’ CNC to ‘individual separable enforceable...carbon sequestration rights in the land.’ The land could not be sold during that 99-year period unless the buyer also agreed ‘to observe the terms of this agreement’:

...this agreement shall be treated as a burden on the land and will accordingly be binding (so far as legally possible) on your successors in title to the land.³⁸¹

In 2002, meanwhile, the Western Australian government introduced a Carbon Rights Bill governing biological carbon sequestration as a ‘first step’ toward setting up a carbon trading regime. The bill defined a ‘carbon right’ as separate from other rights in land and specified that it ‘can be owned by a person unrelated to the owner of the land’.³⁸²

But what do the British voluntary offset market and domestic Australian trading arrangements have to do with the international Kyoto offset market?

They work by the same principles – and appropriate people’s land and futures in similar ways. And they can provoke some of the same reactions.

Local people in Minas Gerais, Brazil, for example, explicitly oppose the way a plantation charcoal project helps obliterate possible futures they wish to build:

The argument that producing pig iron from charcoal is less bad than producing it from coal is a sinister strategy... . What we really need are investments in clean energies that at the same time contribute to the cultural, social and economic well-being of local populations... .³⁸³

Indigenous Peoples’ organisations were among the first to spot the land grabs and mortgaging of the future involved in Kyoto’s carbon sink projects. The Indigenous Peoples’ Statement made at the Ninth Conference of the Parties to the UNFCCC in Milan in December 2003 noted that:

Sinks projects do not contribute to climate change mitigation and sustainable development. The modalities and procedures for afforestation and reforestation project activities under the CDM do not respect and guarantee our right to lands, territories, and self-determination.³⁸⁴

In May 2006, representatives of all of Ecuador’s indigenous nationalities, meeting at Puyo in the Ecuadorian Amazon with other indigenous groups and national and international NGOs, declared:

We reject the use of the Kyoto Protocol's so-called Clean Development Mechanism in projects affecting the communities, such as hydroelectric dams, monoculture tree plantations and others. We reject the signing of further contracts in our communities for the sale of environmental services with national or international NGOs, municipalities or individuals. We exhort CONAIE and CONFENIAE [confederations of indigenous peoples in Ecuador] to submit the corresponding complaints to the courts [and] to have punitive measures taken against the notaries, contract promoters and NGOs that participate in these activities.

We've been talking about who owns the land and water used by carbon projects. But who owns the carbon credits produced by these projects?

It's not always clear. As late as 2004, Baker and McKenzie, an international law firm specialising in carbon trading, was still asking, 'Who is entitled to legal ownership of emissions reductions?'

Could legal title to emission reductions [sic] which are being traded be challenged by another party to the project (i.e., the lessor of the land, the government, another shareholder in the project) or limited by concession arrangements?... What if foreign involvement in a project is limited to the purchase of credits – would this constitute a transfer of 'property rights' to the foreign investor?³⁸⁵

Only in 2005 did the Chinese government, to take one example, clarify what percentage of the benefits from the sale of carbon credits it would take and how much it would leave to implementing enterprises.

Not surprisingly, businesses interested in buying carbon credits are obsessed with property rights. While EU emissions allowances are 'real property', noted one Dutch banker recently, CDM credits 'don't have such a solid status yet'. As international commercial lawyers gear up for disputes over title, one European carbon fund manager was heard to remark in October 2005 that 'there are just not enough guarantees . . . I'm not going to spend my life in the court of Belo Horizonte to get my credits. We're placing bets here. CDM credits will always be discounted.'

What's the problem? People who invest in carbon projects should own the carbon savings. And everybody else should just accept this.

People who have arguably 'invested' for generations in land and other goods used for carbon projects yet do not own, and cannot sell, the credits they produce, are likely to take a different view. Indigenous peoples, for instance, may have preserved forests and soils for

centuries, yet are likely to have no share in the carbon profits that a formal landowner can reap.

Similarly, indigenous communities, environmental groups, policy-makers and even national governments have ‘invested’ in, and continue to invest in, innumerable carbon-saving activities such as preventing oil extraction or maintaining energy-efficient activities in their territories. As Hermann Ott and Wolfgang Sachs point out, ‘a country which, for reasons of equity, promotes biodiversity habitats, resource-light production, livelihood agriculture or the institution of community rights, may already avoid a great deal of emissions,’³⁸⁶ yet may not own, or be able to sell, carbon credits for doing so. Douglas Korsah-Brown of Friends of the Earth Ghana once argued along similar lines that while Southern countries have effectively ‘loaned their ecological space to developed countries’, they ‘have received no credit for avoiding emissions to date’ and ‘should be rewarded for not having adopted dirty technology in the first place’.³⁸⁷

Well, but you can't just give credits to somebody for not doing something.

The Kyoto Protocol does it all the time. *All* CDM credits are generated by not doing something. Remember that every project has to show that it does not do ‘what would have happened without the project.’ Some even have ‘avoidance’ in their name.

Look, for example, at the Lages Methane Avoidance Project in Brazil, which was registered by the CDM board in April 2006. This project generates credits by *not* landfilling wood waste and burning it instead. Or, to take another example at random: Japan gets carbon credits from the Graneros Plant Fuel Switching Project in Chile, registered in July 2005, because the plant does *not* use a certain amount of coal or oil, having switched to gas instead.

If Japan gets credits for industries that do not use coal, and a Brazilian company gets credits for not leaving wood to decay, then Costa Rica should get credits for having prevented US companies such as Harken Oil from exploiting oil on its territory.³⁸⁸ Indigenous communities should get credits for having won the revocation of fossil fuel concessions in their territories.³⁸⁹

In fact, why stop there? Nepal should put in an application to the CDM to get credits for not building a superhighway system. Cameroon should get credits for not undertaking a space programme. Anybody in a Southern or Eastern European country should be able to generate credits for choosing to ride a bicycle instead of investing in a car.³⁹⁰

Stop being silly. Nepal was never going to build a superhighway system. Cameroon was never going to invest in a space programme. And presumably Costa Rica would have stopped Harken Oil from drilling for reasons other than the promise of carbon credits. How could you possibly verify and measure the carbon credits from such projects?

As demonstrated above, the CDM already cannot verify how many credits its projects generate, and for just the same reason: it can't prove that its projects are not business as usual. In accounting terms, there should be no difference between them and these other speculative projects. The silliness is all on the side of the CDM and other carbon-offset programmes themselves. To cite these hypothetical examples is only to throw that silliness into sharper relief.

In fact, in the case of indigenous communities and the Costa Rican government preventing oil exploitation, measurement is arguably a good deal easier than in the average CDM project, involving only quantification of the unexploited oil deposits.

What qualifies you to be a carbon credit owner, in sum, is not that you are saving carbon. It is, rather, that you have the money to invest in various piecemeal technical fixes in specific industries and to hire consultants to calculate and 'verify' carbon credits, crunch numbers, fill in forms, monitor projects and so on. Carbon credits go to well-financed, high-polluting operations capable of hiring professional validators of counterfactual scenarios. They do not go to non-professional actors in already low-emitting contexts or social movements actively working to reduce use of fossil fuels. (See box, p. 61.)

Few rural communities in Northeast Thailand or the Peruvian Amazon, for example, are going to be able to afford the services of the expensive private carbon consultants designated by the United Nations – such as Norway's Det Norske Veritas, Germany's TÜV, Britain's SGS or Japan's JQA – to document, 'validate' and 'verify' their community-friendly energy schemes, even if the UN encouraged such projects.³⁹¹ In the distribution of property rights over carbon savings, there's a clear bias in favour of wealthy corporations and governments and against communities, the poor, non-professionals and certain ethnic groups.

It hardly needs to be added that this prejudice – which often deserves the title of 'structural racism' – badly serves the cause of climatic stability. It reinforces a system in which, ironically, the main entities recognised as being capable of making 'emissions reductions' are the corporations most committed to a fossil-fuel-burning future, such as Shell or Tokyo Power, while indigenous communities, environmental movements and ordinary people acting more constructively

Who Owns Forest Carbon?

The United Nations has never been able to work out a convincing way of deciding who owns the carbon-recycling capacity of forests – and therefore who should be able to cash in on it in a carbon market.

Early in the Kyoto Protocol negotiations, the EU and some Southern countries were eager to prevent industrialised countries from using regrowth of their forests as an excuse for not reducing industrial emissions. They demanded that marketable biotic carbon assets be limited to those resulting from ‘direct human-induced’ carbon uptake, and not include ‘natural fluxes’.

Awkwardly, this opened up the entire terrestrial biosphere to carbon property claims. Every part of the globe has been affected by human activity over millennia, from Australia’s fire-moulded landscape to North America’s forest mosaic.³⁹³

Not even the Intergovernmental Panel on Climate Change has been able to factor out ‘direct human-induced’ effects from ‘indirect human-induced and natural effects’ such as those due to enhanced CO₂ concentrations and nitrogen deposition. ‘The phrase “human-induced”, it admits,

‘has no scientific meaning’.³⁹⁴ Hence it’s been hard to identify which biotic carbon dumps should be regarded as belonging to human beings at all.

The IPCC’s suggested way out – to define ‘directly human-induced’ activities arbitrarily as those resulting from the decisions of contemporary ‘land managers’, including, most obviously, professional ‘afforesters and reforesters’ – tends to exclude historical actors who often have better claims to conserving carbon.

As one of Tuvalu’s negotiations once pointed out, a government or company that hires an aeroplane to scatter a few particles of fertiliser over its land-holdings could gain the right to claim credit for the carbon in the forests below, while indigenous and settler peoples who had a hand in the earlier shaping of such ecosystems – or farmers who happen to look after lands classified by experts as ‘unmanaged’ – might get no credit at all.³⁹⁵ That would make property ownership pretty much entirely dependent on professional and economic status, together with technical measurement capability.

to tackle climate change are tacitly excluded, their creativity unrecognised, and their claims suppressed. As Janica Lane and colleagues observe, ‘Most climate change aid goes to current or future polluters in developing nations, while people conducting relatively climate-friendly practices are ignored.’³⁹²

In other words, carbon offset trading is treating the worst climate offenders as climate heroes, while failing to support many of those who are addressing the problem at its roots.

Exactly. And a final injury of carbon offset trading is that, by licensing more pollution in already-polluted areas, it reinforces a pattern of inequality worldwide.

How does that happen?

Some of the biggest buyers of carbon credits are industries that badly pollute their local communities – utilities, oil refineries, chemical firms, pulp and paper companies and the like. In fact, throughout the world, polluting industries and poor communities suffering discrimination of various kinds tend to be found together, for reasons including weak pollution zoning restrictions and low real estate costs. Cheap carbon offsets help allow these industries to go on damaging their local environments.

But the credits they buy are carbon dioxide credits. Carbon dioxide is not a toxic pollutant in itself.

No, but, as mentioned earlier, the same processes that produce carbon dioxide also produce a lot of co-pollutants that are toxic. By helping industries to go on producing carbon dioxide, cheap carbon credits also allow them to go on producing a range of toxic substances.

Worse, a polluting industrial installation often gets a new lease on life by buying cheap carbon credits from a project that damages the lives and livelihoods of local people elsewhere. In this way, the trade in carbon credits can use the oppression of local people whose land is being used for industrial plantations in Brazil, say, to prolong the oppression of other local communities in the vicinity of oil refineries or power plants in Europe. Communities that should be uniting in their battles for a transition away from the hydrocarbon economy are being pitted against each other by the trading system that pretends to offer a solution. In the future, it may even happen that an indigenous community fighting an oil company's exploitation of its territory will find itself at odds with another indigenous community down the river providing carbon sink credits to the same company.

Once again, the experience of offset markets in the US should have provided some lessons for the carbon trade. In Los Angeles County, for example, minorities are more than twice as likely as Caucasians to be living in a census tract located within a one-mile radius of at least one large-capacity toxic site,³⁹⁶ and a majority of facilities emitting toxic pollutants are in 'Hispanic-dominated' census tracts.³⁹⁷ The Los Angeles RECLAIM offset trading programme described above reinforced this pattern.

How?

The pollution prevented by RECLAIM's programme of destroying decrepit cars would have been spread over a wide four-county region. But the industries that bought the resulting 'offsets' are densely clustered in only a few communities, or 'hot spots'. So the car 'offset' scheme effectively concentrated more pollution in communities surrounding stationary sources, particularly those associated with the four oil companies who were the biggest buyers of the offset credits generated by scrapping cars: Unocal, Chevron, Ultramar and GATX.

