

# Democracy or Carbocracy?

## Intellectual Corruption and the Future of the Climate Debate

# THE CORNER HOUSE

**“Bullshit is a greater enemy of the truth than lies are.”**

**Harry Frankfurt, Princeton University, “On Bullshit”<sup>1</sup>**

When diplomats emerged from their conference rooms in Bonn on the morning of 23 July this year to announce that they had reached agreement on how to tackle climate change, many environmentalists cheered. After being disappointed by the collapse of the climate negotiations last November in The Hague, and by US President George W. Bush’s rejection of the Kyoto Protocol in March, they were ready to celebrate.

The jubilation seemed justified. Global warming is a matter of overwhelming importance. Keeping worldwide negotiations going seems critical. If nothing else, the Bonn agreement signaled that most of the world’s governments recognize that climate change is a problem and are eager to be seen to be doing something about it.

Yet a soberer look may be needed. A decade ago, international climate talks could still be said to be, in part, an environmentalist initiative. But how much of that agenda remains in today’s negotiations? Many observers complain that the talks leading up to Bonn were antidemocratic and scientifically bankrupt. The truth is even worse. They were also, in many ways, counterproductive.

Contrary to popular impression, most climate negotiators no longer bother discussing how to make deep cuts in fossil fuel emissions. Nor do they talk seriously about how to share the world’s limited carbon-cycling capacity. Nor do they scrutinize the underlying causes of global warming. Nor do they support the most important existing efforts to adapt to it.

Instead, they squabble over calculations they should know are unscientific — such as how much fossil fuel emissions they might claim that trees are “neutralizing” through photosynthesis. They argue over who is to receive the spoils of “climate mitigation” activities whose fraudulence is well-established — such as subsidies for tree plantations or coal-fired power plants. They lay plans for a carbon market which has no viable accounting system and which would redistribute air and land from poor to rich. Such cynical games have usurped years of negotiations. The same effort could have been more prudently devoted to practical means of addressing global warming and its effects.

Building on the agreement reached in Bonn is crucial. So is mobilizing against Bush’s anti-environmentalism. But doing either means more than just cheering on any and all attempts to keep the diplomats talking. It also means studying the subtle social processes through which the climate talks have themselves become a contributing cause of the climate crisis. And it means organizing in support of the many more constructive approaches to global warming that exist elsewhere.

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## The Paradox of the Protocol

In 1997 the world's governments, under heavy public pressure, came to an agreement on climate action known as the Kyoto Protocol. When ratified,<sup>2</sup> the Protocol is to bind 38 industrialized nations to reducing their emissions by an average of five per cent by 2008-2012. Countries unable to achieve these modest targets are allowed to "compensate" by buying credits from countries that have exceeded their targets, by putting money into forestry or soil conservation, or by investing in "cleaner" energy technology abroad (*see* Box: "Flexible Mechanisms and Other Loopholes", p. 3).

The Kyoto pact is technocratic. It tends to see global warming's causes mainly in physical terms: the production of excessive amounts of greenhouse gases.<sup>3</sup> On the whole, it declines to address institutions and power imbalances which have resulted in both the overuse and the unequal use of the atmosphere. Avoiding historical analysis, it averts its gaze from the politics of industry, the explosion in trade-related transport, subsidies for fossil fuel exploitation, the creation of consumer demand, and so on.

It views global warming's effects in a similar way, often assuming that "knowing the physical attributes of a climatic variation or change" is "adequate for understanding or predicting its consequences for human society".<sup>4</sup> It pays little attention to the fact that, in the words of geographer Michael Watts, "climate risk is not naturally given",<sup>5</sup> but is partly a function of a society's cultural resources and ingenuity, together with the political forces which support or threaten them.

This technocratic slant is no accident. In addition to having bureaucratic, technical or market backgrounds, many of the Protocol's architects took their cues from an earlier treaty: the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.<sup>6</sup>

The Montreal agreement was a technocrat's dream. Spearheaded by Northern scientific bureaucracies and governments, it managed to restrict the use of ozone-depleting substances internationally without having to scrutinise the industrial system which produced them.<sup>7</sup> Although aimed at phasing out the use of substances many corporations had come to rely on (mainly chlorofluorocarbons or CFCs), the Montreal Protocol was also fundamentally business-friendly. The Chemical Manufacturers Association was a part of the Northern-dominated scientific network which eventually confirmed the link between CFCs and ozone depletion, and Du Pont and other manufacturers joined many governments in announcing their support for an ozone protocol long before it was agreed.<sup>8</sup>

Unsurprisingly, the agreements that resulted presented the ozone problem as rooted in "flights of inanimate particles from activities deemed benign in themselves, and not the lifestyles of the rich and famous", to quote the wry assessment of Sheila Jasanoff, Professor of Science and Public Policy at Harvard.<sup>9</sup> Luckily, the economic and political stakes weren't very high. Unlike global warming, the ozone problem didn't require restructuring energy sectors central to industrialized economies.<sup>10</sup> Substitutes were found for some ozone-depleting substances, and with the help of a few transition-aiding payments to Southern nations, nearly all nations wound up complying with the treaty.

The deliberations leading up to the Kyoto Protocol were biased in similar ways. They saw the way forward in "rational analysis, goal-setting, and policy implementation by technocratic elites".<sup>11</sup> They were even guided by some of the same scientist-bureaucrats. Modest, fixed,

***The Kyoto pact sees the causes and effects of climate change mainly in physical terms.***

***Yet climate risk is not naturally given.***

quantitative targets and timetables for reducing emissions were set without many questions being asked about power, property and political obstacles. It was as if elites and their advisers were imagined already to have their hands on “non-political” dials which, when twisted, would ratchet greenhouse-gas emissions down to a reasonable level.

That kind of unsophisticated approach may have worked in Montreal. But it ran into problems in Kyoto. Even on its own technocratic terms, the Kyoto treaty was seen by most observers as inadequate in itself. Supposing its many loopholes could be plugged, implementing

## “Flexible Mechanisms” and Other Loopholes

**“Acceptance of the flexible mechanisms represents an article of faith, faith in the free market and faith in the process of globalization. It rests on an ideological stance.”**

**Mick Kelly,  
Climate Research Unit,  
University of East Anglia<sup>12</sup>**

The Kyoto Protocol establishes three market-based “flexible mechanisms” to help Northern countries avoid or delay reducing their greenhouse gas emissions.

### 1. *Emissions Trading.*

Northern countries failing to meet their emission targets can buy reductions from other Northern countries who lower emissions beyond their targets.

2. *The Clean Development Mechanism (CDM).* Northern countries can finance projects in the South aiming to mitigate climate change in return for credits which are banked and ultimately used to license continued pollution at home.

### 3. *Joint Implementation.*

Northern countries can finance projects aiming to mitigate climate change in other Northern (often Eastern European) countries, receiving credits accordingly.

Corporations can use the carbon credits from these mechanisms to increase their emissions.

Those that restructure or go out of business will leave governments responsible for the associated carbon debt.<sup>13</sup>

CDM projects may include large-scale fossil-fuel projects

as well as small hydropower schemes, renewables, energy efficiency, and improved techniques of waste disposal. Under the CDM, Northern countries are also encouraged to set up tree plantations in the South. According to the July 2001 Bonn agreement, the North can use these plantations to “compensate” for up to one per cent of their 1990 emissions above their ceiling. That adds up to a total of 145 million tonnes of CO<sub>2</sub> per year. How big a land acquisition this will amount to depends, among other things, on how much fraudulence is permitted in the carbon calculations. But in theory, the Bonn agreement allows the North access to a parcel of land roughly the size of one small Southern nation every year for use as a carbon dumping ground.<sup>14</sup>

The Bonn agreement doesn’t clearly exclude nuclear energy projects from either the CDM or Joint Implementation, although Northern countries are to “refrain from using” them. Otherwise, the agreement sets no specific limits on the use of the “flexible mechanisms”, saying only that a country’s actions to reduce emissions at home must be a “significant element” of its climate actions.<sup>15</sup> Forestry projects aren’t excluded from Joint Implementation.

## Escape Clauses

The three mechanisms constitute large loopholes in the Kyoto Protocol. Under its emissions trading clauses, for instance, the treaty awards Russia and Ukraine huge amounts of saleable carbon credits merely by virtue of their economic stagnation following the

breakup of the Soviet Union. And because the value of the carbon credits created by the Clean Development Mechanism and Joint Implementation can’t be verified (see Appendix: Why Kyoto’s Accounting System Fails, pp. 36-44), the two mechanisms are likely to wind up subsidizing, not mitigating, climate change.

The flexible mechanisms are far from being the only loopholes in the Kyoto Protocol. For example, the treaty also allows Northern countries to claim unlimited credit for domestic soil management changes (including low-tillage agriculture, application of genetically-modified carbon-absorbing microorganisms to soil, and so forth). It permits Northern countries, particularly Canada, Japan and Russia, to claim, together, a total of over 50 million tonnes of carbon a year for forests within their borders, stipulating in vague terms only that these forests be “managed” for increased carbon uptake. Canada, for instance, gets to emit an extra 12 million tonnes of carbon per year<sup>16</sup> by claiming that its forests are “compensating” — around 10 per cent of its total 1990 emissions levels. The Kyoto Protocol also exempts international aviation and shipping fuels, which contribute a rapidly growing proportion of greenhouse gas emissions.<sup>17</sup>

According to Greenpeace, carbon trading will allow Northern countries to *increase* their emissions by an average of 0.3 per cent over 1990 levels instead of decreasing them by over five per cent, as agreed in Kyoto in 1997.

***The numerical goals set in Kyoto, if modest, seem clear and easy to understand.***

***Yet in fact the Protocol opens up new ways of subsidizing global warming.***

the agreement could check the projected several-degree temperature rise over the next century by only a fraction of one degree.<sup>18</sup> Many scientists hold that 60 per cent global emissions cuts are needed just to level off CO<sub>2</sub> proportions in the atmosphere at twice pre-industrial revolution levels, and even cuts this big carry no guarantees.

That provoked some obvious questions. Why devote years or decades of negotiations to trying to find ways to achieve such a paltry objective? Doesn't doing so even risk a backlash when a globally-warmed, flood-plagued, storm-buffed public finds out how little has been done?<sup>19</sup> Two answers were usually given.

The first was that the goal set in Kyoto is easy for intellectuals to understand. It's numerical. You know — it would seem — whether you've reached it or not. Complicated institutional change is left out of the picture. So is the issue of how different societies might best adapt to the climate change already occurring.

Second, so what if the cuts contemplated were small and applied only to 38 countries? Surely some cuts by some nations were better than none at all. Only by building on hard-won, trust-building agreements by which industrialized countries make little reductions first, the argument went, will it become possible for the whole world to join in bigger collective efforts later. Whatever its drawbacks, the Kyoto Protocol was the "best expression we have of collective will to solve the problem".<sup>20</sup> Hence even some of the severest non-government organization (NGO) critics of the talks lavished time and resources on official meetings, creating a generation of activists whose professional lives have in many cases become bound up with legitimizing the treaty process.

These answers are now invalid. The current incarnation of the Kyoto Protocol will fail to curb greenhouse gas releases even by the tiny amounts advertised. Worse: the measures the Protocol proposes for "compensating" for the emission increases which it sanctions open up new ways of subsidizing climate change. As a result, the treaty is arguably on course to discredit the whole idea of climate negotiations.

## **Promoting Unequal Rights to the Air**

**"To say that we should 'leave things to the market' is to say no more nor less than that we should leave things to history as it has come to us."**

**Arthur MacEwen,  
University of Massachusetts,  
*Neoliberalism or Democracy?*<sup>21</sup>**

North America, Europe, Japan and Australia and other industrialized regions use far more than their fair share of the atmosphere as a greenhouse-gas dump. And they throw far more greenhouse gases into the air than the earth's biophysical systems can recycle back out.

To stabilize levels of greenhouse gases at a level twice those at the time of the industrial revolution, global emissions would have to be reduced from the current one tonne of carbon per person per year to an average of 0.4 tonnes. The US emits 13 times this amount per head, or 5.2 tonnes, and Japan and Western European nations five to twelve times this amount per head, or two to five tonnes. More than 50 Southern countries including India, by contrast, emit less than half the maximum level, or 0.2 tonnes per person.<sup>22</sup> Assuming that each person has an equal right to the atmosphere, US emissions will ultimately have to come down to less than 10 per cent of current levels, while India's can double. There's also an accumulated "carbon debt" which the North

# Back to Basics

No one thinks that the Kyoto Protocol's carbon market is by itself an adequate response to climate change. No one even believes that it will be able to keep industrialized countries formally within their Kyoto limits for very long.

The trading of permits to emit greenhouse gases does nothing more than spread the burden of emissions reductions which have been agreed on by other means. If the overall emissions targets aren't enough to stabilize atmospheric concentrations of greenhouse gases, then the emissions market based on those targets won't be, either. Joint Implementation and the Clean Development Mechanism, similarly, are "not designed to reduce global greenhouse gas emissions", but, at best, merely to be "carbon-neutral on a global scale".<sup>23</sup>

Using trees even to *try* to "compensate" for current emissions would require impossible continent-sized plantations.<sup>24</sup> Trying to counteract a single year's emissions in the UK would necessitate covering Devon and Cornwall with trees.<sup>25</sup> 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

anthropogenically-produced CO<sub>2</sub> in the coming century".<sup>26</sup>

None of Kyoto's market measures, in short, tackle directly the physical root of global warming: the transfer of fossil fuels from underground, where they are effectively isolated from the atmosphere, to the air. The July 2001 Bonn decision even calls for cooperation in the "development, diffusion and transfer" of fossil-fuel technologies (albeit ones that emit "less" greenhouse gases).<sup>27</sup>

Yet the mining of coal and oil will have to be halted long before supplies have run out. The amount of carbon in remaining deposits of fossil fuels (over 4,000 billion tonnes) swamps both the carbon pool in the atmosphere (720 billion tonnes) and the carbon pool in the terrestrial biosphere (2,000 billion tonnes) (see TABLE). Atmospheric science suggests that adding just a few hundred to a thousand of this 4,000 billion tonnes to the air could precipitate catastrophe. As geologist Jeremy Leggett has pointed out, there is no long-term technical solution to global warming short of leaving the bulk of remaining minable fossil fuels in the ground.<sup>28</sup>

group of scientists writing recently in *Science* concluded:

"prospects of retrieving anthropogenic CO<sub>2</sub> from the atmosphere by enhancing natural sinks are small . . . There is no natural 'savior' waiting to assimilate all the

**TABLE**  
*Carbon pools*  
(billion tonnes)

<b>Atmosphere</b>	<b>720-760</b>
<b>Oceans</b>	<b>38,400-40,000</b>
<b>Lithosphere (rock)</b>	
<i>carbonates</i>	<b>&gt;60,000,000</b>
<i>kerogens</i>	<b>15,000,000</b>
<b>Terrestrial biosphere</b>	
<i>living biomass</i>	<b>600-1,000</b>
<i>dead biomass</i>	<b>1,200</b>
<b>Aquatic biosphere</b>	<b>1-2</b>
<b>Fossil fuels</b>	<b>4,130</b>
<i>coal</i>	<b>3,510</b>
<i>oil</i>	<b>230</b>
<i>gas</i>	<b>140</b>
<i>other (peat)</i>	<b>250</b>

Source: Falkowski, P. et al., "The Global Carbon Cycle: A Test of Our Knowledge of Earth as System", *Science* 290, 13 October 2000.

owes the South due to its disproportionate emissions over the past century and a half.<sup>29</sup>

Rather than addressing these issues, the Kyoto Protocol stipulates that Europe will be allowed to continue emitting a full 92 per cent of its 1990 level of greenhouse gas emissions until 2012. Canada and Japan are permitted 94 per cent of their 1990 levels, and Australia 108 per cent. Because it "rewards historically high emitters and penalizes low emitters"<sup>30</sup> in this way, the treaty appears to give the North atmospheric "dumping rights" which are both unsustainable and unfair.

The Protocol's defenders argue that this appearance is deceptive. The Protocol, they say, isn't talking about property rights at all, but merely sets temporary emissions targets as a stepping-stone on the way to more radical cuts. This, they say, in no way precludes a future discussion on who really owns the atmosphere.

This defence is invalid. The Kyoto Protocol, together with initiatives outside the official negotiations, creates a "sky market", where money can buy rights to use the air as a greenhouse gas dump. This market, like any other, needs these rights to belong to somebody. You can't trade what you don't have power over. This "somebody" turns out to be the people who are using the atmosphere the most already.<sup>31</sup>

***There's no long-term technical solution to global warming short of leaving most remaining fossil fuels in the ground.***

Under the Kyoto Protocol, if Japan (say) finds that cutting its emissions by the required six per cent between 1990 and 2008 to 2012 is too difficult or expensive, it'll be able to buy cheap emissions permits from elsewhere to help fill the gap. But it won't need to buy permits for the remaining 94 per cent of its 1990 emissions. In effect, it'll be regarded as already holding these — if only until 2008.

By the same token, if Russia, Ukraine, Germany or the UK overshoot their Kyoto targets, they'll have, in effect, permits to use atmospheric dumps which they don't need. These will be available for sale to Japan or other countries. Again, this implies that these countries hold more provisional air disposal rights than nations that have historically made do with a smaller per capita use of global carbon-cycling capacity. The latter countries won't have so many permits to sell even if they make emissions cuts which are proportionally just as great.

## Property Rights Illusions

**"What is remarkable, and frightening, about this language is its inability to admit what it is talking about."**

Wendell Berry,  
"Standing by Words"<sup>32</sup>

The more obvious the realities of atmospheric conflict become, the more strenuous become the efforts of some Northern negotiators to deny them. Take the question of who has rights to the atmosphere — and what kind of rights they are.

Last November, Dutch Environment Minister Jan Pronk, president of the climate negotiations at The Hague and in Bonn, was presented with a Friends of the Earth mandate signed by over 85 organizations calling for governments to study the possibility of allocating rights to the atmosphere on a democratic, per capita basis.

Pronk retorted emotionally that it was "inappropriate and unhelpful" even to bring up the subject of atmospheric rights at that point. Claiming that the Kyoto Protocol was not creating "any right, title or entitlement to emissions of any kind",<sup>33</sup> Pronk spoke as if he were unaware that, *faute de mieux*, he had been talking about atmospheric rights himself in the most provocative and regressive way throughout the meeting.

Similar views are shared by others. Economist Peter Read,

one author on the Intergovernmental Panel on Climate Change (IPCC), for example, notes that climate negotiators "did not sign up to right the inequities that exist in the world". Read goes on to draw the conclusion that:

"To premise policy on the idea that existing inequalities are abnormal is to lead straight to confrontation, resulting in no action and risking climate catastrophe."<sup>34</sup>

The assumption is that the unequal rights to the atmosphere reinforced by the Kyoto Protocol (see "Promoting Unequal Rights to the Air", main text) are normal and therefore uncontroversial.

*The Economist* magazine, similarly, appears not to understand that criticism of current "market" approaches to climate change is often rooted in concerns about the way they allocate property unequally. Instead, the magazine attributes this criticism entirely to a sentimental notion that "pollution is sin, which implies that polluters must be punished"<sup>35</sup> rather than allowed to buy "cheap" means of global warming mitigation like carbon sinks or emissions permits.

Carbocrat Jayant Sathaye of the US's Lawrence Berkeley National Laboratory, meanwhile, claims that anxieties about the rich cleansing their emissions by taking over the poor's land for forestry projects can be relieved simply by "ensuring that the title to the land is separated from the title to carbon".<sup>36</sup> This is to ignore

the fact that land whose tree and soil carbon has been signed over to a utility corporation is going to be less able to provide livelihood goods to local people, as the history of enclosure and tree plantations indicates.

## Vulnerability

When talking about adaptation to climate change, finally, many people involved in the climate debate hold that:

"industrialized countries are not vulnerable to predicted climate change and developing countries would be better helped to cope by hastening their development, not by sacrificing rising prosperity to greenhouse gas mitigation."<sup>37</sup>

But the "underlying causes of vulnerability" to climate change are hardly confined to the lack of shiny, expensive Northern machines, infrastructure and capital.

As Mick Kelly and W. N. Adger of the University of East Anglia stress, they have a lot more to do with the "inequitable distribution of resources". Helping people become less vulnerable to climate change in Viet Nam, for instance, would involve "poverty reduction, risk-spreading through income diversification, respecting common property management rights and promoting collective security".<sup>38</sup>

In practice, such permits cannot help but be treated as what David Victor of the US Council on Foreign Relations calls “semipermanent property rights”. Once distributed, they will tend to become “assets that, like other property rights, owners will fight to protect”. Their immense value will only add to the pressures to treat them as durable property. Victor calculates that at US\$14 per tonne of carbon dioxide (which is somewhere in the middle range of the prices economists expect CO<sub>2</sub> to fetch if global climate trading schemes go into effect), the new carbon commodities created by Kyoto would add up to \$2.345 trillion, the “largest invention of monetary assets by voluntary international treaty in history”.<sup>39</sup>

Awarding most of these assets free to the North is hardly a sustainable settlement. And it’s one that has already been sharply contested. The British organization Christian Aid argues, for example, that the distribution of rights should be just the opposite of that proposed by Kyoto. The G-7 group of industrialized countries, Christian Aid calculates, is “running up carbon debts in economic efficiency terms of around US\$13 trillion each year” while the “group of highly indebted poor countries are running up credits of between \$141-\$612 billion because of their under-use of fossil fuel resources and the climate.”<sup>40</sup>

## **Making Inequalities Worse**

Current carbon trading schemes not only entrench inequalities in access to global resources. They make them worse. The Kyoto Protocol, and the many corporate initiatives being developed in parallel, help make it possible for the well-off to buy the right to operate air conditioners, sports utility vehicles or jet fleets while telling ordinary people to stop using firewood or farming rice in methane-emitting paddies. They encourage companies who already use more than their share of the world’s carbon sinks and stocks to buy still more of them — using cash which has itself been accumulated partly through a history of overexploiting those sinks and stocks.

Under the arrangement, the North gets the right to emit extra greenhouse gases in exchange not only for maintaining trees or soil in its own rural areas but also for planting trees in the South. This expands its already-extensive ecological and social footprint. If Japan uses 24 times more per capita of the atmosphere for carbon-dioxide dumping than India, then it will also need 24 times more tree plantation land, 24 times more trees, and 24 times more “carbon workers” per capita in order to “compensate”. Economic realism dictates that the land will be taken disproportionately from poorer people in the South and elsewhere.

The Norwegian firms Tree Farms AS and Norwegian Afforestation Group, for example, have already leased land from Uganda at bargain prices to use to soak up Norwegian carbon dioxide. This takeover threatens the livelihoods of 8,000 people, mainly farmers and fisherfolk, many of whom consider themselves the owners of the land in question. Carbon revenues will far exceed the rent paid to the Ugandan government.<sup>41</sup> TransAlta, the largest energy utility in Alberta, Canada, is meanwhile financing a project to feed Ugandan cows supplements to reduce the volume of their farts, which contain the greenhouse gas methane, in order for TransAlta to buy itself time to upgrade three coal-fired electricity generating stations.<sup>42</sup>

In neighbouring Tanzania, Tree Farms anticipates selling carbon credits from pine and eucalyptus plantations worth US\$27 million to Industrikraft Midt-Norge on a land rent payment to the government of

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***Going to market without knowing what to count is as foolish as going to market without knowing who owns the goods on display.***

a mere \$565,000. Starting in 1996-7, local people were hired as casual plantation workers between December and March at a rate less than the government's minimum wage (US\$1.05 per day), and many workers were not paid at all. "When we asked about the salaries," commented the residents of Uchindile village:

"the company told us that the money came from a place far away and that there was nothing that could be done about it."