All these companies used their 'offsets' to avoid installing pollution control equipment that captures toxic gases and vapours released during oil tanker loading at their marine terminals, including benzene, which can cause leukaemia, anaemia, respiratory tract irritation, dermatitis, pulmonary oedema, and haemorrhaging.³⁹⁸ The surrounding communities were overwhelmingly Latino, three of them populated between 75 to 90 per cent by people of colour (compared to a figure of 36 per cent for the entire South Coast Air Basin).³⁹⁹

Much of the historical pollution burden of these underprivileged communities was thus maintained through a programme advertised as 'controlling' pollution.⁴⁰⁰ In a trade of like for unlike, the continued release of highly toxic chemicals into certain communities was exchanged for small area-wide reductions in much less toxic chemicals.

Nor is this case unique. A trading programme in the San Francisco area 'unfairly gave up toxic emissions reductions from a petroleum refinery in a community of colour facing high cancer risk, in exchange for credits from reductions in auto use throughout the Bay Area'.⁴⁰¹

How offsets block change

If trading in carbon credits worsens the problem of hot spots, it also adds to the forces blocking the technological and social innovation needed to address climate change. Again, this is a pattern evident from 'offset' projects in earlier US pollution trading schemes that is being repeated in today's carbon-'saving' projects – including the Kyoto Protocol's CDM.

What's the US experience, then?

One example is, again, the RECLAIM pollution market set up in Los Angeles.⁴⁰² Beginning in 1997, the local air quality management authority offered to award marketable credits to businesses or individuals who repaired emissions-related components in high-emitting vehicles, bought clean buses or other vehicles, electrified truck stops and tour bus

stops to prevent engine idling, bought battery-operated lawn mowers and so on. Whether or not these ‘offset’ technologies are themselves regarded as innovative, they were used to relieve pressures on large emitters to make other, more substantial technological changes.

Similarly, as also mentioned above, ‘offsets’ used in the US Environmental Protection Agency’s ‘bubble’ programmes removed big polluters’ incentives to innovate to control their own emissions, usually through use of credits generated by an already-existing technology. Firms also claimed credits for shutting down emissions sources or for production slowdowns, even when such actions were undertaken for business reasons. Writing of such ‘paper credits,’ environmental lawyer David Doniger wrote in 1986 that ‘in practice...there has been far more innovation in shell games and sharp accounting practices than in pollution control technology’.⁴⁰³

In a similar way, the Kyoto Protocol’s credit-generating mechanisms – JI and CDM – are designed in a way that allows industries in the wealthiest countries to avoid or delay innovation in their own technological systems as long as they fund the installation of off-the-shelf technology in Southern or Eastern European countries.

These mechanisms have been a particular failure in promoting renewable energy, in which innovation is especially desirable. Older industrial plants whose emissions are supposedly ‘compensated for’ by carbon credits bought from abroad will more easily undercut newer, more efficient technology, reducing incentives for change. And in addition to failing to promote innovation in the North, they also fail to promote innovation in the South.

Why?

There are several reasons.

First, the more a Southern country makes it a matter of policy to promote renewable energy or climate-friendly technology generally, the harder it is for it to attract CDM projects. The more serious it is about weaning its technological structure off fossil fuels, the harder it becomes to prove that good projects would not have happened without the CDM.⁴⁰⁵

The CDM, in other words, gives governments perverse incentives for choosing the short-term benefit of CDM revenues aimed at plucking ‘low-hanging fruit’ over the long-term benefits of environmental policy promoting climate-friendly technological change. For example, high-level government bureaucrats in South Africa’s Department of Mines and Energy have admitted that they have faced pressure from

Innovation, the Atmosphere and Economics

Because it allows the North to delay urgently-needed social and technological change, every block of carbon credits from the South has a long-term climatic cost.

Carbon accountants need to quantify such 'opportunity costs' when adding up the effects on the atmosphere of each carbon project. Logically speaking, that's a prerequisite for accurately calculating how many carbon credits a project should be allowed to sell.

However, no CDM project validators or verifiers ever make such calculations. No one has any idea how to figure out how

much carbon a project will 'lose' by depriving a company in the North of an immediate incentive to innovate. Nor is it possible they ever will, although in the long term the amount could be enormous.

This failure of the carbon 'offset' market is only one example of the many paradoxes which result when conventional economic thinking is uncritically applied to issues such as climate change mitigation. As legal scholar Robin Paul Malloy explains, efficiency analysis 'is incapable of adequately addressing creativity because creativity is indeterminate.'⁴⁰⁴

the private sector not to make renewable energy targets too stringent, for fear future CDM projects will not be able to prove they are better than what would have happened otherwise.⁴⁰⁶

Pressures for holding off on innovation are increased by the fact that credit buyers and consultant validators seeking future contracts have incentives to postulate, and try to bring about, business-as-usual scenarios which are the highest-emitting possible, in order to make the projects that they back appear to be saving as much carbon as possible.

Second, some proposed CDM projects claim carbon credits simply for obeying the environmental laws of the host country. One example is a proposed project to divert the natural gas now being flared into the sky by Chevron, Shell and other corporations in Nigeria to a productive use. Flaring is already prohibited in Nigeria, and the companies have been paying a penalty for non-compliance.⁴⁰⁸ Indeed, the Nigerian High Court recently affirmed that flaring is illegal and unconstitutional.⁴⁰⁹ Another example is South African regulations that methane emissions from landfills be captured once they reach a certain level.⁴¹⁰

Proponents of carbon projects often claim that they help ensure that environmental laws are obeyed. However, the prospect of carbon finance gives both host countries and project proponents incentives for ensuring that those laws – including those that create incentives for structural change and innovation to lower emissions – are normally

not enforced. The climatic ‘balance sheet’ for such projects would thus, logically speaking, have to be debited for the climate effects of the associated damage done to the rule of law in the host country. In addition to undermining important incentives for structural change and innovation, this type of proposed CDM accounting raises questions about the commitment of the international community involved in CDM projects, including the World Bank and Northern governments, to what the Bank calls ‘good governance’.

Third, and perhaps most important, the cheapest and most secure carbon credits that the CDM has to offer – and thus the ones most in demand by industrialised countries – will be those, like the HFC-23 and N_xO projects mentioned above, that do the least to help develop a structure of renewable energy and transport in Southern countries.⁴¹¹

While such projects (assuming they would not have been implemented anyway) do carry environmental benefits, they are essentially only end-of-pipe add-ons to single, existing plants; could have easily been carried out through traditional regulation; and don’t help bring about structural change in critical climate-related sectors such as energy or transport through research and development, technology sharing, training and so on.

As the US lead and sulphur dioxide programmes demonstrate, because this type of market-oriented project ‘focuses solely on reducing a single pollutant by an exact date and a precise amount at least cost, techniques and practices that deliver multiple benefits – e.g., new ways of energy conversion, as well as conservation, and renewable forms of energy – are frozen out of the market’.⁴¹²

As a 2004 overview of the CDM by the Organisation for Economic Co-operation and Development, a band of 30 industrialised countries, noted:

[A] large and rapidly growing portion of the CDM project portfolio has few direct environmental, economic or social effects other than greenhouse gas mitigation, and produces few outputs other than emissions credits. These project types generally involve an incremental investment to an already-existing system in order to reduce emissions of a waste stream of GHG (e.g. F-gases or CH₄) without increasing other outputs of the system.⁴¹³

Coal-bed methane schemes are another example of business-friendly projects that do have environmental benefits, but don’t promote climate stability when part of a trading scheme. Gas capture projects in oil fields similarly contribute little toward the innovations needed for a transition away from fossil fuels, yet also yield conveniently large chunks of cheap carbon credits.

Many national-level CDM authorities ‘do not care about additionality of CDM projects... There is a real risk of a backlash against the CDM if its sustainability performance does not improve.’⁴⁰⁷

*Axel Michaelowa
(CDM Methodology
Panel) and Katharina
Michaelowa, Hamburg
Institute for International
Economics*

I don't agree with your criticism of projects that capture gas from coal mines and oil wells and then burn it off to generate electricity. Surely these are efficiency measures that need to be undertaken at every such installation. Why are you against them?

No one's against preventing this kind of waste. Considered on their own, such projects are needed and should have been done from the start. The difficulty comes when they become tradable for increased fossil fuel use elsewhere. As part of a trading system, they become not just much-needed efficiency schemes but also licenses for accelerated carbon-dioxide release.

We've been talking about what, from an environmental point of view, are admittedly rather dodgy schemes. But aren't there at least some renewable energy projects in the CDM?

There are a fair number, but they were never going to generate many credits. Often small capital- or labour-intensive greenfield developments that provide low rates of return,⁴¹⁴ are less able to shoulder the burden of the documentation, validation, ongoing monitoring and verification of emissions reductions required of CDM projects. An additional handicap for renewable energy projects, which have to pay more of their costs upfront than many other projects, is the commodity transaction model overwhelmingly followed by CDM and JI projects, in which credits are bought as they are delivered over a 10- or 21-year crediting period.⁴¹⁵

HFC-23 and N₂O projects had a head start in getting their methodologies approved, too, and are likely to maintain their advantage over renewable energy projects for which carbon accounting is more cumbersome and tests of whether a project 'would have happened without carbon credits' are especially difficult to apply.⁴¹⁶ Significantly, none of the nine renewable energy projects being developed under the Dutch-funded CERUPT carbon-trading programme in 2004 was able to demonstrate that it 'would not have happened otherwise'.⁴¹⁷ Similarly, the large renewable-energy Darajat III geothermal project in Indonesia and the Zafarana wind farm in Egypt have failed to get their baseline methodologies accepted by the CDM due in part to their inability to demonstrate that they are 'additional'. Investment by Japan – whose Bank for International Cooperation provided a soft loan to Zafarana in breach of CDM rules against using overseas development aid money – has accordingly shifted more and more toward landfill gas and gas capture projects.

In short, no market system that prioritises price per unit of carbon credits will be of much good to renewable energy, as the World

Bank, among others, recognised early on. Only months after the 2001 Marrakech Accords laid down the rule book for the CDM, the consultancy Ecofys had already concluded that there would be only a ‘limited role for renewable energy projects under... Kyoto Mechanisms dominated by least-cost approaches’.⁴¹⁸ More recently, the World Bank explicitly called attention to the ‘the non-economic’ nature of the renewable projects in the CDM portfolio, noting that the current proportion of renewable energy projects is bound to diminish in the ‘mature CDM market’.⁴¹⁹

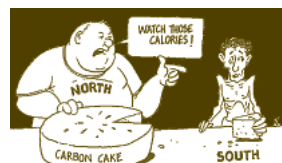
Among registered CDM project types, only energy efficiency schemes have produced fewer credits (less than 1 million tonnes of CO₂ equivalent) than renewables. Calculations by the World Wide Fund for Nature (WWF) show that the amount of financing expected to be mobilised by the CDM for renewable energy is a fraction not only of existing investment and Overseas Development Assistance (ODA) flows, but also of Global Environment Facility (GEF) financing for renewable energy. WWF estimates that the CDM will account for less than 0.5 per cent of the annual renewable energy market in Southern countries if current trends continue.⁴²⁰

When investors do put money into renewable energy schemes, they are treating them mainly as green decorations for portfolios dominated by conventional energy rather than as sober market investments. The Finnish government, for example, submitted four micro-hydro projects in Honduras to the CDM, yet their credit generation is so small – one project is claiming to generate only 9,000 tonnes of CO₂ credits over 10 years – that it is difficult to see how credit sales could even cover transaction costs.⁴²¹ Similarly, the minimum price tag for certifying a CDM project in South Africa – estimated at around 40,000 RAND/USD 6,300 – puts carbon finance out of reach of most small-scale renewable energy project developers.⁴²²

But don't the Southern governments hosting CDM projects want them to be of more long-term value to their peoples?

Some might like it to be that way, but that's not how the market works. If host countries started trying to enforce ‘sustainable development’ criteria, transaction costs would go up and their projects would be less likely to attract investment. Unsurprisingly, CDM host countries haven't been very insistent on promoting renewable energy or other ‘high-quality’ CDM projects capable of driving innovation and strategic change.

In sum, CDM is not a renewable energy promotion instrument or a ‘sustainable development’ fund. It identifies and funds low-cost



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carbon credits rather than investments that drive strategic change in energy and transport.

Still, it must be better than nothing.