As environmentalist Jorn Stave notes, the agreement requires not only that local people give up rights to future use of the land. It also demands that Tanzania "relinquish the option of using the plantation areas in its own CO<sub>2</sub> budgets when, as is likely, the Kyoto Protocol is expanded" to include restrictions on Southern emissions.<sup>43</sup>

Such projects don't only damage local livelihoods. They're also used to sanction fossil fuel-related pollution elsewhere, both at mining and oil drilling sites and around energy generating plants. The impacts once again fall mainly on the poor. As always, using technical fixes to try to remedy what are essentially political problems tends merely to pile inequality on inequality.

All this is bound to stir growing opposition over time. Governments of some poorer nations may sell permits while their industrial output is in decline,<sup>44</sup> but then defect from the agreement when their country looks set to put out carbon dioxide in excess of its allocation. Still others may be angered when they can't build a power plant because the North has already acquired ownership of the needed emissions rights. Frustrated by land grabs, finally, local people may take matters into their own hands and render "carbon-saving" forest or land projects projects valueless.<sup>45</sup>

## **Call to Account**

Climate negotiators' commitment to untenable notions of property and resource distribution isn't the only reason why their plans for an atmosphere market are headed for trouble. In addition to clear property rights, markets need workable accounting systems. Venturing into a market without knowing how or what to count is as dangerous as doing so without knowing who owns what.

An accounting system for a market with billions and perhaps trillions of dollars of emission permits circulating throughout the global economy on the basis of gas fluxes, needs to be, as US commentator David Victor notes drily, "reasonably robust". It needs to be able to quantify in a single number the direct and indirect atmospheric effects of any credited actions taken on climate. That would require:

***(1) The biophysical knowledge necessary to assemble a sufficiently certain and complete quantitative picture of carbon flows between the atmosphere and biosphere.*** The margin of uncertainty in quantifying carbon stocks and flows must be small enough for credits gained from planting or maintaining trees, or maintaining or improving soil, to be climatically meaningful.

***(2) Sustainable consensus on what social agency is responsible, and in what proportion, for any quantified change in carbon flows.*** For credits to be assigned, it is insufficient simply to quantify and verify that some atmospheric change has been brought about by some set of trees or flight of particles. The



trees' presence or the particle flights must be traced to some nation, corporation, group or individual. Somebody must be responsible for, or be the owner of, or be entitled to, the trees. Somebody must have caused the particles to fly. Accounting presupposes accountability. Who is to be credited and debited?

**(3) *The ability to quantify the effects of social actions and institutions which mediate those carbon flows.*** Sociological as well as biophysical knowledge is necessary for tracing, assessing, predicting or controlling carbon flows resulting from efforts to mitigate climate change. For example, physical action (planting trees, building power plants fueled by so-called “clean coal”<sup>46</sup>) may cause social effects (outrage among local farmers, diminished interest among investors in renewable energy, loss of local knowledge). These social effects may in turn bring about further physical effects (migration to cities, increased use of fossil fuels) which exacerbate climatic instability. Assessing, predicting or controlling carbon flows into or out of the biosphere resulting from a carbon plantation requires understanding and monitoring the “carbon behaviour” of any people affected by the plantation project, whether they are dispossessed peasants who move to Los Angeles or Wall Street bankers whose advice to utility investors is affected by the plantation’s anticipated impact on carbon prices.

**(4) *The ability to specify a story line constituting what “would have happened” without a particular climate action.*** This is crucial especially when actions are being credited which result in the transfer of carbon from fossil fuel deposits to the air, but in amounts “less than would otherwise have been the case”. To make the accounting system work, the story line describing “what would have happened otherwise” must be singular. If more than one possible alternative future emissions scenario is specified, then quantitative comparisons with the carbon effects of each story line will have to be made, the number of credits will be indeterminate and the accounting system will break down.

The failure of any one of these conditions would be enough to make Kyoto’s accounting system impossible, and explode the foundations of the trading system it envisages. Yet not only one but all four of the conditions fail spectacularly.

First, if the biosphere is to be part of the accounts, “the current state of knowledge regarding carbon sources and sinks cannot determine the levels and flows of carbon with sufficient accuracy to form the basis for the Protocol and any viable trading scheme”.<sup>47</sup> Second, there is unlikely to be consensus on who is entitled to which carbon credits. Third, quantifying the effects on carbon stocks and flows of policies and other social actions is admitted by all sides to be impossible. Finally, the future is a matter for decision, not just prediction. The story line describing “what would have happened otherwise” can never be singular. (For elaboration, discussion and references, see Appendix: “Why Kyoto-Style Accounting Systems Fail”, pp. 36-44.)

Because the carbon accounting system envisaged by Kyoto is quadruply impossible, the pretence that it works — enshrined in the Bonn agreement — is bound to end in tears. Bad or unverifiable carbon credits are likely to jam the trading system. Cheating will be both encouraged and uncontrollable. Ultimately, the market is unlikely to survive. Far from being checked, climate change will be subsidized and exacerbated.

***The particular accounting system envisaged by Kyoto is quadruply impossible.***

***Bad or unverifiable carbon credits will jam the trading system.***

***Ironically, the current negotiations distract from or even threaten many existing climate-friendly practices and initiatives.***

## **Undermining Existing Initiatives and Resources**

One of the biggest ironies in the current climate talks is that they often distract from an impressive range of existing positive practices and initiatives. In sharp contrast with the wishful technical fixes mooted by the corporate sector and the Kyoto Protocol, many of these go straight to the political and social root causes of global warming. To take a few examples:

- Communities in Burma, Malaysia, Nicaragua, Colombia, Nigeria, Chad, Thailand, Bolivia and Ecuador have stepped to the forefront of constructive action against global warming by protesting oil drilling and winning the revocation of fossil fuel concessions in their territories. In doing so, they argue, they're helping to keep some 3.655 billion tonnes of carbon in the ground. Such groups are also building alliances with other communities who have lost out in the hydrocarbon economy through having their health or livelihoods threatened by oil-burning installations. In support of these movements, which provide powerful incentives for managing demand and development of renewable energy, the non-governmental organization Oilwatch is calling for a plan for a moratorium on the exploration for further oil, gas and coal and on loans and subsidies for extraction and generation projects.<sup>48</sup>
- At a time when North American emissions are rocketing upwards, China reportedly reduced its own by 17 per cent in only two years, between 1997 and 1999 — during a time when its economy expanded by 15 per cent. The reductions, achieved in part through mundane technical improvements in boiler technology, equal the 400 million tonnes of carbon that the US transportation sector emitted in 2000.<sup>49</sup>
- In Sweden, communities supported by non-government organizations are independently undertaking efficiency and renewable energy programmes to cut their emissions by up to six times their per capita share of the country's Kyoto targets. The city of Vaxjo is working toward abandoning the municipal use of fossil fuels altogether.<sup>50</sup>
- A continent away, citizens in Haat Yai, Thailand, are mobilizing at community level to analyze the huge floods which struck the area in 2000. They're also assessing locally-appropriate ways of coping in the future with such events and monitoring the effectiveness of state interventions.
- The Caribbean nation of St. Lucia is meanwhile quickly and unilaterally moving toward a fossil fuel-free energy future with a practical renewable energy technology investment plan.<sup>51</sup>
- Movements protecting community forests and low-input swidden agricultural systems worldwide continue to be a powerful force preventing climatically-destabilizing land clearance, commercial logging and high-input intensive agriculture.
- Movements battling the deleterious effects of global trade liberalisation are also helping slow down the mining and burning of fossil fuels. One example is the international campaign spearheaded by groups such as the New Economics Foundation to cut state subsidies for transport of internationally-traded goods — projected to increase 70 per cent between 1992 and 2004.<sup>52</sup>

The first question for any global agreement on climate to ask itself is whether it nurtures — or whether it undermines — such already-existing actions. On the whole, the answer so far isn't encouraging.

# Reinforcing a Fantasy

The idea that planting trees, investing in energy-generating technology abroad and managing agricultural land in new ways are climatically equivalent to cutting emissions is irresistible to a lot of institutions.

Heavy industries and energy companies hope to delay carbon dioxide reductions. Agribusiness and forestry corporations are happy to sell them the means of doing so. Energy and commodity exchanges and trading firms are enthusiastic about the profits to be made by getting the two sides together. Consultants, too, are looking to cash in by advising on carbon liabilities and sequestration projects.

Small wonder that *The Economist* magazine states without argument or evidence — as if it were an obvious truth — that planting trees and the rest are alternative means “of achieving a stated goal (fewer net emissions) at lowest cost”.<sup>53</sup> Small wonder, too, that this assumption was built into the Kyoto Protocol.<sup>54</sup> Everybody wants to believe.

The belief gains plausibility through a natural confusion between two different sets of propositions:

(1) Trees are vitally important for climate.<sup>55</sup> So is practising low-tillage agriculture, improving energy efficiency, and so forth. Furthermore, it's important not only to cut emissions, but also, where emissions must increase,

for them to increase as little as possible. Finally, cutting emissions is important wherever it takes place on the earth's surface given that the atmosphere circulates so rapidly.

(2) Conserving forests, planting trees, practising low-tillage agriculture, improvements in energy efficiency and so on can be *traded* for emissions cuts in a way that makes the emissions “climate-neutral”. Actual emissions can be *traded* for hypothetical emissions reductions below “business as usual” in a way which renders the emissions “climate-neutral”. An activity in one social context which results in a short-term emissions cut can be *traded* for an activity in another social context which results in an identical short-term emissions cut.

To the unrigorous observer, the propositions in the second paragraph seem to follow from those in the first. For example, Richard Tipper of the Edinburgh Centre for Carbon Management reasons:

“If you know that saving the Amazon is better for the atmosphere than keeping one car off the road, then you ought to be able to calculate how many cars are equivalent to saving the Amazon. [The calculations] may be difficult, but I don't see why the problems should be insurmountable.”<sup>56</sup>

But in fact while the propositions of (1) are common sense, those of (2) are nonsense. Saying something is important and saying it can be quantified and incorporated into an accounting system are two different things (see Appendix: “Why Kyoto-Style Accounting Systems Fail”, pp. 36-44).

Take a utility company releasing a million tonnes of carbon a year. According to the Kyoto Protocol, the firm can be just as “carbon-neutral” as a subsistence farming household emitting one tonne a year. All the company has to do is contract a forestry consultancy to plant thousands of hectares of trees or “manage” soils or native forests in some new carbon-conserving way.

But as forester Ricardo Carrere of the World Rainforest Movement points out, any system which equates two activities so vastly different in the scale of their disruption of the earth's systems is like trying to posit a “numerical equivalence between apples and oranges”.

By unearthing and burning huge quantities of fossil fuels, Carrere notes, a large corporation will introduce uncertainties into the climate system which go far beyond anything undertaken by a swidden farmer.<sup>57</sup>

Trees and soil are highly relevant to climate and to the cycling of fossil fuel emissions, but the relation among the three can't be quantified in the way a climate market would require.

For example, the Bonn agreement does call on parties to the climate convention (especially, oddly, Southern ones) to “remov[e] subsidies associated with the use of environmentally unsound and unsafe technologies”. But few diplomats or their technical advisers have proposed lending a hand to community groups resisting coal and oil exploitation (and thus helping in the economic transition to a post-hydrocarbon economy) by applying pressure on export credit agencies or the World Bank to stop providing handouts to Northern fossil fuel companies from public funds.<sup>58</sup> No clear measures are being considered, either, to induce governments to reduce the subsidies they provide for coal-and oil-fired power (estimated at US\$200 billion annually<sup>59</sup>), the automobile economy, long-distance food transport and new fossil fuel exploration. Yet such actions are crucial in helping build local alternatives

***Technocrats may not comprehend the forces with potential to help stabilize the climate that already exist at the local level in both South and North.***

***Violating the principle “First do no harm”, current governmental and UN approaches may also damage communities’ ability to adapt to climate change.***

and ingenuity and develop climate-friendly ways of using and conserving energy.

Worse, the technocracies shaping the official climate change agenda show few signs of even comprehending some of the materials for climate care which already exist at the local level. By supporting (for example) plantation projects, they often threaten their very existence instead.<sup>60</sup> By continuing to define the climate crisis as a problem to be solved through indefinite capital accumulation, state subsidies for large corporations and consultants, transnational capital flows, neoclassical economics and national “development”, the climate establishment makes it almost impossible for itself to connect its top-down emissions targets with support for independent actions at the local level — actions that will necessarily be variegated and difficult to administer from above through development channels whose failures are widely acknowledged (see Box: “The Limits of Centralized Carbon Projects”, pp.14-15).

The approach currently followed by the UN and corporate sector also tends to menace existing reserves of flexibility many communities will need to adapt to the degree of climate change which is already inevitable. One problem lies in the de-skilling and disempowerment of ordinary people in the South which tends to accompany state-centred developmentalist approaches. As researcher R.W. Kates puts it:

“If the global poor are to adapt to global change, it will be critical to focus on poor people and not on poor countries as does the prevailing North-South dialogue. The interests of the poor are not always the same as the interests of poor countries, since in the interests of ‘development’, the poor may grow poorer.”<sup>61</sup>

Ordinary people in the North are disempowered, too, when the dominant market approach to climate change diverts their concern into individual self-blame and green consumerism. For example, Europeans and Australians are often invited by carbon-“offset” companies, governments or environmentalists to calculate their individual carbon emissions using simple questionnaires. Inevitably, most of those answering are revealed to be “individually responsible” for large releases of CO<sub>2</sub> from, for example, home heating or national transport systems which the questionnaires provide no clues on how to change.

One indirect effect of this procedure is to leave respondents vulnerable to the challenge that they “have no right to talk about climate change until they stop using their cars”. Another is to draw them into attempts to “compensate” for their outsize “individual” emissions by investing in tree-planting. The following “carbon equations”, for instance, which represent the current market approach in microcosm, are cited in recent promotional material by the British tree-planting firm Future Forests:

7 trees = 5 London-New York single air tickets

5 trees = 1 year’s driving of an ordinary car

2 trees = 4 pots of tea a day for 6 years

40 trees = 1 average home’s CO<sub>2</sub> emissions over 5 years

These calculations are part of Future Forests’ invitation to individuals and corporations to become “carbon-neutral®”. It doesn’t matter how much fossil fuel you use, or what you use it for. Simply write out a cheque and the carbon professionals will punch numbers into their computers representing your carbon-dioxide emissions, plant the requisite number of trees, and watch over them for you.<sup>62</sup>

In addition to slighting or ignoring many existing climate-friendly local practices, negotiators' technical advisers have also been slow to acknowledge an important and growing international climate movement. This movement demands both that the discussion of rights in the atmosphere be brought out of the shadows and that a scientifically meaningful programme of aggregate emissions cuts be undertaken. It calls for all countries to agree, in line with evolving wisdom on climate, how rapidly world greenhouse gas emissions should contract each year. It proposes then allocating permits to emit to all countries in proportion to the number of their citizens. Countries unable to keep their emissions in line with their per capita allocations could buy extra ones from those whose emissions were under the limit.

This equitable, flexible "contraction and convergence" framework has been endorsed by many Southern countries including China, India and the nations of the Africa Group; European government ministers including Michael Meacher of the UK, Jacques Chirac of France and Svend Auken of Denmark; insurance industry associations; and organizations ranging from the Royal Commission on Environmental Pollution to India's Centre on Science and Environment and Climate Network Africa. Unlike any other proposal on offer, the framework would enable the US's bluff to be called on all three of its objections to the Bonn climate agreement: that it doesn't commit the South to emissions limitations; that it's "unfair"; and that it doesn't address sources of future emissions.<sup>63</sup> It would thus advance the discussion in a way which could result in a better future agreement.

## From One Technical Fix to Another

**"Why is there so much bullshit? . . . The production of bullshit is stimulated whenever a person's obligations or opportunities to speak about some topic are more extensive than his knowledge of the facts that are relevant to that topic. This discrepancy is common in public life, where people are frequently impelled – whether by their own propensities or by the demands of others – to speak extensively about matters of which they are to some degree ignorant . . . The lack of any significant connection between a person's opinions and his apprehension of reality will be even more severe, needless to say, for someone who believes it is his responsibility, as a conscientious moral agent, to evaluate events and conditions in all parts of the world."**

Harry Frankfurt, "On Bullshit"<sup>64</sup>

How has an international discussion that advertises itself as well-intentioned, and which has benefited from the involvement of so many environmental activists, veered so far into nihilism and irrelevance? "Lack of political will" is one stock answer given by columnists, pundits, diplomats and non-government organizations. But this response is both glib and unenlightening. It'd perhaps be more exact to cite a "surfeit of political will" on the part of the private corporations and technocratic institutions that have influenced the negotiations so deeply.

The search for a better-grounded answer might begin with the fact that many industrialized countries long ago abandoned the goal of meeting their Kyoto Protocol targets by reducing emissions. Instead of lowering its greenhouse gas emissions by seven per cent by 2012, as specified in the Protocol, for instance, the US is likely to increase them by 25-30 per cent.<sup>65</sup> Instead of cutting its emissions by six per cent, Canada will probably increase them by 44 per cent.<sup>66</sup> Since 1990, Australia's CO<sub>2</sub> emissions have risen by 17 and Japan's by over 14.<sup>67</sup>

***Climate bureaucracies have been reluctant to discuss per capita rights to the air.***

***"Lack of political will" isn't a very good explanation of the climate talks' failures.***

# The Limits of Centralized Carbon Projects

**"Fostering flexibility means fostering power at the local level."**

**Elizabeth Malone and Steve Rayner,  
*Human Choice and Climate Change*<sup>68</sup>**

The institutions through which international treaties are negotiated have a built-in bias. They can't help but define the problems they discuss as challenges which national governments, UN agencies and large corporations have both the ability and the prerogative to tackle.

Sometimes this presupposition makes sense. Take the problem of how to phase out CFCs. CFCs are a specialized industrial commodity used in refrigerators, spray-cans, air conditioners, and machines making styrofoam and other insulants. In their heyday from the Second World War through the 1980s, they were produced mainly by a small group of companies including DuPont, Allied-Signal, ICI and Hoechst. Many national governments, with public support, were fairly well able to apply the legislation, regulation, monitoring techniques and enforcement needed to curb CFC use.

But the problem of how to tackle global warming isn't so simple. The carbon cycle is more complicated than the CFC cycle. Carbon is found not just in a selected range of consumer products like spray cans and refrigerators but in everything from newspapers to peat to oceans to human bodies. Carbon dioxide is produced not

just by a few companies like DuPont operating under one or two cultural systems, but by billions of scattered sources associated with billions of actors operating through thousands of cultural and biological systems. It isn't a commodity that can simply be banned.

Regulating the carbon-related activities of a few utilities or big nationalized industries may turn out to be relatively easy for centralized authorities in many countries. But trading industrial CO<sub>2</sub> emissions for trees or carbon-conserving land use activities will require understanding, monitoring and controlling a wide swathe of the biosphere and the societies who live on the land. That's not a job to which national governments, UN organizations or global markets are well-suited. They'll be constantly thwarted by their own inherent needs to reduce stubbornly complex situations to numbers and graphs so they can be understood by administrators in offices, "improved" by experts with a vested interest in keeping an appearance of superior knowledge, or exploited by business. These tendencies are bound to result in misunderstanding, violence and counter-productivity.

Take, for example, the extraordinarily complex carbon economy of Baan Laan Kham community in Samoeng District of Chiang Mai, Thailand. Here, a pattern of frugal carbon emissions is tied up, and dependent on, the interpenetration of a constantly-regenerating human environment with a constantly-evolving culture largely opaque to state agencies.

## A Grassroots Case

**"[T]he only frameworks that can tell you *anything* about the likely efficacy of a policy are those at the most local level."**

**M. Thompson,  
M. Warburton and T. Hatley,  
*Uncertainty on a Himalayan Scale*<sup>69</sup>**

The Baan Laan Kham system works through a sort of dedicated pottering. It requires residents to have an exceedingly fine-grained knowledge of the area.

In the local scheme of rotating agriculture, the easy dichotomy made by the state between "forest" and "field" is irrelevant. What may appear to outsiders to be permanent fields will in a few years be covered again with trees. Some of what looks to outsiders like permanent forest, conversely, is actually set aside for future temporary cultivation.

Over 30 kinds of crops are grown in carefully-chosen local swiddens. Deer and boar visit plots during the first fallow year; by the sixth, they become a haven for jungle fowl. Fields are weeded by hand, and frequent minute adjustments made to water channels.

Every corner of the landscape is constantly scrutinized by dozens of well-trained pairs of eyes both for violation of local forest preservation rules and for fires. The entire community is mobilized to battle blazes which appear dangerous, whether by beating them out or clearing new fire lines. Permanent fire breaks are painstakingly maintained in periodic rituals involving most of the community.

To many Northern politicians and thinkers, these trends are destiny. Oil and energy corporations' plans must be accommodated. The current generation of energy-generating equipment must be allowed to run for the rest of its lifetime. Protests over fuel costs must be avoided. Improving efficiency is not worth the effort. Underlying these imperatives is the belief that cutting carbon emissions is more expensive than continued burning of fossil fuels — a notion which underpins the entire market approach to climate.

This notion is either false or oversimplified (*see* Box: "Which is Cheaper, Action or No Action?", p. 17). But it has prevailed with economic modelers, policymakers, technocrats — and climate negotiators.<sup>70</sup> As a result, the problem for Northern politicians and their advisers has become how to reconcile rising emissions with climate action.

Even within village compounds, the landscape is maintained through a multitude of miniature actions. Hens leap up again and again to pick insects off cows' bellies to feed their chicks, while other chickens scratch at the dirt in search of fallen rice grains and other tidbits. Local piglets scramble over the same territory, seeking other fare. Little goes unused.

The variety of human and animal caretakers of the community is reflected in the crowd of spirits of place, rice, water, field and forest. In the "bellybutton forest", the umbilical cords of newborns are tied to trees that will house their spirits for life. Wood and bamboo shrines put up near swidden plots display stylized stick sculptures symbolizing dire retributions — ranging from strangulation to anal violation — sure to be visited on anyone stealing crops.

In this environment, aggressive state-packaged attempts to increase "efficiency" in the production of single commodities such as carbon are almost certain to come to grief. For example:

**Applying off-the-shelf theories** like "slash-and-burn agriculture must be curbed in order to slow global warming" is likely, paradoxically, to increase carbon emissions. Already, helicopters can periodically be glimpsed hanging over the mountains, ready to report newly-cleared swiddens to central authorities in the name of forest conservation. Yet keeping all wooded areas off limits to human activity, regardless of their characteristics, will increase pressures on less suitable land elsewhere. It's also likely

to make villagers feel they have nothing to lose by abandoning their own local forest conservation rules. Carbon storage in both trees and soil is likely to be affected and dependency increased on carbon-intensive inputs like chemical fertilizer and petrol.