‘A mechanism designed to promote climate protection,’ as CDM expert Ben Pearson puts it, ‘should be reducing the number of coal and oil projects, not providing them with a new revenue stream and diverting financing from renewable projects.’ The technology the CDM promotes merely embroiders an overwhelmingly fossil-oriented approach to energy and transport. Nearly every institution that invests in the CDM market is investing far more in the fossil fuel market.

It’s useful to return once again to the example of the World Bank. Many corporate investors in the Prototype Carbon Fund (PCF) – the Bank’s flagship carbon fund – are in fact receiving far greater amounts of Bank financing for fossil fuel projects that *produce* emissions (Table 4).

Table 4

Corporation	PCF contribution for CDM and JI projects 1999–2004 ⁴²³ (USD million)	Received from WB for fossil fuel projects 1992–2002 (USD million) ⁴²⁴
Mitsui	17 ⁴⁸¹	1,807.5
BP	5	938.8
Mitsubishi	5	403.6
Deutsche Bank	5	165.6
Gaz de France	5	138.9
RWE	5	138.9
Statoil	5	242.3
Total	46	3,834.6

The involvement of BP and Statoil in the PCF is particularly notable given the ongoing financial support by the Bank’s International Finance Corporation (IFC) for their efforts to open up the massive Azerbaijan oil fields for consumption in Western Europe and the US. In October 2003, BP and Statoil were part of a group of corporations who received USD 120 million from the IFC for development of the Azeri-Chirag-Guneshli oil fields in Azerbaijan. Greenhouse gas emissions from the oil produced by this project will be over 2,000 million tonnes carbon dioxide over 20 years. In November 2003, the IFC approved another USD 125 million for the Baku-Ceyhan pipeline between Azerbaijan and Turkey, whose investment consortium is again led by BP. An estimated three billion tonnes of carbon dioxide will be released to the atmosphere through the burning of the oil that will be transported by the pipeline.

Similarly, just five months after the PCF was launched in 2000, the Bank approved over USD 551 million⁴²⁷ in financing for the Chad-Cameroon oil pipeline. The financing package for the pipeline came to about three times the capitalisation of the PCF, and the expected lifetime emissions of approximately 446 million tonnes of carbon dioxide⁴²⁸ generated by the pipeline's oil amount to roughly three times the 142 million tonnes that will allegedly be 'saved' by PCF projects in total.⁴²⁹

Significantly, PCF investors get carbon *credits* from PCF projects, but no *debits* for their Bank-supported projects involving fossil fuel extraction or use.

Finally, technology 'transfer', CDM-style, has been implicated in technology *displacement* – in particular, displacement of superior low-carbon technologies (see Chapter 4, 'India – A taste of the future'). It is not as if, through the CDM, the North is somehow bringing technology to technology-free places. Promotional brochures may show shiny, seemingly benign technologies being peacefully 'transferred', but the technologies being disrupted in the process are typically less visible. 'Technology transfer' often also centralises political control.

'Technology transfer' is a highly ideological phrase denoting a highly political process. When used with the CDM, it tends to stand for a pattern of fossil fuel-oriented corporate incursion that can exclude types of informal technology exchange between communities that are often more climate-friendly.

In general, the CDM is impeding constructive action not only in the North (where it allows government and industry to avoid investment in long-term change), but also in the South (where, by and large, it channels resources into non-renewable projects that sustain the fossil fuel economy).

But if we can't fix the damage the CDM has on the North's transition to a post-fossil era, maybe we can still fix the CDM in a way that helps the South toward more renewable sources of energy. What we need are standards that will tell buyers which CDM carbon credits come from responsible, renewable energy and energy efficiency projects that really do something for the climate and for people. Buyers could well stampede to buy these premium credits. Finally the market would start working for a liveable climate instead of against it.

Somebody's already thought of that idea. It's called the Gold Standard, and was developed by World Wide Fund for Nature and other NGOs in collaboration with governments, corporations and experts around the world.

The Gold Standard attempts to ensure that carbon credits are 'genuine,' 'credible,' and provide 'real emissions reductions' and 'real

*If the CDM continues to operate within the current policy perversity in which the Kyoto Protocol and CDM exist alongside massive North-South financial flows to fossil fuels, then it will fail.*⁴²⁶

Ben Pearson,
CDM Watch

Segments of the
Baku-Ceyhan
pipeline await
assembly.



increases in sustainable energy investment'.⁴³⁰ It claims to be able to do this by 'exceed[ing] the environmental standards demanded by the market regulator and governments', which it admits are unsatisfactory. Forestry and fossil fuel projects are excluded and projects must try to 'prove' once again that they are not 'business as usual' and that they have 'sustainable development' benefits.

Of course, Gold Standard credits cost more. But, it's argued, they help buyers avoid dodgy products.

Sounds perfect. Has the idea worked?

No. Why should it? It can't change the market fundamentals. The underlying dilemma remains: the harder you try to make your offset project have a positive long-term impact on climate, the more it will price itself out of the market. You can't have it both ways – good,

small projects and cheap credits. A few buyers may be interested in good Gold Standard projects as window dressing, but they can never become the main stock in trade at the CDM. But if the Gold Standard tries to accommodate business' wishes too closely, it risks a credibility already in question.

Thus one common business complaint against the Gold Standard is that it is too 'rigorous' to supply a steady stream of cheap credits. By the same token, 'good' Gold Standard projects – such as the Kuyasa scheme in South Africa – can't survive in the market and have to be propped up with large subsidies (see Chapter 4, 'South Africa – Carbon credits from the cities'). Gold Standard credits make up an insignificant fraction of the total CDM trade, and there are few expectations this will change in the future.

The CDM is 'not working.'

*Gold Standard
staff member*

So there's no way around it. The carbon 'offset' market is actually frustrating environmentally superior outcomes by pointing investment in the wrong direction.

That's about the size of it. As with emissions trading, the focus on short-term 'efficiency' without fostering radical innovation and local sensitivity is leading, paradoxically, to ineffectiveness.⁴³¹

Why wasn't this foreseen?

A lot of it was. Even a carbon trading proponent, Michael Grubb, admitted early on that the CDM had the potential to turn into a 'sink for the intellectual as well as some of the physical resources of the developing world, and a distraction from the fundamental goals of sustainable development'.⁴³²

But such warnings were not heeded. It was simply assumed that fixes could be concocted that would make carbon trading compatible with constructive climate action. Once again, free-market ideology – and the hope that the fundamental contradictions of the Kyoto Protocol would simply go away if they were ignored – have occupied the space that should have been taken up by a careful weighing of the evidence and an investigation of the existing institutions, infrastructure, and traditions of different countries and regions. Many officials and environmentalists – including many NGOs – have been looking for 'positive solutions' in the wrong place. In the words of Ruth Greenspan Bell, they have prescribed the cure before examining the patient.⁴³³ A lot of time has been wasted.

Still, suppose I'm a renewable energy developer with a strong interest in working closely with small communities. Frankly, why should I care? This market, wacky as it is, is already here, and maybe I can get some money out of it for my

pet schemes, even if its overall tendency is destructive. After all, there aren't all that many opportunities to get funding for renewable energy around, and I've got to take them where I can find them.

If you still think this market is going to provide support for the pain-taking work you do, good luck. As one Dutch banker involved in the carbon credit market put it recently, '[F]ew in the market can deal with communities.' Economic carbon projects are not going to be the ecologically- or socially-beneficial ones.

The problem is not just that only 2 per cent of CDM money is going into renewable energy. It is also, as Ben Pearson stresses, that the CDM is *diverting* finance that should be going into renewable energy into easier projects that merely prop up an outdated, fossil fuel-dependent industrial structure. As a renewable energy developer, you stand to lose from the CDM in the long term.

All right, let me adopt an even more cynical attitude. Suppose I'm not a responsible renewable energy developer but rather a Southern government. Surely the CDM will be useful to me and my ministries as a source of new investment in my country. The investment may not do any good for global warming, and it may be economically and socially useless.⁴³⁴ But it might, if I'm lucky, at least provide a few new capital flows to development projects – and my business sector.

It's hard to argue this point. But notice that we've now left the climate debate behind entirely, by admitting that the CDM has nothing to do with tackling global warming. The fact that the conversation has collapsed into a general discussion of international investment and development shows to what extent the institutions concerned have taken over and diverted the climate debate. And that should give us pause.

Even if CDM projects are considered merely as 'foreign direct investment through construction' with no climatic benefits, they still hold the same sort of risks as any other foreign direct investment. As Yin Shao Loong and Ben Pearson point out, these include 'shift of capital ownership from domestic to foreign and high transfers of surplus away from host countries'.⁴³⁵

If carbon credit investors are mostly interested in high-volume industrial projects, or those with low transaction costs, doesn't that mean they're going to wind up discriminating against smaller, poorer Southern countries anyway, and favouring only a few, well-prepared ones?

Yes. The World Bank has admitted that most Southern countries can deliver only small projects. The risks and high per-credit transaction costs involved in delivering carbon from these projects makes it unlikely that smaller, poorer countries will be able to attract much carbon finance.

Indeed, the Bank's response to the problem – setting up a special-purpose Community Development Carbon Fund that pays higher than market prices for small projects in Southern countries – is an implicit admission that 'the market' will not work in the hoped-for way in the South, and that a carbon market that revolves around private capital and low-cost carbon credits will bypass the smallest countries.

As of August 2006, just four countries – China, Brazil, Korea and India – were hosting over 61 per cent of the 265 CDM projects registered by that date, and producing an overwhelming 86 per cent of the associated CDM credits (see Figures 9 and 10).

Figure 9. Expected Average Annual CDM Credits from already registered projects, August 2006

Source: UNFCCC

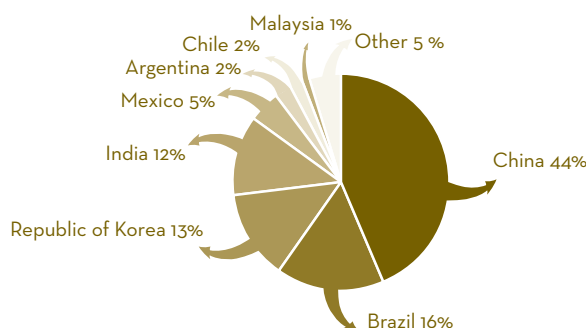
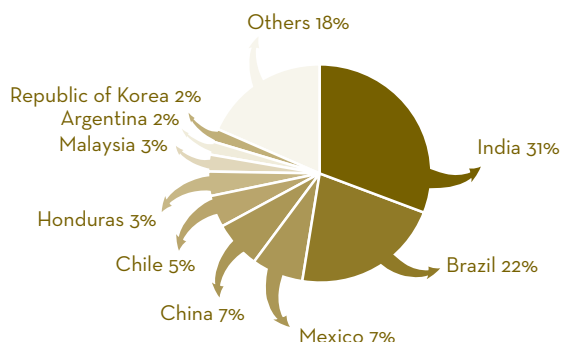


Figure 10. Number of Already-Registered CDM Projects by Country, August 2006

Source: UNFCCC



Where's the enforcement?

One of the most important lessons of US pollution markets is that trading requires not only a credible system of measuring emissions but also a system of strict enforcement of the rules under a single governmental jurisdiction.⁴³⁶

As argued above, these conditions are not present under either the Kyoto Protocol or the EU ETS. Measurement is inadequate or impossible. Monitoring is insufficient or impossible. Penalties would have to be made far more serious than they are today. And without a world government, signatories to treaties such as the Kyoto Protocol may simply renege on their agreements if they find that meeting their targets are inconvenient.

Both Los Angeles's RECLAIM and the US sulphur dioxide programme were instituted under single governmental jurisdictions that were able to impose tough and enforceable penalties.⁴³⁷ The Kyoto Protocol, by contrast, is an international agreement that will be easy for any country to disobey, or withdraw from, if its pollution allowances prove insufficient. Former Canadian Finance Minister John Manley recently reassured Canadians that they should not worry about international penalties if the country falls short of its Kyoto targets, because the treaty is 'not binding'. Countries that do stay in the agreement but overshoot their targets in 2012 are required to find only an extra 0.3 permits over the next five years on top of each permit they 'owe'.