**Installing plantations** of fast-growing Australian eucalyptus on Baan Laan Kham swidden fields in order to "protect local watersheds" has already had counterproductive effects. Native seedlings, saplings and other vegetation have had to be cleared to establish the plantations. Regeneration of native forest has been rendered impossible. Biodiversity has plummeted, and with it animal food supplies and carbon-storage capacity. Many of the eucalyptus trees are now dead or dying.

**Turning fire control over to the state** in the name of more "efficient" forest protection has already led to increasingly scorched landscapes in many places in Northern Thailand, making forests less carbon-rich. Fire-fighting officials are fewer in number than villagers and tend to have less knowledge of the fire ecology of the area to which they are assigned. As a result, their control practices tend to be "all thumbs". Worse, they often have bureaucratic incentives to encourage rather than control fires.

**Attempting to control "population"** (a favourite variable of administrators) in the name of the atmosphere may also be damaging to many carbon-conserving regimes. Raising the spectre of "population increase" in Baan Laan Kham ignores the fact that the

local community, while increasing its numbers, has already reduced its cultivated area by 40 per cent, from 800 to 480 hectares, through measures to increase agricultural diversity and multiple use.

**Further commercializing land and water** in line with official development plans is likely to reduce the effectiveness of local rules for land conservation which depend on community rather than individualized control.

Centralized power tends to breed ignorance of such local realities. Its need to simplify and situate itself as a "universal teacher" also makes it inflexible in dealing with them. In the process, centralized power's own local nature becomes hidden to itself.

This does not mean that fruitful encounters between small farmers and carbocrats from state or international agencies are impossible. But they require carbocrats to make huge and time-consuming adjustments in their thinking for each local area they visit, exploring flexible solutions unique to each area rather than one-size-fits-all formulas. That can only stir impatience among their office-bound bosses.

The incentives to disregard this central principle of economics are overwhelming at the UN level, including that of the Framework Convention on Climate Change and the Intergovernmental Panel on Climate Change. The way forward is not lectures and manuals, but political mobilization aimed at changing power imbalances.

The answer is inevitable: instead of delinking from carbon-intensive technologies, find ways to make technologies which transfer underground stores of fossil-fuel carbon into the air seem just as "climate-neutral" as technologies which keep the carbon in the ground.

Few expected such measures to solve the climate change problem. Few even believed that they would be able to keep industrialized countries within their Kyoto limits for long, given expanding fossil fuel use. But they were supposed to give the North, especially the US, a "money-saving" reprieve from having to meet its Kyoto targets by emissions cuts. Getting carbon credit for changes in forest and land management within Northern countries alone, it was asserted, could reduce the costs of compliance with the Kyoto Protocol by a third.<sup>71</sup> Credits from the South were expected to be even cheaper.

***Large companies  
have been working  
steadily behind the  
scenes to guide the  
climate talks.***

As time passed, Southern elites were seduced into the deal as well, with the help of development agencies and energy, development and forestry companies. Before long, negotiators were talking about little else. After one technical fix — legislating mere numerical limits on 38 countries' emissions — had proved politically unworkable, diplomats had simply added another: market-based mechanisms and trees. An infrastructure began to be built up which would “lock in” societal dependence on carbon sequestration and trading techniques just as, during the previous century, carbon-intensive technologies had been politically and culturally “locked in” to industrial economies.

But the political nature of ecological crises isn't so easily evaded. The repressed always returns. The techno-fix diplomats hoped would remedy the “inflexibility” of the Kyoto targets now faces breakdown due to its own ill-concealed neocolonialism and scientific fraudulence.

## **Corporate Influence, Diplomatic Paralysis**

**“How we got to this convoluted state, God only knows.”**

**Andrew Kerr, World Wide Fund for Nature, November 2000**

A fuller explanation for the deepening quagmire in official climate politics would look in detail at how large private corporations have come to dominate official international forums on global warming — and why they have taken the trouble to do so.

Many corporate lobby groups treat serious efforts to tackle climate change as threats to corporate capitalization, culture, market share and stability. Research by the non-governmental Corporate Europe Observatory and others suggests that, viewed in the aggregate, such groups, though diverse in their individual interests, have followed a two-pronged, “fail-safe” strategy.<sup>72</sup> On the one hand, they've tried to prevent the Kyoto Protocol from being ratified. On the other, they've subverted and weakened the Protocol from the inside.

The second is the dominant approach followed by corporate representatives outside the US, including US negotiators outside their own borders. Widening the loopholes the US built into the Protocol in 1997, they've helped divert the climate talks into politically regressive and scientifically spurious discussions about avoiding emissions reductions while reinforcing the inertia of fossil fuel-intensive industries.

The tactics for achieving these ends are many. One is to swamp official meetings with lobbyists and consultants. At UN climate conferences, private sector representatives easily outnumber both delegates and environmentalists. Far more important, however, is patient corporate work behind the scenes, particularly with other companies, with technical experts, and with national governments.<sup>73</sup>

One example is a mission mounted by the International Chamber of Commerce (ICC) shortly before the 1998 climate talks in Buenos Aires. Together with Shell, Texaco, Mobil and Chevron, the ICC sent a 30-person team to Senegal to round up support for the Clean Development Mechanism (CDM) (*see* p.3) from the energy and environment ministers of more than 20 African countries. In return, the companies offered technology transfer and foreign investment. Similar efforts with forest-rich Latin American nations have helped recruit nearly all their governments to the cause of carbon forestry. A fossil-fuel industry coalition called the Climate Council works closely with prominent members of the Organization of Petroleum Exporting Countries (OPEC) in countering various climate proposals, while the World



Business Council on Sustainable Development has put its head together with the UN Development Programme to facilitate carbon trading and get companies involved in CDM projects.<sup>74</sup> Other alliances such as the International Petroleum Industry Environmental Conservation Association, the Transatlantic Business Dialogue and the Emissions Marketing Association are in touch with national governments daily to promote market approaches to global warming. At the July 2001 talks in Bonn, five representatives of the Indonesian Association of Logging Companies sat on their country's delegation, pushing for schemes which would create climate credits for logging and plantations.

## Which is Cheaper, Action or No Action?

There are at least three reasons for questioning the establishment assumption that taking action on climate is more expensive than not doing so.

First, the costs to the world economy of continued fossil fuel use are likely to rise to catastrophic levels over the next decades. Andrew Dlugolecki, a climate change specialist with CGNU, the sixth largest insurance company in the world, notes that while world economic growth is averaging three per cent a year, insurance losses because of extreme weather are increasing by an annual 10 per cent:

"By 2065 the two growth graphs cross, the world economy can no longer sustain the losses, and collapse will follow."<sup>75</sup>

Second, fossil-fuel-based energy systems were not chosen because they were a rational, low-cost, efficient means of meeting pre-existing ends. Rather, they triumphed through political and cultural struggles in which "timing, strategy and historic circumstance, as much as optimality, determined the winner."<sup>76</sup> It was these struggles, rather than their initial cost, that gave fossil-fuel energy systems a crack at economies of scale; allowed them to develop the base of skills, research and resources which guaranteed rapid technological development; integrated them into transport, production, consumption and other cultural systems; starved competing technologies of research and resources; ensured demand; and ultimately won them adherents among subsidy-providing states.

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 centralized generation close to large fossil-fuel sources, closed out more efficient direct-current technology not because it was cheaper, but because it won judicial, political and public relations battles. AC's advantage then snowballed into technological and economic hegemony. Through such processes, fossil fuels became "locked in" to both the transport and electricity generation sectors, which together account for approximately two-thirds of global carbon emissions.<sup>77</sup> Similarly, a centralized, energy-intensive forestry-based paper industry came to prevail not because it was intrinsically more "efficient" than decentralized, waste- and agricultural-based paper manufacture, but because of political and cultural factors.<sup>78</sup>

Third, even after a century of entrenchment of carbon-intensive technologies, non-carbon or reduced-carbon energy generally lowers costs rather than raising them, for corporations, consumers and countries alike.<sup>79</sup> Even the US Department of Energy has found that the US could cut its predicted energy consumption by 20 per cent by 2020 and its CO<sub>2</sub> emis-

sions by a third, bringing them close to 1990 levels, all the while saving US\$124 billion on its energy bill.<sup>80</sup> 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.<sup>81</sup> The problem is not price so much as what Gregory Unruh of the Instituto de Empresa in Madrid calls the "techno-institutional complex" which has "locked in" carbon-profligate technologies.<sup>82</sup> According to energy expert Amory Lovins, the US is failing to make reductions in carbon emissions not because they would be expensive — in fact, they would save US\$300 billion annually — but because of capital misallocation, organizational and regulatory failures, lack of information, perverse incentives, and so on:

"People can save energy faster if they have extensive ability to respond to a weak price signal than if they have little ability to respond to a strong one."<sup>83</sup>

What's needed is not so much technological breakthroughs as structural change, and for existing non-carbon energy technologies to have the same crack at economies of scale and learning that carbon-intensive ones do. The problem lies less in getting the carbon out of energy than in getting energy companies out of fossil fuel deposits in indigenous territories, wildlife refuges and elsewhere.

***Corporations have attacked the Kyoto Protocol from the outside while also weakening it from the inside.***

***By bankrolling their campaigns, corporations strongly influence US politicians.***

Europe's corporations have meanwhile worked to erode from within European opposition to demands from the US and its allies for no limits on "flexible mechanisms". The European Roundtable of Industrialists, a club of 48 of the largest European transnationals, has been an influential proponent of the view that business should be offered "flexibility to develop alternative approaches" to regulation.<sup>84</sup> UNICE, the European confederation of employers, and the European Chemical Industry Federation are active on the same front, and other European firms hope to cash in on exports of supposedly "zero-carbon" nuclear energy. Other busy European groups include the Dutch FACE Foundation, which has been a pioneer in carbon forestry both in The Netherlands and abroad, and aid bodies such as Switzerland's Intercooperation, which is putting taxpayers' money into research on carbon forestry.<sup>85</sup>

### **Good Cop, Bad Cop**

While corporate actors acting internationally have helped retool the Kyoto Protocol from within, those inside the US have triumphed with a more primitive siege approach, attacking the Protocol itself.

This approach – although obsolete elsewhere – still works in the US partly because of the disproportionate cultural influence enjoyed there by multinational fossil-fuel-related corporations. Such companies shape a great deal of the information to which ordinary US citizens have access. Corporate or corporate-backed groups such as the Business Roundtable, the Global Climate Information Project, the Coalition for Vehicle Choice, the National Center for Public Policy Research, the Advancement of Sound Science Coalition and the Information Council for the Environment have spent millions of dollars on experts, conferences, books and advertisements associating climate action with economic harm to the US, including higher petrol prices.<sup>86</sup> For a decade, the Global Climate Coalition, another corporate group, aimed a multimillion-dollar disinformation campaign at US audiences attacking the whole idea that the climate was changing, including a US\$13 million pre-Kyoto advertising blitz in 1997 alone.<sup>87</sup> Corporate-linked non-government organizations such as the Pew Center for Climate Change<sup>88</sup> and establishment think-tanks such as the Council on Foreign Relations also help carry the message to the media that Kyoto targets are "unrealistic", aided enormously by the faculties of North American and British economics departments.

Through campaign finance, corporations also exercise tight control over US politicians. Nearly the entire US Senate endorses the line that the Kyoto Protocol is "damaging" to the US economy and "unfair" because it requires Northern countries to reduce emissions first.<sup>89</sup> Since the Senate would have to ratify any climate agreement signed by the US, the effects reverberate throughout the government and bureaucracy. Under the Bill Clinton regime, for example, US negotiators constantly had to assure Senators that they were willing to disregard both scientific and public opinion on atmospheric change.

A Senate hearing to which US chief climate negotiator Frank Loy was summoned two months before the meeting in The Hague offers a case in point. The Senators to whom Loy had to report included businessman Chuck Hagel, chair of the Senate Observer Group to the climate negotiations. In 1997-8 alone, Hagel had received more than a million dollars in campaign contributions from, among others, BP Amoco, Chevron, Shell, Mobil, Texaco, Marathon, Occidental and Tenneco; the three largest US automakers; and electric utilities in nine

states other than the one (Nebraska) which Hagel ostensibly represents. Revealingly, these contributions flowed into Hagel's coffers just after he was first elected, not before. Most went directly — and legally — into his personal bank account.<sup>90</sup> Hagel lectured Loy that other countries were just going to have to “get over” the idea that the US bears heavy responsibility for the climate crisis:

“the developing countries that are not held to any standard in Kyoto are obviously the biggest polluters when it comes to the black soot and some of these other emissions. Carbon dioxide, the United States has made good progress on that, as has [sic] most developing countries, imperfect yes. But we are not the problem.”<sup>91</sup>

In fact, as Hagel should have been notified by his platoon of researchers, the US, with five per cent of the world's population, releases nearly a quarter of its greenhouse gases and a third of its carbon dioxide. He should also have been informed that nearly half of the total growth in global CO<sub>2</sub> emissions since 1990 has come from the US, more than the combined increase of China, India, Africa and Latin America.<sup>92</sup>

Senator Frank Murkowski — a banker and one of the Senate's top five recipients of campaign funding from air-polluting industries including auto, fossil fuel mining, electric utility and trucking firms<sup>93</sup> — then added this observation:

“We have spent an astronomical amount on renewables. We have not achieved the percentage of the market share we would like, but it is not because we have not expended the money.”<sup>94</sup>

In fact, US government investment in renewable energy research and development has been poor compared with subsidies for nuclear and fossil energy, and has fallen steeply since 1980.<sup>95</sup> In 1995, renewables got less than five per cent of total government expenditure on energy research and development, or \$393 million, having fallen from a high of only 15 per cent, or nearly \$1.2 billion, in 1980. (In April 2001, President Bush announced that support for renewables would be cut again in 2002 from \$373 to \$237 million.<sup>96</sup>)

Loy acquiesced without comment in the Senators' inaccurate claims. Significantly, however, he wasn't prevented from setting out certain virtues of a pro-Kyoto position. Whatever the facts of global warming might be, he assured the Senators, staying in the talks could make it possible for the US simply to compute its way out of its Kyoto commitments. Even better, it could help make some extra money for some of its wealthier citizens on the side. For instance, the US could arrange things so that it could take credit for having a lot of trees within its borders. It could also try to find other so-called “climate mitigation” measures from which large US landowners could financially benefit.

The cordial understanding eventually arrived at between Loy and the Senators reflects an important strategic truth. Corporate attacks on the Kyoto Protocol don't necessarily contradict corporate attempts to use it. Like the proverbial “bad cop”, industry activists within the US go straight for the throat of the Protocol.<sup>97</sup> Like the proverbial “good cop”, their colleagues, largely outside the US, “defend” it, hoping to cajole and squeeze it into giving them what they want. The broader goal is the same: entrenchment of corporate power over atmospheric CO<sub>2</sub> dumps.

Sometimes good and bad cop are even the same person. The American Petroleum Institute, for instance, lobbies both for and against the Kyoto formula, depending on whom it's talking to. It tells US political elites that it would be unfair to restrict US emissions without also

***Almost half the growth in global CO<sub>2</sub> emissions since 1990 has come from the US.***

***The US “has made good progress” in reducing carbon dioxide, one Senator recently told the public.***

## **Many have criticized President Bush's rejection of the climate treaty.**

limiting the South's.<sup>98</sup> It then tells Southern elites not to submit to such restrictions on pain of losing growth and foreign investment. Similarly, the International Chamber of Commerce's attempt to bend the Kyoto framework in favour of big business meshes beautifully with the more aggressive anti-Kyoto line<sup>99</sup> of its US branch.<sup>100</sup>

By the same token, President Bush's ditching of the Kyoto Protocol in favour of "voluntary" corporate approaches to climate change doesn't contradict corporate efforts to take advantage of the Protocol from within. It's very much of a piece with them. Bush's "no Kyoto" position has made it even easier for those seeking to subvert the Protocol to argue that huge concessions must be made to the US's climate allies Japan, Canada and Australia to secure any sort of treaty at all. In fact, Bush's own diplomats were present at the Bonn conference in July 2001 in large numbers to haggle over the details of a treaty their President had already rejected. The deal which resulted is congenial to many sectors of the US business community, who may well eventually succeed in pushing Bush into backing Kyoto — no doubt to much public acclaim.

## **Roots of Spurious Science: A Case Study**

**"I learned, by seeing how they worked, how people in a big system . . . know what has to be done — without being told."**

**Nobel Prize-winning physicist Richard Feynman, on the scientifically-unsound decision to launch the space shuttle Challenger in 1986 so that it would coincide with President Reagan's State of the Union address.<sup>101</sup>**

One example of how an anti-democratic climate politics can nurture scientific fraudulence is the IPCC's response to diplomats' request to investigate the possibility of storing carbon in trees and soil as a way of "offsetting" CO<sub>2</sub> emissions.

The resulting 377-page report on *Land Use, Land Use Change and Forestry* (LULUCF),<sup>102</sup> released in May 2000, simply assumed without evidence that "emissions by sources and removals by sinks" could be aggregated quantitatively in a way which would make a carbon market involving the biosphere possible. The report was allowed to stand and played a strategic role in keeping open the loopholes of the political agreement reached in July 2001 in Bonn.

Naive observers might assume the LULUCF panel's

scientific failures (see Appendix: "Why Kyoto-Style Accounting Systems Fail", pp. 36-44) were due to lack of information. Not a bit of it. As early as the middle of 1998, the blue-ribbon German Advisory Council on Global Change had warned that it was crucial to clarify:

"to what extent the objective of 'long-term stabilisation of greenhouse gas concentrations at a level that is not dangerous' could be compromised by an accounting of biological sources and sinks"<sup>103</sup>

and cautioned against allowing countries to claim that the growth of forests within their borders could count as "emissions reductions". In July 1999, the International Institute for Applied Systems Analysis had pointed out that the IPCC's work to date could not "be considered adequate in handling the uncertainties underlying the carbon-accounting problem and thus the Kyoto Protocol".<sup>104</sup> Many independent environmentalists and NGOs had also provided the IPCC with early warning of the impossibilities of a carbon market involving the biosphere.

A slightly more plausible explanation of the panel's failures might mention personal conflicts of interest (see Box: "Conflict of Interest in the UN Climate Apparatus", pp. 22-23). Institutional

conflicts of interest are also worth exploring. Most experts on the panel were affiliated with environmental consultancies, mainstream forestry or economics institutes or faculties, industry associations, official agencies and government-funded research institutions such as the US's Lawrence Berkeley National Laboratory. Many saw carbon "offset" research as a promising enterprise for their institutions. Many had already put a great deal of time into it.<sup>105</sup>

Still another source of bias was evident in Chapter 4 of the LULUCF report. This chapter examines the technical possibility of countries' claiming carbon credit for "additional land and forest activities" within their borders under Article 3.4 of the Kyoto Protocol — perhaps the biggest sticking point at The Hague negotiations. Over half of the authors and editors of this chapter were from the USA, Canada or Australia, the three countries most active in demanding credit under Article 3.4.<sup>106</sup> No surprise that the chapter says such credit is feasible.

Yet even panel members whose institutions or countries did not have such clear vested interests in carbon-sink projects tended to avoid disciplined examination of the impossibilities of carbon accounting involving the biosphere. Here, the narrowness

In sum, to criticize Bush's withdrawal from the treaty without criticizing corporate pressure inside the climate talks is to risk falling victim to the elite strategy that underlies both. In truth, Bush's position merely formalizes the destructive role the US and its carbon-intensive industries have played in the climate negotiations from the start.

Here as elsewhere, lack of democracy *within* the US — the isolation of US negotiators and leaders from their own environmentally-concerned public, to say nothing of the billions of people outside the country — constitutes a global problem. It magnifies corporate influence on international discussions of all kinds.<sup>107</sup> What climate specialist Michael Grubb calls the "dominance of US power, and the continuing weakness of foreign policy . . . elsewhere"<sup>108</sup> has ensured that the negotiations following the Kyoto Protocol — as well as the Protocol itself — have been "very much as sought by the US administration".<sup>109</sup>

This US dominance, like the corporate dominance to which it's linked, is partly based on force of numbers. The story is often told, for example, of how, in The Hague, the US fielded 150 well-equipped delegates, housing them in the luxury Bel Air Hotel and sending well-rested

***But corruption  
within the climate  
talks is no less  
important.***

and uniformity of panel members' backgrounds — most were middle-class natural scientists and economists — was one key problem.

To many of the authors, it was simply a given that there were vast "degraded lands"<sup>110</sup> in the South (but not the North) which could be taken over for carbon projects without land or forests being degraded elsewhere as a result. To many of the authors, it was simply a given that the consultants and development agencies which would implement CDM projects would be able to do what they promised to do.<sup>111</sup> To many of the authors, it was simply a given that it would be easy to determine from an office what rural dwellers or foreign governments "would have done" without a carbon offset project. Dissenting voices were quietened by peer pressure — often under the name of "peer review".

## Missing Knowledge

Not coincidentally, three-quarters of the authors and editors of the LULUCF report hailed from the North. Even many of the Southerners present on the panel worked at Northern institutions. At the same time, the panel had no representatives of indigenous peoples who live in or depend on forests, communities directly affected by plantation projects, or communities affected by fossil-fuel pollution licensed by "offset"

projects — all of whom would have had an interest in insisting on a more thorough examination of the science.

Nor did the authors and reviewers include more than a handful of social scientists. Unlike the climatologist-dominated IPCC Working Group I, whose job is to peer into the future of the climate system, the LULUCF panel's membership was mismatched with the problem it investigated. Little of the available knowledge relevant to biospheric carbon accounting was brought to bear on the deliberations. And there were few incentives to seek it out.

Nor did NGOs concerned with climate — many of whom had similar class and cultural backgrounds to panel members, were deferential toward the experts involved, and feared that any charge of conflict of interest might also apply to themselves — raise any sustained challenge to the panel's narrowness and uniformity.

This imbalance damaged the quality of the report's science irreparably. According to one author, the panel "never considered"<sup>112</sup> whether Kyoto's biospheric accounting procedures were actually possible or not.<sup>113</sup> At most, it pointed to possible "challenges".

Thousands of relevant peer-reviewed references were missing — on social mechanisms of deforestation, peasant resistance, commons regimes, counterfactual history, investment psychology,

and the internal dynamics of development institutions — and the relevant issues never discussed. As Tanzanian delegates observed in June 2000, even the report's carbon-stock tables were based on temperate, not tropical, experience and neglected the importance of seasonality in carbon cycling in many Southern ecosystems.<sup>114</sup>

Yet after the report came out, one businessman panel member had the audacity to proclaim that "there are no technical problems left" with the idea of trading emissions for trees.<sup>115</sup>

Even where the panel did find crippling problems in those parts of the Kyoto Protocol that raise the possibility of a market in carbon offsets, it neglected to inform negotiators that, if taken seriously, they would make the Protocol unenforceable.