The EU ETS may appear to have more enforcement power at its disposal than Kyoto does. However, it's revealing that it dares to impose only a paltry penalty of €40 per tonne of carbon dioxide on those who use more than their entitlements, compared to an April 2006 carbon price that had reached €30 per tonne. This effectively caps the carbon price at a level not much higher than it started out at – a level everybody agrees is not going to provide an incentive for structural change. Even then, Germany proposed halving the penalty in 2006.⁴³⁸ By contrast, the US sulphur dioxide programme imposed a penalty 20 times the permit price.

But will it really come to the point that countries simply default on their Kyoto targets?

Well, it's already clear that many industrialised countries won't achieve their targets – even if they take advantage of what economist Cornelius van Kooten calls the 'smoke and mirrors' of purchases of 'hot air' from Russia and the Ukraine, 'carbon offset credits for

business-as-usual forest management', 'temporary carbon sinks' and bogus emission 'reductions arising from a "fortunate" choice of base year.'⁴³⁹ Carbon trading hasn't made the bullet of emissions reductions much easier to bite than it was to begin with.

Each Kyoto signatory knows, moreover, that both it and its fellow signatories have strong short-term economic incentives to look the other way when firms exceed their emissions targets. That makes default even more tempting.⁴⁴⁰ Many observers have doubts whether Kyoto-like agreements can survive after 2012 anyway.

As pollution trading expert Ruth Greenspan Bell observes, it is 'highly unlikely that anything approximating the rigour of the US [sulphur dioxide] trading system can be devised to control climate change worldwide' in the future even if measurement of emissions were possible, since countries tend to see international oversight as a 'threat to their sovereignty'.⁴⁴¹ They are likely to withdraw from a treaty whose conditions are too onerous, or simply accept the penalties imposed by a lax agreement.

Not that the US itself is exactly a model for 'rigour' in this respect.

No. As economist William D. Nordhaus notes, 'the accounting scandals of the last decade have not been limited to dollar scandals,' but 'have also spilled over into emissions markets.'⁴⁴² Greenspan Bell herself has documented the case of PSEG Fossil LLC, the biggest player in New Jersey's emissions trading system, which apparently had not installed necessary pollution controls or obtained proper permits:

The US Justice Department discovered this and brought an enforcement action, which was resolved in the form of a consent decree. PSEG, without admitting any wrongdoing, agreed to stop selling its credits to other firms and to stay out of the trading system. When PSEG was forced to withdraw, its sheer size and status as one of the largest "suppliers" of credits in New Jersey brought that state's system close to collapse.⁴⁴³

It makes you wonder what kind of fraud lies ahead for the world carbon market.

Yes. 'Such cheating,' Nordhaus concludes, 'will probably be pandemic in an emissions trading system that involves large sums of money.' He observes that whereas in a tax system, the government has an incentive to try to ensure taxes are paid, in an emissions trading system, both buyers and sellers can afford to be indifferent to whether reductions have actually been made. Tax evasion in the US is on the order of 10 or 20 percent of taxes due. Given the incentives and the lack of adequate means of quantification, it is hard to put an upper limit on the extent

of cheating possible in a global emissions trading system. As Greenspan Bell remarks, 'keeping companies honest is hard enough in a robust legal and regulatory environment, as Enron's sham energy trades and WorldCom's balance-sheet fraud amply demonstrated. In a weak legal system, the potential for emissions trading fraud is enormous.'⁴⁴

The lack of an adequate measurement system for either carbon emissions or so-called 'emissions reductions' only adds to that potential, making cheating not only easy but almost irresistible.

What about the legal systems of various countries? How will they respond when US-style pollution trading systems are pushed on them?

Greenspan Bell emphasises that many Southern countries will be unable to 'manage or enforce complex intangible property rights concerning goods such as polluted air escaping from a factory' or provide enough incentives for businesses to run pollution control equipment even if it is installed. International standards governing CDM projects

Carbon Trading's Unconscious Cultural Assumptions

The theory behind carbon trading is that factories, power plants, and anyone else that generates carbon dioxide will be eager and capable partners in deals to buy and sell emissions. Nothing seems more obvious to many middle-class Westerners.

But the theory rests on several faulty assumptions. The first is that all industry everywhere wants to save on the costs of obeying environmental laws. But where pollution laws are little more than paper, industry knows it need not worry much about these costs. Plants that aren't being forced to comply with requirements may not see the point in elaborate trading regimes.

A second assumption is equally intuitive for many Westerners, but equally wrong: that the opportunity to trade will reveal a natural instinct to make a profit and to do so in the most efficient way possible. In much of the world, efficiency and profit

are secondary to production or employment goals, or the need to maintain valuable traditions, and supposedly 'uncompetitive' companies are kept afloat through government support.

A third weak assumption behind carbon trading is that even if plants around the world are not themselves motivated to embrace clean technologies, they will accept them if they are offered free through the Kyoto Protocol's flexible mechanisms. Maybe so, but what incentives do they have to keep the equipment on and pay its running costs? That doesn't happen anywhere without disinterested enforcement.

In short, carbon trading rests on unexamined cultural assumptions many of which are unrealistic in most of the world.

Source: Ruth Greenspan Bell, 'The Kyoto Placebo', *Issues in Science and Technology*, Winter 2006.

are even less likely to be obeyed (see Chapter 4) – particularly since carbon accountants' inability to verify that such projects 'compensate' for any given quantity of industrial carbon dioxide emissions is not a problem that can be fixed by improvements in technique.

'Survey the world', Greenspan Bell says, 'and few countries can demonstrate dependable legal systems and an independent judiciary ready to stand behind contracts such as environmental trading agreements'.⁴⁴⁵ Pursuing violators is going to be hard when one party to a transaction is a state-owned enterprise that is 'clearly more powerful than the regulatory body that supposedly supervises it, or when the ultimate beneficiary of the sale of emission credits is the party in power. When the scale of the regulatory effort is global, no world court exists to litigate the trustworthiness of the pollution reductions that become emission credits'.⁴⁴⁶

Many countries also have legal traditions and conceptions of the relationship between government and industry which are a far cry from those of the US.

Narrowing the discussion

All right, I admit carbon trading may not have much potential for helping us to address climate change directly. But it's valuable at least in that it encourages the public in Northern countries to discuss and educate itself about the global warming issue.

How does it do that?

Well, look at business. When carbon has a price, business has to pay attention. For the first time, the climate crisis speaks to corporations in a language they can understand. As a result, the business world begins buzzing with concern and ideas for action. And that's bound to have a positive long-term effect on climate. If only it were possible to calculate that into the monetary value of carbon credits!

Let's look at these claims carefully. First, do carbon prices direct business's attention and ingenuity toward the climate crisis – or away from it? As documented above, the European market for carbon so far hasn't pushed corporations into creative long-term undertakings to do something about global warming. Instead, it has taught them how to lobby for more emissions permits, find ways of passing on costs to customers, game the system, locate cheap carbon credits abroad, present a green

face to the public, keep gas as an option, and make marginal efficiency improvements. Responding to carbon prices is one thing; taking practical long-term action on climate change quite another.

The truth is that carbon prices are a pretty inferior way of educating corporations about climate change and its importance for their work. Insurance companies are already learning fast through other means – including Hurricane Katrina’s devastation of New Orleans – that global warming threatens their business. Power utilities, technology developers and retailers are already asking governments for longer-term signals than those that are provided by a market. There are more credible ways of entering into a dialogue about climate with corporations than by appealing to a new commodity system whose flimsy basis they are only too well aware of. As University of London geographer John Adams notes in a similar context, ‘[T]reasuries and big business are better equipped than most to notice when someone is speaking nonsense in their own language.’⁴⁴⁷

Maybe so, but how about the case of individual consumers?

You mean people buying carbon credits in the ‘voluntary market’ to make up for the carbon dioxide emitted during their jet flights or international conferences?

Yes. Admittedly, these carbon credits – the ones you buy from firms like the Carbon Neutral Company, Climate Care, Atmosfair, Natsource, Terrapass, DrivingGreen, Drive Neutral, carbonfund.org, MyClimate, AtmosClear Climate Club, Carbonfund.org or Climate Friendly – don’t really make your jet flight or home or daily driving verifiably ‘carbon-neutral’ or ‘zero carbon’. But when you buy these ‘offsets,’ at least you have to calculate how much carbon you emit in your daily life. That can’t help but improve your awareness of the causes of climate change.

Take a simple example. An executive trainer from Reading, UK named Charlotte Robson recently learned for the first time from the Carbon Neutral Company’s carbon calculator that her personal carbon ‘footprint’ was 24 tonnes of carbon dioxide per year. ‘I am astonished I have been such a monster,’ Robson wrote in the London Daily Telegraph.⁴⁴⁸ Isn’t it great that people like her are discovering the real impacts of their actions?

It’s not clear what is really being discovered here. Is the cause of climate change really that individuals like Charlotte Robson are ‘monsters’? Is Charlotte Robson personally responsible for the historical lock-in of heavy fossil fuel use in industrialised societies? Does she choose for the UK government to use her tax money to subsidise oil extraction and road and airport construction rather than renewable energy? Did she

have a say in the invasions of Iraq in 1991 and 2003? Somehow it's hard to imagine Charlotte Robson being as bad a person as she says.

The deeper difficulty is that if you blame yourself as an individual for climate change, then you're likely to think that, by the same token, you can also discharge all your responsibility for solving the problem simply by making a few different personal lifestyle choices. If you blame 'consumers' for global warming, then you'll probably think that the solution lies in reforming their individual consciousnesses and purchasing habits.

Now that you mention it, Charlotte Robson did report being pleasantly surprised to learn from the Carbon Neutral Company that all she had to do to 'neutralise' the effect of her carbon-emitting ways was to make out a cheque to the firm for around GBP 156 a year for planting trees and building non-CO₂ emitting energy-generation plants. 'A cost of GBP 156 is nothing,' she exulted. 'Think of the money you spend on lipstick and magazines.'

Exactly. Thanks to the Carbon Neutral Company, Robson was able to feel that she had gone from 'monster' to makeover in a heartbeat.⁴⁴⁹ The question is to what extent this sort of cathartic individual drama helps move society toward understanding the urgency of change in the policies that feed global warming. Does it help anyone understand that most remaining fossil fuels are going to have to be left in the ground? Or that choosing a better brand of consumer product may have limitations as a strategy for dealing with climate change? It would seem that it does just the opposite.

Well, but surely customers of the Carbon Neutral Company and similar firms, once they're sensitised to the issue, will go on to try to reduce their use of fossil fuels as well as try to 'offset' them. As companies selling 'voluntary' carbon credits to the public often point out, they're bound to begin thinking more about how they might save carbon in their daily lives.

For example, after calculating her individual carbon emissions, Charlotte Robson decided to try to minimise business travel: 'If a client wants two programmes in Singapore, they have to be at the same time, so we don't stack up CO₂ by flying in twice'. Surely there's nothing wrong with that!

The problem is that the misleading term 'carbon neutral' conveys a completely different message: that any emissions that people happen to be personally unable or unwilling to reduce can be compensated for by buying carbon credits instead, since buying credits is climatically 'just the same' as reducing fossil fuel use.

You can use carbon credits, the Carbon Neutral company says, for those areas in which your emissions are 'unavoidable'.⁴⁵⁰ But what

are those areas? What are the criteria for being ‘unavoidable’? Who decides what is ‘unavoidable’? What it is about the way society is organised that makes these emissions ‘unavoidable’? How might they ultimately be made ‘avoidable’ through political action and planning? The answers to all these questions are left mysterious. Indeed, the questions themselves go unasked.

What’s left is a feeling of personal guilt and resignation, not a sense of history, politics or economics. In addition to propagating the falsehood that carbon credits can ‘neutralise’ emissions, such corporations convey a message that nothing can be done about what they call ‘unavoidable’ emissions. That’s disempowering, to say the least.

But maybe the awareness that comes with buying carbon credits from firms like the Carbon Neutral Company will someday lead customers to other, more engaged kinds of thinking and action on global warming.

Maybe, but it’s difficult to see how. The main message such firms provide today is that individual consumers can relieve their guilt through purchases. It’s a classic instance of helping to shape demand for a new product while simultaneously offering to supply that demand.

This commercial recasting of climate politics as a narrative of individual guilt and redemption tends to poison public discussion, not promote it. It makes criticism of, say, air travel or car-centred societies seem like a moral critique of the ‘rich and privileged’ for being ‘self-indulgent’ and a call for government to ‘punish’ them. That only provokes defensive reactions against calls for long-term social action.⁴⁵¹

In reality, the climate crisis doesn’t require people to feel guilty. What it requires is for them to be aware of the deeper roots of the problem, and to join with others in political action. It requires not buying and selling ‘offset’ credits, but social responsibility.

All right, but what about the public discussion encouraged by official emissions trading programmes? Emissions trading helps the public decide how much they want to invest in action on climate change, by enabling it to focus on how strict the emissions ‘cap’ should be, rather than arcane questions about what technologies industry should be required to adopt to meet that goal, which are best left to industry itself. Emissions trading opens up an intelligent, democratic debate about questions about overall goals, such as ‘How important is a healthy environment anyway? When should we stop pouring money into the environment in order to make room for more spending on education, health or foreign aid?’

That’s not what happened in the US. When promulgating the sulphur dioxide trading programme, as Georgetown University law profes-

sor Lisa Heinzerling points out, the US Congress didn't debate how much emissions should be cut or how badly sulphur dioxide was affecting forests, streams and lakes. Instead, Congress merely accepted the emissions cut originally proposed to it and occupied itself with dividing up the rights to pollute that it was giving away in a way that would best satisfy influential business interests. Along the way it handed out special favours to, among others, the high-sulphur coal industry, a powerful lobby group, by providing extra incentives to use scrubbers – thus contradicting the claim of trading enthusiasts that the scheme would give polluters the freedom to choose means of controlling their pollution. As Robert Glicksman and Christopher H. Schroeder note, legislators seemed to see 'little distinction between the Clean Air Act and a fight over which defence installation to close, or an appropriation for public works project. The pork tastes as good, from whichever barrel it comes.'⁴⁵² Alternatives to giving rights away free to high-polluting corporations were also little discussed, though if they had been, the controversy could have been intense.

As noted above, discussion of social goals has also taken a back seat to horse-trading during the implementation of the EU Emissions Trading System. And the market in CDM and JI credits is likewise unfriendly to democratic discussion of social goals, including emissions cuts.

Unfriendly in what ways?

Well, for one thing, anyone wanting to comment on planning documents for CDM projects (for example) has to learn English, find a computer, log onto a website, register, and then navigate hundreds of pages of technical jargon, usually under a tight deadline. CDM comment forms provide no spaces for discussing the reliability of the implementing companies or the indeterminacy and scientific ignorance that stand in the way of the projects' being verifiably climatically effective. Nor are there spaces for questioning the ubiquitous assumption that such projects produce 'emissions reductions'.⁴⁵³ As one Indian social activist remarked on being confronted with an official UN form for submitting comments on a CDM project, 'the form for public input is so full of technicalities there seems to be no space for general comments'.⁴⁵⁴

By their sheer bulk and repetitiveness, such documents entrench a 'mainstream' discussion about climate change that sidelines thinking about how to halt the flow of fossil fuels out of the ground and limits the political choices a society can make to small, incremental variations on business as usual. As Adil Najam and colleagues concluded in 2003, 'There is a danger that Kyoto has now become so much of a mechanism for managing global carbon trade that emission cuts for

atmospheric carbon stabilisation could be neglected, or at least delayed.³⁵⁵

But surely the Kyoto Protocol has focussed public attention on overall emissions targets. That's what Kyoto means for most people – a set of targets – even if everybody agrees they're inadequate.

That's true. But Kyoto's success in making emissions reduction targets a matter for political debate isn't due to the market that the treaty sets up. Emissions targets were going to be a public issue whether or not carbon trading was involved.

I'm still a bit confused by this discussion. Politicians and economics professors are always telling us that markets reduce centralised decision-making and bureaucracy, and allow people to think and act for themselves. Are you saying that isn't always true?

The charitable response would be that politicians' press conferences and economics classrooms are perhaps not the best places to learn about these issues.

After 60 years, Karl Polanyi's perspective is still the more balanced one: that trading schemes are 'opened and kept open by an enormous increase in continuous, centrally-organised and controlled interventionism'. The Kyoto Protocol's market has set up one of the most centralised, opaque, complicated and jargon-ridden international processes ever seen, while the EU ETS is perhaps the most complex, impenetrable piece of environmental legislation Europe has ever known.

True, the Kyoto market does not dictate to anybody the technologies they must adopt to reduce emissions. And it has opened up all sorts of discussions about the means by which countries might meet their minimal emissions reductions obligations. But at the same time, it has created large bureaucracies remote from ordinary people at both global and national levels in order to try to create a market commodity – to inventory emissions; divide up emissions rights; register trades; protect property rights; approve, validate and verify projects; establish exchanges; enforce compliance; ensure reporting and so on.

Not even the US's sulphur dioxide scheme actually decentralises decision-making to firms. Since power generation is highly regulated, it merely pushes certain decisions back onto state public utility commissions. At no point was the price of pollution rights ever determined by anything describable as a 'market' separable from 'government'.

Are you saying that the carbon market isn't, after all, increasing transparency and giving ordinary people more choices?

Well, look around you. Few members of the general public have any inkling of what is going on in the bureaucracies that govern either the UN's or the EU's climate market, or what evasions, abuses and conflicts are afoot. Few are even aware how far the attempt to set up a giant global carbon market has gone. Few, too, can make sense of the swarm of acronyms and technical terms Kyoto has spawned and continues to spawn, including AAUs, CERs, ERUs, DNAs, DOEs, NAPs, PDDs, AIEs, SBIs, COPs, MOPs, SBSTAs, LULUCF, additionality, model rules, meth panels, supplementarity, leakage, and so on. Not even many journalists covering climate know what's going on.

No wonder I haven't heard about all this stuff before.

Yes. That's not to say that there hasn't been a lot of debate about the shortcomings of pollution trading. But it rages largely among affected communities and an expert elite with its own interests. The public at large, whether in the US or worldwide, has tended to be fooled by the complexity of trading systems into believing that they are reducing pollution more than they are. On the whole, public debate has not been enhanced, but rather blocked, by the schemes. And, as will be detailed in the coming chapter, the carbon market has not expanded, but rather contracted, ordinary people's choices, in case after case.

Nor is the discussion helped when NGO trading proponents insist that emissions markets have nothing to do with assets and property. 'The Kyoto Protocol and the EU ETS do NOT create property rights,' one large Washington environmental NGO staff member proclaimed indignantly in late 2005. 'The EU ETS created the "allowance" specifically to make clear that it constitutes a discrete permit under a regulation, not a property right.'⁴⁵⁶ Kyoto units are merely 'unitised and divisible embodiments of promises,' insists another environmentalist.⁴⁵⁷ To warn the public that assets are being given away to the rich, fumes still another, is 'ideological claptrap'.

Such dismissive views block intelligent public debate about what kind of property rights emissions trading schemes involve; whether those rights are defensible; how they might be distributed or transferred and to whom and for whose benefit; and so on. Such a debate is crucial. Whose atmosphere is it, and whose earth? This is a question for everybody, not just for government ministries, lobbyists, experts and large environmental NGOs.

Indeed, one of the reasons the EU ETS has run into such difficulties is that there has been no open debate on allocation of allowances. No newspaper or television programme appears to have covered the 'choices involved in setting up the system during the period in which

it would have been possible for the plans to have been changed.⁴⁵⁸ Even the brief debate on the system in the European Parliament on 10 October 2002 was unreported in any major British broadsheet or financial newspaper. Nor did many Members of the European Parliament understand the ramifications of the scheme, since the official summary they had been given did not discuss who owned the rights that the permits represented, but only which industrial sectors would be covered, how many allowances should be given out free, and so forth. The last thing that is needed is more such suppression of debate.⁴⁵⁹

But are conventional regulation or taxes any more transparent to public scrutiny or conducive to public discussion?

In many ways, they are. As law professor and emissions trading expert David Driesen remarks,

With a little work, citizens can understand whether an Environmental Protection Agency or state regulation will force a factory in their neighbourhood to meet emission limitations, including technology-based limitations, that similar factories meet elsewhere, or that can be met with known technology. Understanding the myriad potential games that can be accomplished through emissions trading requires expertise that very few possess.

The fact that emissions trading, unlike more conventional forms of regulation, allows each factory to ‘emit at a different level from its peers’, makes public scrutiny and comparison even harder. Keeping track of trades in the ‘invisible, intangible commodity’ that consists of ‘the right to emit a given amount of CO₂’ is going to be difficult for ordinary people even in a country like the US. Imagine the problems for nations with different understandings of property rights and property law, whether in Europe or the South.⁴⁶⁰

Maybe what you say is true. But isn't too much public discussion sometimes dangerous, too? For example, by exposing problems with carbon trading, you're exposing problems with the Kyoto Protocol. And isn't that, again, just playing into the hands of George W. Bush and other obstructionists?

No. It's precisely to insist on the respect for evidence that Bush lacks, by seeking answers to global warming that work while trying to avoid those that don't. The ‘trading fix’ for global warming currently promoted by many governments and mainstream NGOs, in fact, is similar in many ways to the ‘technological fix’ that Bush is seeking. Both fixes fail because they pretend to be able to avoid the unavoidable: politics.

Summing up – Market ideology vs. climate action

Many people of strong environmentalist convictions and democratic spirit genuinely believe that if the earth's carbon-cycling capacity is to be respected and preserved, it is inevitable that it be treated as a commodity. 'Given the logic of capitalism', says Peter Barnes, one thoughtful US environmentalist and egalitarian, treating carbon-cycling capacity as a 'scarce resource' and an 'asset' to be marketed 'is the best way to save it'.

Not, Barnes hastens to add, that the 'sky has no value other than its exchange value... . If anything we know can be called sacred, the sky is such a thing... . It has incalculable intrinsic value.' Yet, at the same time, he argues:

[W]e need to communicate with markets because markets determine how resources are used. All our preachings and sermons will be for naught if we don't inscribe them on tablets that markets can understand... [The market] is a great system for managing scarcity... If you ask a market to determine price of a thing someone owns, it will do so quickly and efficiently. Transactions will then follow... [The price] is not the equivalent of the intrinsic value, nor an editorial comment on it. It's merely a proxy, a useful numerical substitute. And it's a much better proxy than the one markets currently use – namely, zero... . To achieve the ends of Chief Seattle, we must use the means of Dow Chemical. The world has come to that, and it's sad. But... selling the sky is not an end in itself. It's a means for achieving a higher end – the preservation of our planet.⁴⁶¹

This chapter has provided concrete materials to help show that this appealing argument – which today is encountered in politics, in international development, in the UN, in think tanks, in the academy and in environmentalist circles – is both invalid and unsound. That is, it has helped show both that its conclusion does not follow from its premises, and that the premises themselves are mistaken.

The argument is *invalid* because even if the premise that the 'logic of capitalism' necessitates or encourages pollution markets were true, it would not follow that carbon trading is a sensible regime for addressing global warming. By the same token, while it is true that some 'markets' do partly determine how some resources are used in some circumstances, and that having a 'zero price' does result in the

inadequate valuation of some resources in certain limited contexts, it doesn't follow that a trading system of the type currently being set up is capable of improving the 'scarcity management' of the earth's carbon dump in a way that could foster a liveable climate.

Price is *not* a 'useful numerical substitute', in any context, either for the 'intrinsic value' of carbon-cycling capacity (whatever that might be) or its survival value. To suggest that it could be reveals fundamental misunderstandings of climate, scientific as well as social, economic and political. The purported carbon commodity is different from established commodities such as wheat or silver. For governments to take it upon themselves to make it an economically scarce good is not encouraging, but rather hampering, practices that could increase the chances of a liveable climate in the future. The price assigned by carbon markets in the course of 'managing' that scarcity, accordingly, and the resulting incentives and 'transactions', are moving the world away from that goal rather than toward it. This is particularly so in view of the facts that the market 'management' of this scarcity involves providing extensive property rights to corporations, is biased mainly toward short-term cost reductions for industry, and involves a commodity that is an incoherent amalgam consisting both of 'emissions' and of credits generated by carbon projects.

The argument is also *unsound* in that its premises are false. In truth, 'markets' do not, in most circumstances around the world, 'determine how resources are used,' in any sense in which markets can be distinguished from, or do not depend on, commons regimes, state agencies and other social organisations that don't revolve around the price mechanism. To put this another way, it is empirically false that no market price entails less responsible stewardship than a positive price. Only if, *per impossibile*, commodification somehow became all-pervasive, and the price mechanism the sole and all-powerful coordinating mechanism for all transactions involving land, water, life and so forth, could this assertion even become possible to evaluate. Carbon trading, in addition, is no more congenial to anything that might be called the 'logic of capitalism' than a multitude of other types of regulation, taxation, planning and stewardship that private corporations themselves have always depended on – and in this case, given the increasingly obvious contradictions of carbon trading, may wind up preferring.