For example, the LULUCF report observes that it is "very difficult, if not impossible" to distinguish changes in biospheric carbon stocks which are "directly human-induced" from those which are "caused by indirect and natural factors".<sup>116</sup> But it declines to draw the logical conclusion that it will be "very difficult, if not impossible" for countries to claim climatically-relevant carbon credits for changes in forests and soils. Instead, it moves directly to the question "How should 'direct human-induced' be interpreted?".<sup>117</sup>

representatives to every working group meeting, while Mozambique had to put up its three harried delegates in a noisy youth hostel occupied largely by Chinese tourists.<sup>118</sup> The US also organizes other trading and sink enthusiasts such as Japan, Australia, Canada, New Zealand and Norway and applies political pressure on less enthusiastic negotiating partners. Not least, it lavishes resources on ensuring dominance in technical forums. As IPCC member Wolfgang Sachs observes, the US is the most “politically-minded” participant in IPCC deliberations:

“Many governments don’t even bother to comment on . . . drafts, but the Americans do, with a staff of many people. [That’s how] influence and power works, even in a relatively marginal thing like the IPCC”.<sup>119</sup>

## Conflict of Interest in the UN Climate Apparatus

One standard way of assessing the risk of corruption is to look at possible conflicts of interest. In science, conflict of interest:

“refers to situations in which financial or other personal considerations may compromise, or *have the appearance of compromising*, an investigator’s professional judgement in conducting or reporting research.”<sup>120</sup>

The key phrase here is “*appearance of compromising*”. By this standard, there’s little question that many economic modellers who claim that the price tag for climate mitigation would be in a position of conflict of interest.

As the editors of the journal *Climatic Change* note, the US Electric Power Research Institute, which is funded by electric utilities, has financially supported “seven of the major authors of integrated assessment studies” as well as co-sponsoring a special issue of *The Energy Journal* on the costs of the Kyoto Protocol. The “nature of funding of most leading economic models” of climate change “is a source of concern”, the editors conclude.<sup>121</sup>

Similar questions can be raised about the findings of certain UN-appointed specialists who have told diplomats that the idea of trading tree carbon for industrial emissions is scientifically sound. Here too, financial or institutional considerations may present the appearance of compromising professional judgement.

In 1998, the Bureau of the Intergovernmental Panel on Climate Change (IPCC), the UN’s technical advisory board on climate, chose a team to examine the “scientific and technical state of understanding for carbon sequestration strategies related to Land Use, Land Use Change and relevant Articles of the Kyoto Protocol”.<sup>122</sup> Lists of nominees had been provided by governments. In May 2000, the panel released a report claiming that it was possible to devise a viable accounting system for trading trees or soil for industrial emissions.

Among the authors were numerous employees of firms or other organizations which would benefit from the advancement of this claim. While such connections shouldn’t be read as evidence of wrongdoing, they’re still capable of *appearing* to have compromised judgements. Stricter standards at the IPCC would therefore have excluded many authors from the panel. For example:

**Pedro Moura-Costa** and **Marc Stuart** are executives of Ecorescurities Ltd., a consulting firm specializing in the “generation of Emission Reduction Credits” from activities including tree-planting. Ecorescurities has offices in Europe, Brazil, Australia and the US.

**Mark Trexler** runs Trexler & Associates, Inc., a pioneer US “carbon firm” poised to profit from promoting and monitoring carbon sequestration and other “climate mitigation” projects.

**Sandra Brown** works for Winrock International, a US-

based nonprofit organization which monitors forest carbon for private firms, government agencies and NGOs. Winrock has conducted or planned carbon inventories in Latin America, Southeast Asia and the US. It’s in its financial interest to claim that tree projects have quantifiable “sequestration potential”. **Kenneth MacDicken**, one of the IPCC report’s Review Editors, has also been associated with Winrock.

**Richard Tipper** is on the staff of the Edinburgh Centre for Carbon Management (ECCM), a consulting company which he helped form some months after being appointed to the panel and which designs, assesses and monitors carbon forestry projects. ECCM works closely with Future Forests, a firm contracted by Mazda, Avis, British Telecom, Access Freight, and J. Walter Thompson to plant trees to “compensate” for their emissions. ECCM staff have also been involved in a Mexican forestry project “offsetting” the carbon emitted annually by Formula One car racing.

**Gareth Phillips** is with SGS AgroControl, a division of the Societe Generale de Surveillance (SGS) of Geneva, the world’s largest inspection, auditing and testing company. SGS AgroControl, based in The Netherlands, offers a Carbon Offset Verification Service under SGS’s fledgling Climate Change Programme. SGS has certified the tradeable offsets offered by Costa Rica and hopes to expand its work elsewhere in the carbon forestry field. (Ex-SGS staff also

## A New Dialect

“[A number of] important questions cannot be addressed by policymakers engaged in the climate change discourse as it is currently framed.”

Elizabeth L. Malone and Steve Rayner<sup>123</sup>

Climate diplomacy may have been brought low partly by bullying, dirty tricks and undue private-sector influence. But even more important is the corporate-friendly idiom that now sets the terms of the discussion. The function of this idiom is to reconcile the *actual* current topic of the climate talks — how to expand and consolidate corporate access rights to the atmosphere — with its *apparent* topic — how to take scientifically-based action to mitigate global warming.<sup>124</sup>

work in the UNFCCC Secretariat, which exerts a crucial influence on climate negotiators’ agenda.)

**Bernhard Schlamadinger** works for the Joanneum Research Institute in Austria. Joanneum, together with Oak Ridge National Laboratory in the US (where fellow panel member **Gregg Marland** is employed) is part of a consortium financially supported by the US Department of Energy’s Centre for Research on Carbon Sequestration in Terrestrial Ecosystems. The Centre investigates ways of making possible, in its own words, “continued large-scale use of fossil fuels”.

**Peter Hill** is with Monsanto, a company which stands to make increased profits as a result of the panel’s findings. Monsanto claims that more carbon could be stored in soil if farmers reduced or stopped ploughing and instead bought its herbicide Roundup, together with Monsanto seeds genetically modified to be “Roundup Ready”. The firm has also shown interest in developing genetically-engineered plants that absorb more carbon dioxide.<sup>125</sup>

**Robert Scholes** is with CSIR Environmentek, a South African crown research bureau that consults on projects such as private tree plantations.<sup>126</sup>

Most IPCC members are reluctant to confront the issue of conflict of interest that such associations raise. Said one panel member:

“I saw absolutely no evidence that any author acted in a manner that would have served to reduce the scientific integrity of the chapter. Attacks on the personal and professional integrity of

chapter authors are deeply misguided and can serve no useful purpose.”

Mark Trexler and Gareth Phillips downplay the contribution carbon offset work makes to their firms’ revenue. They note that even without the IPCC report’s blessing, carbon companies could still find corporate clients seeking emissions credits for forestry schemes.

Before the report came out, for example, Richard Tipper’s firm ECCM was already profiting from helping its partner company, Future Forests, “certify” clients’ airline flights, car-driving, and heating as “carbon-neutral”.

To have disqualified all experts with vested interests, adds John Houghton, a member of the IPCC Bureau which appointed the review team, would have “cut out important experts. It’s impossible to flush out everybody.”

Anyway, Houghton argues, the report’s “wide review process”, was capable of “picking up any ‘special pleading’.” In addition:

“It was made very clear to the authors that they were there in their personal capacities and that they had to be neutral.”<sup>127</sup>

But established definitions of conflict of interest leave no doubt that such assurances of personal integrity, neutrality and wide peer review are irrelevant. What count are the questionable associations themselves.

The US National Institutes of Health, for instance, see conflict of interest as:

“employees, consultants or members of the government bodies using their positions for purposes that are, or give the appearance of being, motivated by a desire for private financial gain for

themselves or others such as those with whom they have funding or business or other ties”.<sup>128</sup>

## A Public Issue?

Despite the seemingly open-and-shut nature of the case, conflict of interest on the IPCC’s land use panel — and elsewhere in the IPCC and the influential UNFCCC Secretariat — has yet to become a serious public issue in the climate debate.

That may seem like bad news to those who value scientific integrity. But there’s another side to the story.

In challenging the principle conventionally used to adjudicate conflict of interest cases, IPCC members have also been forced to relinquish a false claim often used to shore up scientists’ social authority: that good science is disinterested and that “political” and “technical” judgements can be sharply distinguished.

No one’s work is disinterested, they have been compelled to admit; what matters is that scientific work is subject to comprehensive and wide-ranging review.

That admission throws the questions “Who gets to review?” and “Whose reviews count?” into sharp relief. It helps reopen debates about the nature of scientific authority.

It also implicitly raises questions about the extreme narrowness of the technical community currently deciding for the world what can and cannot be done about climate change.

***A new technical jargon is being created which makes business demands sound scientifically respectable.***

***By making it hard to raise central issues, the new climate dialect makes the job of large corporations and the US easier.***

A decade or two ago no such vocabulary existed. Today it is ubiquitous. A mass of disembodied, interlinked terms such as “leakage”, “additionality”, “baselines” and “supplementarity” has been conjured up which fuse biophysics, neoclassical economics, neocolonialist politics, and international law into a seductive and authoritative ideological fudge which gives business demands moral (read: scientific and technical) content while obscuring their political thrust.

The new idiom isn’t just a handful of individual words dressing up a central set of false equations. Nor is it just a pseudo-scientific smokescreen concealing a grab for resources. Nor is it merely a jerry-rigged code large companies and industrialized countries use to communicate threats, offer inducements and conceal their meaning from a skeptical public — like adults spelling out the naughty words they don’t want their children to overhear.

On the contrary, it’s a full-blown dialect with its own independent heft, texture and shadings. It’s a conceptual home in which a growing number of professionals forge solidarity and find collective confidence and self-respect. Inducing a state of sustained, dreamlike suspension of disbelief, the new idiom enables diplomats to discuss “flexible mechanisms” for weeks on end without needing to ask whether they can either verifiably address climate change or be implemented in the real world (*see* Box: “Transforming Impossibilities into ‘Difficulties’”, pp. 26-27). At the same time, it helps transform field research into carbon sequestration into, to borrow the words of anthropologist Hugh Gusterson, a “ritual furnace” in which the corporate ideology of carbon trading is “forged into subjective truths in the lives of the scientists” involved.<sup>129</sup> It’s a dialect capable of luring intelligent, technically-minded inquirers into an ambience of seriousness, civility and collegiality even in the course of mediating what are, clinically speaking, stupid discussions.

Scholar Joyeeta Gupta has written perceptively that many accepted UN negotiating techniques tend to be friendlier to the North than the South. “Avoiding polarization”, “incrementally building on agreement”, pretending to be guided by international legal norms — all handicap activist Southern diplomats by automatically relegating talk of structural change to the category of the “merely rhetorical” or “irrelevant”. The resulting series of “decision-less decisions” wind up buttressing an exploitative status quo.<sup>130</sup>

The emerging “technical” discourse on mitigating climate change works in much the same way. Within it, it becomes impossible to change the subject to serious science or responsible politics. Yet to refuse to speak the idiom is to risk “political incorrectness” and marginalisation in the UN corridors and meeting rooms in which climate change is discussed. For example, as IPCC member Wolfgang Sachs notes, orthodox economics and public policy methodology prevents the question even being raised of what type of changes would be necessary to reduce greenhouse gas concentrations to a safer level or allocate atmospheric property equitably; and this methodology, largely due to the influence of US climate intellectuals who are forced to adhere to it within their country, continues to dominate IPCC discussions.<sup>131</sup>

The climate idiom which results is the cultural substrate on which the so-called “political will” of the US and Big Oil fattens, while that of the less privileged languishes. Talking about how corporate and US power operates in climate politics without discussing how the new idiom works is like talking about how Beethoven achieved his effects without talking about the musical language within which he laboured.