As in so many areas of contemporary social life, a vague ideology of market effectiveness and market inevitability is concealing a regressive, confused, contested and environmentally dangerous political and technical project. The ideology and the project both badly need to be opened to wider public criticism.

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- 2 Whether trading is an efficient way of reaching a goal depends on what the goal is, and how society and technology are organised in any particular time or place. Trading in land would not have been an efficient way of maximising returns to scale from grazing during the era of open-field agriculture in Europe (Carl Dahlman, *The Open Field System and Beyond: A Property Rights Analysis of an Economic Institution*, Cambridge University Press, Cambridge, 1980, pp. 115–21). Trading in agricultural seed varieties is not the most efficient way of making the greatest diversity available to the most people over the long term. Trading in bandwidth is not an efficient way of ensuring the free exchange of information over radio. Trading in human rights would not be an efficient way of maximising respect for human rights, nor trading in medical malpractice an efficient way of ensuring the best health care. Privatised electricity, water and medicine typically result in higher prices for small consumers. Raising the price of energy can be a less efficient way of reducing energy use than regulating certain kinds of investment (Gar Lipow, *No Hair Shirts: Money and Politics in the Fight against Global Warming*, draft manuscript).
- 3 Larry Lohmann, 'Pulp, Paper and Power: How an Industry Reshapes Its Social Environment', 1995, <http://www.thecornerhouse.org.uk/item.shtml?x=52196>.
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- 9 US Environmental Protection Agency, Clean Air Act Amendments, 1990, Section 403 (f), Title IV, <http://www.epa.gov/air/caa/title4.html>.
- 10 'S. 139, the Climate Stewardship Act', Sec. 331, <http://democrats.senate.gov/~dpc/pubs/108-1-379.html>.
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- 12 Jeanne M. Dennis, 'Smoke for Sale: Paradoxes and Problems of the Emissions Trading Program of the Clean Air Amendments of 1990', *UCLA Law Review* 40, 1993, pp. 1101–1125.
- 13 *Ibid.*, p. 1118.
- 14 The Kyoto Protocol differs sharply from most systems of tradable fishing or hunting quotas, in which the total number of quotas given out is supposed to represent only a small part of the available stock, or a 'sustainable yield'. Under Kyoto, the total number of emissions quotas given out is several times the 'available' stock or resource. Of course, the number of these permits is supposed to be reduced over time.
- 15 Karl Polanyi, *The Great Transformation*, Beacon Press, Boston, 2002 [1944].
- 16 Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge University Press, Cambridge, 1990.
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- 19 As Daniel H. Cole remarks in *Pollution and Property: Comparing Ownership Institutions for Environmental Protection*, Cambridge University Press, Cambridge, 2002, a utility can't stop the government from confiscating the allowances it is given, but 'it certainly can exclude all others from interfering with it' (p. 54).
- 20 Quoted in J. P. Morgan, client report, Global Utilities Partner, London, 10 November 2003, p. 38. The Board says that participating companies should 'account for allocations of emission allowances or rights to emit as intangible assets' whose 'fair value' should be 'determined by the appropriate market prices at the time of allocation'.
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- 25 *Ibid.*
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- 59 Heinzerling, *op. cit. supra* note 55, p. 333.
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- 127 California Environmental Protection Agency, 'Frequently Asked Questions: Climate Action Team Draft Report', Sacramento, 8 December 2005.
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- 132 Quoted in Ross Gelbspan, 'History at Risk: The Crisis of the Global Climate', *The Heat is Online*, 1999, <http://www.heatisonline.org/htmlloverview.cfm>.
- 133 Lisa Jacobson and Allison Schumacher, 'Emissions Trading: Issues and Options for Domestic and International Markets', Business Council for Sustainable Energy, Washington, 2000, <http://www.bcse.org>, p. 8. See also Ross Gelbspan, 'Toward a Global Energy Transition', *Foreign Policy in Focus*, January 2004, <http://www.fpif.org/pdf/petropol/ch5.pdf>.
- 134 Quoted in Michael Shellenberger and Ted Nordhaus, 'The Death of Environmentalism: Global Warming Politics in a Post-Environmental World', 2004, p. 15, available at http://thebreakthrough.org/images/Death_of_Environmentalism.pdf.
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- 137 Cole, *op. cit. supra* note 19, p. 84.
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- 144 Hernando de Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else*, Black Swan, London, 2000.
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- 146 The EU advertises its ETS as 'an open scheme promoting global innovation to combat climate change' in the title of one of its pamphlets – without offering any argument for the claim or even mentioning the word 'innovation' in the text. See 'EU Emissions Trading', European Commission, Brussels, 2005, <http://europa.eu.int>.

- 147 Adam B. Jaffe *et al.*, 'Environmental Policy and Technological Change', *Environmental and Resource Economics* 22, 2002, pp. 41-51, p. 51; Richard B. Stewart, 'Controlling Environmental Risks through Economic Incentives' (1988), *Columbia Journal of Environmental Law* 13, 1988, p. 160. Under the EU ETS, companies are not formally allowed to bank leftover allowances from one phase of the programme to the next. However, they can achieve the same effect through what traders call 'trading the spread': selling, say, their 2007 allowances while buying 2008 allowances. See 'Backwardation Allows and Incentivises EUA Banking into Phase Two', *Point Carbon*, 23 September 2005, <http://www.pointcarbon.com>.
- 148 See, e.g., Jeff Romm, *Cool Companies*, Island Press, Washington, 1999; F. Krause, 'The Cost of Mitigating Carbon Emissions: A Review of Methods and Findings from European Studies', *Energy Policy* 24, 10/11, pp. 899-915; Ernst von Weizsacker and Amory B. Lovins, *Factor Four: Doubling Wealth, Halving Resource Use*, Earthscan, London, 1997. The US Department of Energy has found that the US could cut its predicted energy consumption by 20 per cent by 2020 and its carbon dioxide emissions by a third, bringing them close to 1990 levels, all the while saving USD 124 billion on its energy bill (US Department of Energy, Office of Energy Efficiency and Renewable Energy, 'Scenarios for a Clean Energy Future', Washington, 2000. See also P. Raeburn, 'It's Perfect Weather to Fight Global Warming', *Business Week*, 11 December 2000, p. 36). According to energy expert Amory Lovins, the US is failing to make many reductions in carbon emissions not because they would be expensive but because of capital misallocation, organisational and regulatory failures, lack of information, perverse incentives, and so on. See 'Climate Protection for Fun and Profit', *Rocky Mountain Institute Newsletter*, 13, 3, Fall/Winter 1997, p. 3 and Amory B. Lovins, 'More Profit with Less Carbon', *Scientific American*, September 2005, pp. 74-82.
- 149 Working Group III contribution to Third Assessment Report, IPCC, Cambridge University Press, Cambridge, 2001.
- 150 Henrik Hasselknippe and Kjetil Reine, eds., *Carbon 2006: Towards a Truly Global Market*, Point Carbon, Copenhagen, 2006, http://www.pointcarbon.com/wimages/Carbon_2006_final_print.pdf.
- 151 David A. Malueg, 'Emissions Credit Trading and the Incentive to Adopt New Pollution Abatement Technology', *Journal of Environmental Economics and Management* 16, 1987, p. 52; A. Denny Ellerman *et al.*, *op. cit. supra* note 93, p. 14.
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- 153 Margaret Taylor *et al.*, 'Regulation as the Mother of Invention: The Case of SO₂ Control', *Law and Policy* 27, 2005, pp. 348-78, p. 372.
- 154 Ruth Greenspan Bell, 'What to Do about Climate Change', *Foreign Affairs* 85, 3, June 2006, available at http://www.weathervane.rff.org/solutions_and_actions/International/What_to_Do_About_Climate_Change.cfm.
- 155 Greenspan Bell, *op. cit. supra* note 1, pp. 28, 30.
- 156 'Statement of G8 Climate Change Roundtable', World Economic Forum and Her Majesty's Government, UK, London, 9 June 2005. Even the oil corporation Shell admits that carbon efficiency measures are more likely when market solutions such as emissions trading are limited, globalisation has been restricted in favour of national laws and standards, and cross-border economic integration is limited. Under a regime of greater cross-border integration, regulatory harmonisation and voluntary codes, it concludes, there may be higher economic growth, but an 'absence of security-driven investment in indigenous renewable energy sources' (Royal Dutch Shell, 'The Shell Global Scenarios to 2025. The Future Business Environment: Trends, Trade-Offs and Choices', 2005, www.ukerc.ac.uk/component/option,com_docman/task,doc_download/gid,346/). It was for such reasons that the low-emissions vehicle program enacted by several US states to stimulate innovation and secure emissions reductions didn't require merely that emissions standards be met. That goal could have been achieved merely by tweaking existing technology through, for instance, introducing very efficient catalysts. Rather, the program recognised that some economically 'unjustified' zero-emissions vehicles had to be introduced as well, in order to jump-start more serious technological change. The most efficient short-term solution, it was understood, would not necessarily deliver environmentally-superior technological innovation (David M. Driesen, 'Does Emissions Trading Encourage Innovation?', *Environmental Law Reporter News and Analysis* 33, 2003, p. 10094).
- 157 Margaret Taylor *et al.*, *op. cit. supra* note 153; David Popp, 'Pollution Control Innovations and the Clean Air Act of 1990', *Journal of Policy Analysis and Management* 93, 2003, p. 390.
- 158 David M. Driesen, Syracuse University School of Law, personal communication, 2005. But see also Curtis A. Moore, *op. cit. supra* note 61, p. 11, who states that the market did have a role, but writes dryly that the 'innovation' it stimulated was 'in new railroad tracks, on- and off-loading systems and other ways of bringing lower-sulphur coal from the Powder River Basin to market'.

- 159 Taylor *et al.*, *op. cit. supra* note 153, p. 23.
- 160 N. Madu (ed.), *Handbook of Environmentally Conscious Manufacturing*, Kluwer Academic Publishers, Boston, 2001, pp. 32–33.
- 161 David Driesen, *The Economic Dynamics of Environmental Law*, MIT Press, Cambridge, 2003, pp. 79–80.
- 162 Ellerman *et al.*, *op. cit. supra* note 93, p. 14.
- 163 Once the trading scheme got under way, many installations managed to cut emissions without trading at all. Most of those who did trade traded only within their own firm. Inter-firm trading came to only two per cent of total emissions (Moore, *op. cit. supra* note 61, p. 26).
- 164 Moore, *op. cit. supra* note 61, pp. 7–8.
- 165 Curtis A. Moore, 'RECLAIM: Southern California's Failed Experiment with Air Pollution Trading', Health and Clean Air, 2003, www.healthandcleanair.org/emissions/reclaim.pdf, p. 24.
- 166 Richard A. Liroff, *Reforming Air Pollution Regulation: The Toil and Trouble of EPA's Bubble*, Conservation Foundation, Washington, 1986, p. 100.
- 167 'BP's Credibility Gap over Carbon Emissions', *ENDS Report* 326, March 2002, p. 4. In 2001, just the one-year growth increment in emissions from the products BP sold by itself amounted to double the greenhouse gas emissions from the company's own operations. BP's oil and gas production has only increased since 1990 ('BP – Annual data – reported basis', http://www.investis.com/bp_acc_ia/ar/htdocs/reports/report_17.html). BP estimated that its products emitted nearly 1.3 billion tonnes of greenhouse gases, equivalent to 5 per cent of the total 24 billion tonnes emitted each year from fossil fuel consumption.
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- 170 David Driesen, 'Trading and Its Limits', *Penn State Environmental Law Review*, forthcoming 2006.
- 171 *Ibid.*, pp. 83–4.
- 172 Gar Lipow, *op. cit. supra* note 2.
- 173 Gregory C. Unruh, 'Understanding Carbon Lock-In', *Energy Policy* 28, 2000, pp. 817–30.
- 174 *Ibid.*, p. 820.
- 175 Estimates of military and foreign aid costs associated with ensuring the flow of oil to major consumer countries from the Arabian Gulf vary dramatically. One study in 1990, when Saudi Arabian oil was selling at around USD 15 a barrel, argued that another USD 60 should be added to yield the real cost to the US. More recently, the director of the Earth Institute at Columbia University reckoned that the 'dollar costs of US military operations in the Middle East attributable to policing the energy flows are tens of billions a year, if not 100 billion or more. This amounts to a hidden subsidy to oil use of USD 10 or more per barrel exported from the region'. See Toby Shelley, *Oil*, Zed Books, London, 2005, pp. 162–3. For universities, see PLATFORM *et al.*, *Degrees of Capture*, PLATFORM, London, 2003.
- 176 J. Pershing and J. Mackenzie, 'Removing Subsidies: Levelling the Playing Field for Renewable Energy Technologies', lecture presented to the International Conference for Renewable Energies, Bonn, June 2004. Subsidies, of course, are difficult to quantify, as they may involve not only direct financial transfers but also trade restrictions, regulatory instruments, preferential tax treatment, police and military budgets, legal changes, company bailouts and publicly-funded research and development.
- 177 See also Amory Lovins, 'Soft Energy Paths', *Foreign Affairs*, 1973; Ivan Illich, *Energy and Equity*, Penguin, London, 1971; Ricardo Carrere and Larry Lohmann, *Pulping the South: Industrial Tree Plantations in the World Paper Economy*, Zed Books, London, 1996. If a broader range of political issues is not addressed, fuel efficiency will not cause fossil fuel use to decline. It may simply lead to incentives to warm more rooms or buy bigger cars.
- 178 Lipow, *op. cit. supra* note 2.
- 179 In its first years, FedEx lost money building the infrastructure necessary to implement reliable overnight mail delivery. Once it had put the necessary infrastructure in place, however, it began to profit by offering the service. Venture capitalists financed Jeff Bezos's 'inefficient' Amazon.com for years in the hope that the company would eventually turn a profit, even though it lost hundreds of millions of dollars to start with. By contrast, venture capital for environmental technologies in the US has dropped in recent years at a time when emissions trading has gained unprecedented prominence. See Driesen, *op. cit. supra* note 161, pp. 93–97.
- 180 Israel M. Kirzner, *Discovery and the Capitalist Process*, University of Chicago Press, Chicago, 1985, p. 157.
- 181 Tim Denne, 'Aggregate versus Gas by Gas Models of Greenhouse Gas Emissions Trading', Centre for Clean Air Policy Scoping Paper No. 6, 1999, p. 19.
- 182 Philip Verleger, the Institute for International Economics, quoted in George Monbiot, 'Crying Sheep', *The Guardian*, 27 September 2005.

- 183 Lipow, *op. cit. supra* note 2. See also Dermot Gately and Hillard G. Huntington, 'The Asymmetric Effects of Changes in Price and Income on Energy and Oil Demand', Economic Research Reports, New York University, 2001, <http://www.econ.nyu.edu/cvstarr/working/2001/RR01-01.PDF> and Jerry Taylor and Peter Van Doren, 'Evaluating the Case for Renewable Energy: Is Government Support Warranted?', *Policy Analysis* 422, Cato Institute, 10 January 2002.
- 184 Corporations, for their part, often rationally prefer investing in technologies that increase their power over labour over those that improve productivity per unit of energy (Michael Perelman, *Class Warfare in the Information Age*, Palgrave Macmillan, New York, 2000).
- 185 Henrik Hasselknippe and Kjetil Reine, *op. cit. supra* note 150.
- 186 'Emission trading "no good without targets"', *Environment Daily* 1739, 4 October 2004.
- 187 William Nordhaus, 'Life after Kyoto: Alternative Mechanisms to Control Global Warming Policies', Yale University, 2005, <http://www.fpf.org/fpifxt/3167>.
- 188 Ellerman *et al.*, *op. cit. supra* note 93; Moore, *op. cit. supra* note 61.
- 189 Vincent de Rivaz, 'Short Term Strategies Can Distort Emissions Progress', *Financial Times*, 28 July 2005, p. 19. See also Fiona Harvey, 'Market Begins to Influence Behaviour of Generators', *Financial Times*, 10 October 2005; and Jean Eaglesham, 'Business Attacks Government's Short Term Target on Global Warming', *Financial Times*, 6 October 2005, p. 2).
- 190 Robert L. Hirsch *et al.*, 'Peaking of World Oil Production: Impacts, Mitigation and Risk Management', February 2005, www.hilltoplancers.org/stories/hirsch0502.pdf.
- 191 Moore, *op. cit. supra* note 61, p. 23.
- 192 For example, the Competitive Enterprise Institute states that the costs of complying with the Kyoto Protocol alone would cost the US USD 300 billion per year, losing 28 per cent of GDP over 10 years (cited in Vijay V. Vaitheeswaran, *Power to the People*, Earthscan, London, 2005). Energy expert Amory Lovins claims, by contrast, that reductions in carbon emissions would save USD 300 billion annually given better capital allocation and correction of organisational and regulatory failures, lack of information, perverse incentives, and so on ('Climate Protection for Fun and Profit', note 168). The US Department of Energy also predicts billions of dollars in savings ('Scenarios for a Clean Energy Future', *supra* note 148). Differences in assumptions even among conventional economic models can 'easily lead to cost estimates that differ by a factor of ten or more', notes Stanford economist John Weyant. 'If you ask the broader question of how much tackling climate change will cost over this century', concludes Vaitheeswaran, 'the honest answer must be that we simply do not know'.
- 193 Jack Cogen, presentation at the side event arranged by the International Emissions Trading Association and the World Bank at the Conference of the Parties to the UNFCCC, Montreal, 5 December 2005.
- 194 Lipow, *op. cit. supra* note 2.
- 195 Driesen, *op. cit. supra* note 161, p. 24.
- 196 Michael E. Porter and Claas Van der Linde, 'Toward a New Conception of the Environment-Competitiveness Relationship', *Journal of Economic Perspectives* 9, 1995, p. 97.
- 197 Driesen, *op. cit. supra* note 161, p. 86.
- 198 *Ibid.*, p. 68.
- 199 Commission on Sustainable Development, *Report of the Secretary General*, UN Doc.E/CN.17/2001/PC/20, 2000, p. 4; Driesen, *op. cit. supra* note 156.
- 200 Wolfgang Sachs *et al.*, *The Jo'Burg Memo*, Heinrich Böll Foundation, Berlin, 2002, p. 38.
- 201 See, for example, Barbara White, 'Coase and the Courts: Economics for the Common Man', *Iowa Law Review* 72, 1987, pp. 577-635; Larry Lohmann, 'Making and Marketing Carbon Dumps: Commodification, Calculation and Counterfactuals in Climate Change Mitigation', *Science as Culture* 14, 3, pp. 1-33; Nick Johnstone, 'Efficient and Effective Use of Tradable Permits in Combination with Other Policy Instruments', OECD, Paris, 2003, <http://www.oecd.org/dataoecd/11/55/2957650.pdf>.
- 202 Pat Mooney, *What Next? Trendlines and Alternatives for Civil Society over the Next 30 Years*, Dag Hammarskjöld Foundation, 2006, <http://www.dhf.uu.se>; Ken Nealsen and J. Craig Venter, 'Summary' of Workshop on The Role of Biotechnology in Mitigating Greenhouse Gas Concentrations, 23 June 2001, US Department of Energy, Office of Biological and Environmental Research; Alun Anderson, 'Craig Venter', *Prospect*, April 2006.
- 203 Greenspan Bell, *op. cit. supra* note 1, p. 21.
- 204 Michael McCarthy and Michael Harrison, 'Carbon trading will not cut airline emissions, says BA', *Independent*, 30 June 2006.
- 205 'BP's Credibility Gap over Carbon Emissions', *ENDS Report* 326, March 2002, p. 4.
- 206 Paul McGarr, 'Capitalism and Climate Change', *International Socialism* 107, 2005, <http://www.isj.org.uk/index.php4?id=119&issue=107>.

- 207 These figures are taken from the US's Carbon Dioxide Information Centre.
- 208 Personal communication.
- 209 Polanyi, *op. cit. supra* note 15.
- 210 'Robbed of the protective covering of cultural institutions, human beings would perish from the effects of social exposure; they would die as the victims of acute social dislocation ... Nature would be reduced to its elements, neighbourhoods and landscapes defiled, rivers polluted, ... the power to produce food and raw materials destroyed.... A self-adjusting market ... could not exist for any length of time without annihilating the human and natural substance of society; it would have physically destroyed man and transformed his surroundings into a wilderness' (Polanyi, *op. cit.*, p. 3).
- 211 The grandfather of emissions trading, Ronald Coase, himself pointed this out: 'The rights of a landowner are not unlimited. It is not even always possible for him to remove the land to another place, for instance, by quarrying it. And although it may be possible for him to exclude some people from using 'his' land, this may not be true of others. For example, some people may have the right to cross the land. Furthermore, it may or may not be possible to erect certain types of building or to grow certain crops or to use particular drainage systems on the land. This does not come about simply because of governmental regulation. It would be equally true under the common law. In fact, it would be true under any system of law. A system in which the rights of individuals were unlimited would be one in which there were no rights to acquire' (Coase, *The Firm, the Market and the Law*, University of Chicago Press, Chicago, 1988, p. 155).
- 212 Daniel Altman, 'Just How Far Can Trading of Emissions Be Extended?', *New York Times*, 31 May 2002.
- 213 Torres, *op. cit. supra* note 5, p. 227. In addition, under conventional regulation, richer communities pay a smaller proportion of their wealth for overall pollution cuts than poorer ones do.
- 214 Altman, *op. cit. supra* note 212.
- 215 Moore, *op. cit. supra* note 61.
- 216 Haywood Turrentine, Chair, National Environmental Justice Advisory Committee, Letter to Carol Browner, Administrator, U.S. Environmental Protection Agency, 11 March 1998.
- 217 David Biello, 'Emissions Trading under Attack', *Environmental Finance*, May 2002.
- 218 *Ibid.*
- 219 Larry Lohmann, 'Whose Voice is Speaking? How Cost-Benefit Analysis Synthesizes New "Publics"', Corner House Briefing Paper No. 7, 1998, <http://www.thecornerhouse.org.uk>.
- 220 Altman, *op. cit. supra* note 212. Lifting regulation of utilities' profit margins makes the transfer of wealth to corporations in the form of emissions allowances still more blatant.
- 221 Simone Bastianoni *et al.*, 'The Problem of Assigning Responsibility for Greenhouse Gas Emissions', *Ecological Economics* 49, 3, 2004, pp. 253-57, p. 254.
- 222 See, e.g., Michael J. G. Den Elzen *et al.*, 'Differentiating Future Commitments on the Basis of Countries' Relative Historical Responsibility for Climate Change: Uncertainties in the "Brazilian Proposal" in the Context of a Policy Implementation', *Climatic Change* 71, pp. 277-301, 2005.
- 223 Larry Lohmann, 'Democracy or Carbocracy? Intellectual Corruption and the Future of the Climate Debate', Corner House Briefing Paper No. 24, 2001, <http://www.thecornerhouse.org.uk/>.
- 224 Keeler, *op. cit. supra* note 136.
- 225 FEASTA and New Economics Foundation, *op. cit. supra* note 97, p. 3; John FitzGerald, 'An Expensive Way to Combat Global Warming: Reform Needed in the EU Emissions Trading Regime', *ESR/Quarterly Economic Commentary*, April 2004; UBS Investment Research, 'European Emissions Trading Scheme', London, 2004, www.unepfi.org/fileadmin/documents/materiality1/emissions_trading_eu_ubs_2004.pdf.
- 226 Peterson, *op. cit. supra* note 116; Lisa Jacobson and Allison Schumacher, 'Emissions Trading: Issues and Options for Domestic and International Markets', Business Council for Sustainable Energy, Washington, 2000.
- 227 *Point Carbon*, 16 November 2004.
- 228 IPA Energy, *op. cit. supra* note 82.
- 229 *Point Carbon*, 16 November 2004.
- 230 *ENDS Report* 369, October 2005, p. 47.
- 231 *Ibid.*
- 232 'HSBC: Testing the Waters for Carbon Neutrality', *ENDS Report* 369, October 2005, p. 25.
- 233 *National Business Review* (New Zealand), 30 December 2003.
- 234 *Ibid.*
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- 244 Already, carbon costs associated with international emissions trading schemes are encouraging some energy-intensive industries to think about relocating production abroad, and the same would likely happen if foreign countries had a surfeit of carbon permits to offer (Philibert *et al.*, *op. cit. supra* note 65, p. 22). Martin Pecina, chairman of the Czech Republic's Anti-Monopoly Office, noted in February 2006, for example, that the EU ETS is likely to induce Mittal Steel, which has plants in the Czech Republic, merely to increase output in Kazakhstan, beyond the reach of the EU ETS. 'At the same time, it would reduce production in the Czech Republic, and would even profit from the sale of the unused carbon credits,' Pecina noted, claiming that the EU ETS fails to protect the environment and should be abolished (Bouc, *op. cit. supra* note 88).
- 245 As one trade expert puts it, 'if a specific subsidy causes adverse effects to competing entities in foreign countries, then it can be actionable in the World Trade Organisation.' S. Charnovitz, 'Beyond Kyoto: Advancing the International Effort Against Climate Change' in Pew Centre on Global Climate Change, *Trade and Climate: Potential Conflicts and Synergies*, Washington, DC, 2003, <http://www.pewclimate.org/docUploads/Beyond%20Kyoto%20Epdf>, pp. 141-170. In the US, for instance, the Clean Air Act restricted imports of low standard reformulated gasoline in 1999, but the WTO forced the US Environmental Protection Agency to rewrite the rules to comply with the WTO rules. Similarly, a recent NAFTA dispute with the US forced the Canadian government to repeal its ban of MMT, a substance manufactured by US-based Ethyl Corporation (and which had been banned in the US), and to pay compensation to the company for profit losses. Heidi Bachram *et al.*, *The Sky is Not the Limit: The Emerging Market in Greenhouse Gases*, Transnational Institute, Amsterdam, 2003 <http://www.carbontradewatch.org>.
- 246 Dove, *op. cit. supra* note 30, pp. 45-47, 49.
- 247 White, *op. cit. supra* note 201.
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- 254 Polanyi, *op. cit. supra* note 15; Harvey, *op. cit. supra* note 29.
- 255 Mitchell, *op. cit. supra* note 23.
- 256 The importance of the aesthetic appeal of such approaches has been highlighted by the distinguished University of Iowa economist Deirdre N. McCloskey: 'When economists are asked why almost all of them believe in free trade, they will say that it is a "theoretical" argument that persuades them. Further inquiry will reveal that it is in fact a pretty diagram that persuades them.'

- 257 Driesen, *op. cit. supra* note 93, p. 94.
- 258 Robert H. Socolow, 'Can We Bury Global Warming?', *Scientific American*, July 2005, pp. 45–55; Bert Metz et al., eds., *Carbon Dioxide Capture and Storage: Summary for Policymakers and Technical Summary*, Intergovernmental Panel on Climate Change, 2005. For problems with this geosequestration 'solution', see, e.g., 'Carbon Dioxide's Great Underground Escape in Doubt', *New Scientist* 2560, 18 July 2006, p. 19; 'Plan to Bury CO₂ under North Sea', *the Guardian*, 5 September 2003 and German Advisory Council on Global Change, *The Future Oceans: Warming Up, Rising High, Turning Sour*, Summary for Policy Makers, Berlin, 2006, which notes that 'storing CO₂ in geological formations under the sea floor can only be an "emergency" solution for a transitional period' (p. 5).
- 259 Metz, *op. cit.*, pp. 34–36. The German Advisory Council on Global Change, *op. cit.*, concludes flatly that 'introducing CO₂ into seawater should be prohibited, because the risk of ecological damage cannot be assessed and the retention period in the oceans is too short' (p. 5).
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- 265 'No Carbon Credit for the West African Gas Pipeline', http://www.eration.org/modules.php?name=ERA_News&file=article&sid=33; 'Groups Slam Nigeria's Submission of Gas Flare Reductions for Carbon Credits', <http://www.carbontradewatch.org/news/nigeria.html>; 'Judge Orders Shell Nigeria MD and Petroleum Minister to Appear in Court', <http://www.climatelaw.org/media/Nigeria.shell.april06>.
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- 267 Hasselknippe and Reine, *op. cit. supra* note 150, p. 22.
- 268 Veronica Vidal, *La Aplicacion de Politicas sobre Cambio Climatico en el Sector Forestal del Ecuador*, Memoria de Investigación Doctorado en Gestión Ambiental y Economía Ecológica, Autonomous University of Barcelona, October 1999.
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- 279 Mark C. Trexler, 'A Statistically Driven Approach to Offset-Based GHG Additionality Determinations: What Can We Learn?', *Sustainable Development and Policy Journal*, forthcoming.
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- 282 *Financial Times*, 16 February 2005.
- 283 International Rivers Network, 'Comments Submitted to the Japan Consulting Institute (JCI) Clean Development Mechanism (CDM) Centre regarding Xiaogushan Large Hydroelectric Project (XHP)', August 21, 2005, <http://www.irn.org/programs/greenhouse/index.php?id=050823xiaogushan.html>.
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- 293 Van Vliet *et al.*, *op. cit. supra* note 272, p. 154.
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- 306 Liroff, *op. cit.* *supra* note 166, pp. 16, 117.
- 307 *Ibid.*, pp. 83-6.
- 308 Jacob Werksman, 'The Clean Development Mechanism: Unwrapping the "Kyoto Surprise"', *Review of European Community and International Environmental Law* 7, 2, 1998, pp. 149-150.
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- 395 Ian Fry, 'Report on The Hague Negotiations', *Forest Cover* (Global Forest Coalition newsletter) 2, 2001.
- 396 Drury *et al.*, *op. cit. supra* note 123.
- 397 *Ibid.*

- 398 *Ibid.* See also Shipra Bansal and Scott Kuhn, 'Stopping an Unfair Trade: Environmental Justice, Pollution Trading, and Cumulative Impacts in Los Angeles', *Environmental Law News*, Spring 1998, pp. 16–18.
- 399 Drury *et al.*, *op. cit. supra* note 123.
- 400 *Ibid.* It is disputed whether RECLAIM made pollution 'hot spots' worse or not. Installations buying RECLAIM credits were situated in communities that had significantly higher populations of minorities and impoverished people within a half-mile radius than the Los Angeles-wide average. So, however, did installations selling credits. See Jacob Hawkins *et al.*, 'An Evaluation of the LA Regional Clean Air Incentives Market', Santa Barbara School of Environmental Sciences and Management, 2001.
- 401 Driesen, *op. cit. supra* note 107.
- 402 Drury *et al.*, *supra* note 123; Moore, *op. cit. supra* note 61.
- 403 David D. Doniger, 'Point ... And Counterpoint', *Environmental Forum* 4, 29, 1986, p. 34.
- 404 Robin Paul Malloy, *Law and Market Economy*, Cambridge University Press, Cambridge, 2000, p. 3.
- 405 Marte Nordseth, 'CDM EB takes measures against "perverse incentives"', *CDM Monitor*, 27 October 2004. Because some CDM host countries have refrained from implementing climate-friendly policies so that CDM projects can still generate carbon credits, the CDM Executive Board decided in 2004 to require that policies introduced after the 1997 Kyoto Protocol that have led to increased greenhouse gas emissions not be included in project baselines. Yet if incentives for more emissions exist in practice, they 'should be taken into account in the baseline'. The Board also decided that policies aimed at reducing greenhouse gas emissions implemented after the adoption of the Marrakesh Accords in 2001 should be disregarded in the baseline. In other words, project developers can claim credits on a baseline that pretends that such climate-progressive policies do not exist.
- 406 See Chapter 4, 'South Africa – Carbon Credits from the Cities'.
- 407 Axel and Katharina Michaelowa, 'Sustainable Development: The Forgotten Aspect of the CDM?', *Joint Implementation Quarterly* 11, 4, December 2005, p. 8.
- 408 See Environmental Rights Action, 'No Carbon Credits for the West African Gas Pipeline', Benin City, Nigeria, 2004, http://www.eraction.org/modules.php?name=ERA_News&file=article&sid=33.
- 409 'Court Orders Nigerian Gas Flaring to Stop', *E-Law Advocate*, Winter 2006, <http://www.elaw.org/news/advocate/default.asp?issue=2006-1>.
- 410 See Chapter 4, 'South Africa: Carbon Credits from the Cities'.
- 411 Ben Pearson, then of CDM Watch, was the first analyst to document and explain this crucial point in a series of thorough and clear papers. See www.cdmwatch.org.
- 412 Moore, *op. cit. supra* note 61.
- 413 Jane Ellis *et al.*, 'Taking Stock of Progress under the CDM', OECD, Paris, 2004, <http://www.oecd.org/dataoecd/58/58/32141417.pdf>.
- 414 The comparatively small credit volume yielded by such projects is due partly to the fact that they are designed to 'reduce' carbon dioxide rather than, say, methane, which is 21 times more potent as a climate-forcing gas, or some HCFCs, which are 11,000 times more potent.
- 415 World Bank, *State and Trends of the Carbon Market 2004*, Washington, DC, <http://www.carbonfinance.org>.
- 416 Ben Pearson, 'Market Failure: Why the Clean Development Mechanism Won't Promote Clean Development', CDM Watch, Sydney, 2004, p. 2.
- 417 For submissions on Suzlon, see <http://www.cdmwatch.org>.
- 418 Ecofys, 'Opportunities for Renewables under the Kyoto Mechanisms', Ecofys, The Netherlands, 2002, <http://www.ecofys.com>.
- 419 Ben Pearson, *The World Bank and the Carbon Market: Rhetoric and Reality*, Clean Development Mechanism Watch, Sydney, 2005, p. 3.
- 420 *Ibid.*
- 421 *Ibid.*, p. 6.
- 422 See Chapter 4, 'South Africa – Carbon credits from the cities'.
- 423 This was the operational period of the PCF during which the funds were placed. This table is thanks to Ben Pearson.
- 424 Figures taken from 'Transnational Corporate Beneficiaries of World Bank Group Fossil Fuel Projects, 1992 – August 2002', Sustainable Energy and Environment Network, Washington, 2002, <http://www.seen.org>.
- 425 Some of Mitsui's contributions went toward the Biocarbon Fund, another World Bank-managed enterprise.
- 426 Ben Pearson, 'Market Failure: Why the Clean Development Mechanism Won't Promote Clean Development', CDM Watch, Sydney, 2004, <http://www.cdmwatch.org>.
- 427 World Bank, *Striking a Better Balance: Extractive Industries Review*, Washington, 2004.

- 428 'The World Bank's Investments in Climate-Changing Fossil fuels', *Environmental Media Services*, 16 October 2003, <http://www.ems.org>.
- 429 Based on figures provided in the PCF's 2004 *Annual Report*, World Bank, Washington (<http://www.carbonfinance.org>). Because some of the PCF's projects would have happened without the PCF, and thus cannot represent real reductions, the word 'allegedly' is necessary here.
- 430 Gold Standard brochure, n. d.
- 431 Driesen, *op. cit. supra* note 161, pp. 158, 164.
- 432 Grubb, *op. cit. supra* note 236, p. 246.
- 433 Ruth Greenspan Bell, 'The Kyoto Placebo', *Issues in Science and Technology*, Winter 2006, p. 22.
- 434 Clean Development Watch and Third World Network, *The CDM: Reducing GHG Emissions or Business as Usual?*, CDM Watch, Sydney, 2003.
- 435 *Ibid.*
- 436 Philibert and Reineaud, *op. cit. supra* note 65.
- 437 *Ibid.*
- 438 The cost of compliance for a Chinese sulphur dioxide trading programme was often greater than the maximum allowed penalty for non-compliance. See Greenspan Bell, *op. cit. supra* note 129, p. 19.
- 439 G. Cornelius van Kooten, 'Smoke and Mirrors: The Kyoto Protocol and Beyond', unpublished paper, 2003, p. 24. See also G. Cornelius van Kooten, *Climate Change Economics: Why International Accords Fail*, Edward Elgar, London, 2004.
- 440 McKibben and Wilcoxon, *op. cit. supra* note 266, p. 126.
- 441 Greenspan Bell, *op. cit. supra* note 112.
- 442 William Nordhaus, 'Life after Kyoto: Alternative Mechanisms to Control Global Warming Policies', Yale University, 2005, <http://www.fpiif.org/fpifxt/3167>.
- 443 'Climate Change Monitoring: International Greenhouse Gas Emissions Trading', http://www.emissierechten.nl/climate_change_monitoring_inter.htm.
- 444 Greenspan Bell, *op. cit. supra* note 433.
- 445 *Ibid.*
- 446 *Ibid.*
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- 448 'Charlotte's "Carbon Footprint"', *Daily Telegraph*, 5 March 2006.
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