## Origins of the Idiom

**“All institutions — academic disciplines, markets, nations, families — . . . match their problems and their solutions to their institutional imperatives.”**

**M. Thompson, M. Warburton and T. Hatley,  
*Uncertainty on a Himalayan Scale*<sup>132</sup>**

Like any language, the new vocabulary hasn't been spirited up suddenly by a conspiracy of a few individuals. It has a material basis in the varied and shifting details of the patient livelihoods of hundreds of highly-educated communities who speak, maintain and develop it. Nurturing its evolution have been corporations, governments, universities, think-tanks and non-governmental organizations, as well as the UN itself.<sup>133</sup> But what has emerged could have been only partly foreseen or intended.

The Northern-dominated<sup>134</sup> intellectual network responsible for this language produces two things. One consists of authoritative, sobering, ever-evolving narratives of future climate change. These story lines have to be standardized and clear-cut enough to meet international needs for “the” scientific view on global warming. Accordingly, they sometimes homogenize contrasting views and downplay controversy. Under pressure from policymakers, scientists presenting the narratives have also occasionally reformulated indeterminacies in their climate system modelling as “uncertainties”. This reinforces existing lay understandings of scientific authority, makes risks seem more calculable and manageable by state institutions, and suggests that generous further funding for technical research will some day issue in determinate answers making policy choices clearer.<sup>135</sup> Some of these “uncertainties”, in addition, provide policymakers with welcome room to make compromises, and corporations with an excuse for doubting that humans are changing the climate at all. However, there's little sign that these establishment narratives of future climate change significantly misrepresent the seriousness of global warming.

The second product is more damaging. It consists of pseudo-scientific justifications for the climate market which the UN and other institutions have agreed on as a result of political horse-trading.<sup>136</sup> This product functions to make standard climate narratives acceptable to the US government, its allies in Japan, Canada and Australia, transnational corporations, and a handful of other elites. It also describes global warming's effects in ways that help legitimize agendas and institutions fundamentally unrelated to climate change. Shortly before the climate negotiating round in Bonn in July 2001, for instance, the World Bank issued a press release liberally quoting its environment chief Robert T. Watson (who also happens to be chair of the Intergovernmental Panel on Climate Change). Its message was that the World Bank now had an important new role in “helping developing countries protect themselves as much as possible from climate change”.<sup>137</sup>

The misnamed “uncertainties” in this second product — stemming from the four impossibilities of carbon accounting described on p. 9 and in the Appendix (pp. 36-44) — again guarantee a growing stream of funding for research. Based on false premises, this research is guaranteed to produce yet more failures and “problems”, which in turn provide still more jobs for economists, foresters, development consultants and NGOs. In this way, a carbon technocracy, or carbocracy, grows which is capable of manipulating to its own advantage both fears of climate catastrophe and corporate and governmental predilections for self-serving technical “solutions”.

***The new language  
is being collectively  
developed by  
thousands of  
professionals from  
several disciplines  
and many  
organizations.***

***Part of the idiom  
consists of  
pseudo-scientific  
justifications for a  
climate market.***

# Transforming Impossibilities into "Difficulties"

**'Alice laughed. 'There's no use trying,' she said: 'one can't believe impossible things.'**

**'I daresay you haven't had much practice,' said the Queen. 'When I was your age, I always did it for half-an-hour a day. Why, sometimes I've believed as many as six impossible things before breakfast.'**"

Lewis Carroll,  
*Through the Looking Glass*

Believing in the impossible may not be quite as hard as Alice thought. But it's not quite as easy as the Red Queen claimed, either. Many carbocrats wind up yo-yoing between the demands of logic and the requirements of carbon marketeers.

Take the idea that precise numbers of carbon credits can be assigned to a Clean Development Mechanism project by comparing the with-project reality to a hypothetical without-project narrative. Most carbocrats know this is impossible but find it hard to resist pressures to believe otherwise.

Carbon trading enthusiast Michael Grubb and his colleagues, for instance, admit that to expect "some bureaucracy in the Clean Development Mechanism" will be able to quantify this comparison "amounts to asking it to play the role of an all-knowing and all-seeing God, an entity that even most theologians reject as inconsistent with human free will." They openly acknowledge the:

"impossibility of measuring or even defining savings that are additional to those that would have occurred in the absence of emissions credits".<sup>138</sup>

A scant page later, however, this "impossibility" is stealthily upgraded to an "uncertainty".<sup>139</sup> A dozen pages further on it's bumped up still further<sup>140</sup> to a mere "difficulty". "What would have happened" without any given project is now merely "unknown", not unknowable, making the CDM merely "some-what cumber-some".<sup>141</sup> A clue to this shift can be found in a sentence in the middle of the

passage: "CDM credits *will be* a commodity of some form".<sup>142</sup> We need CDM commodities; therefore we must make the impossibility go away.

Carbocrats Erik Haites and Farhana Yamin try to grope their way out of the dilemma in a different way. They, too, start out by admitting that there can never be a single "correct" account of "what would have happened without a project".<sup>143</sup> But instead of reinterpreting this indeterminacy as "uncertainty", they try to eliminate it by fiat, proposing that an official committee choose one out of all the possible hypothetical stories without pretending that any of them is "correct".<sup>144</sup>

This, of course, only sharpens their predicament. Who is to appoint this committee? On what ground will it choose? Are those grounds relevant to climate change? As Grubb and colleagues correctly observe, "every government and every company"<sup>145</sup> that wants carbon credits wants them for projects which they are already implementing or had planned even before the Kyoto Protocol came along. These actors are obviously not candidates for such a committee. But who is? If the story of "what would have happened otherwise" is to be chosen arbitrarily, the carbon credits which it justifies can't have any verifiable scientific relevance to the climate.<sup>146</sup>

## A Machine for Making Absurdities

**"Technical communities negotiate ceaselessly with the practical reality of their work, but when their conceptions of that reality are mistaken, these negotiations do not necessarily suffice to set them straight."**

Phillip E. Agre,  
University of California,  
*Computation and Human Experience*<sup>147</sup>

The more that carbocrats rack their brains for "solutions" to such intractable dilemmas, the more contradictions emerge. Tackling the new contradictions leads to still more baroque attempts to

square the circle.<sup>148</sup> This dynamic has contributed greatly to the Kyoto Protocol's reputation for Byzantine complexity.

Early in its deliberations, for example, the IPCC's land use panel sensed it was pointless to talk about improving the carbon storage in ecosystems without discussing the relevant social environments. Accordingly, it toyed with the idea of giving carbon credit for good conservationist policies. But it could hardly escape the conclusion that this was impossible: "quantifying the impact of policies themselves is unlikely to be feasible".<sup>149</sup> The panel imagined it could escape this problem by merely trying to quantify how much carbon was taken up in specific projects. But to do that required comparing a project's effects with "what would have happened otherwise", and under different policies the same project could give rise to many "otherwises". The only way to spell out a single story line would be to deny that there could have been different policies. That contradicted the admission of the IPCC carbocrats made at the outset, namely that different policies with different carbon impacts were possible.

Similarly, carbocrats have often been forced to admit to the irreducible social, political, biological and atmospheric differences between above-ground carbon and below-ground carbon. Yet they need to equate the two in order to keep alive hopes for Kyoto's accounting system. One way out is to "discount" above-ground carbon. But this only ushers in further dilemmas. No scientific basis exists for any particular discount rate any more than it exists for any numerical relation between a given forestry project and a given set of industrial emissions. And choosing an arbitrarily high discount rate is likely either to discourage commercial patrons of carbon forestry or to multiply the amount of land required and the associated risks and uncertainties.<sup>150</sup>

Carbocrats are also often frustrated at having to set out so many counterfactual story lines – one for each small tree plantation

or gas-fired power plant. Verifying such narratives is impossible, of course, but even just making them up is "extremely costly", what with "high transaction costs, numbers of participants and uneven information distribution".<sup>151</sup> One economical way out is to appeal to generic criteria which can be used to quantify the degree to which a whole range of projects, considered as a whole, are better than "business as usual".

Of course, this move can't get rid of the underlying question, "Which 'business as usual'?" But a further problem also arises.

In a recent study, Steve Bernow and colleagues at the Tellus Institute in Boston decided for the sake of argument to use a business-as-usual forecast for the global power sector from the International Energy Agency's most recent *World Energy Outlook* as a reference case for new generation facilities built between 2000 and 2012.<sup>152</sup> They then estimated, using conventional economic techniques, what sorts of energy projects might wind up being subsidized by the CDM. Their conclusion was that the CDM is on course to serve primarily as a source of spurious "free-rider" carbon credits for projects that, according to the IEA's business-as-usual scenario, would have been undertaken even without the Kyoto Protocol.<sup>153</sup> Even on the most implausibly conservative assumptions, in other words, a lot of Kyoto Protocol money is likely to go toward accelerating climate change.<sup>154</sup> The effects that Bernow and colleagues found will be made even worse if carbon prices are driven down by cheap tree-plantation and forestry projects.<sup>155</sup>

In forestry, where there is not even an IEA-like baseline to rely on in constructing a plausible "what would have happened otherwise" story, the situation is even worse. For an energy project, it's necessary only to make up a story about "what would have occurred without the project in the 10 or 15 years during which the project generates credits". But forestry or soil projects can claim to offset increase emissions fully:

"only if the baseline is accurate far after the time at which

sequestration occurs, and only if the sequestration in permanent . . . There have been no serious proposals for dealing with this problem."<sup>156</sup>

Whatever fictions about "business as usual" are adopted, Kyoto accounting is likely to lead to countries getting "large amounts of credit for 'business as usual'", effectively subsidizing accelerated climate change by excusing more emissions.<sup>157</sup> Even the parties to the Bonn agreement admit that, even by the UN's own dubious standards, Northern countries will get tens of millions of tonnes of carbon credit per year for carbon absorption which "would have happened without Kyoto".<sup>158</sup>

## Playing with Words

**"These people can cheat each other, but do they think they can cheat the climate?"**

**Scientist overheard at The Hague negotiations, November 2000**

By now, the carbocracy's tendency to treat insoluble dilemmas as soluble "problems" has almost become a way of life.<sup>159</sup>

So what if it's impossible to specify a single story line describing "what would have happened otherwise"? Rephrase the impossibility as a "problem of setting correct baselines" to be solved through "learning by doing". So what if none of the spatial, temporal or disciplinary boundaries which carbon accounting would require exist (see Appendix: *Why Kyoto-Style Accounting Systems Fail*, pp. 36-44)? Reformulate the impossibility as a mere "problem of leakage". And so on.

Some words are better at hiding impossibilities than others. Take the simple term "emissions credits". The feelgood emotional content of this phrase conceals a number of intractable self-contradictions.

For example, trading credits, at best, does nothing more than prevent buyer and seller from collectively doing any better than to fulfill the climatically trivial pledges made in Kyoto. At worst, it creates incentives for sellers to set low future emissions targets or high baseline emissions in order to be able to exceed the

targets with ease and sell off the difference.<sup>160</sup> This makes the relation between the monetary and climatic values of such "credits" both obscure and unquantifiable.

The pleasant word "credits" also hides from the public — and perhaps from politicians as well — the political aggression inherent in carbon trading.

Northern sellers of credits offer buyers atmospheric CO<sub>2</sub> dumps that they no longer need. But in reality, they have no claims on these dumps in the first place other than that their industries have grown accustomed to using them. Others who use them less could legitimately argue that they have more right to a say in their disposal since they had less of a crack at them in the first place.

Everybody gets the joke when the New York con man tries to sell the country rube a piece of the Brooklyn Bridge. The anodyne jargon of "emissions credits" allows the carbon market's version of the scam to pass virtually unremarked.

The upshot is that historical overuse of the atmosphere is quietly rewarded in preference to historical low use. This affects investment and industrial and land use planning — and, in turn, rates of global warming.

The self-contradiction is stark. To talk "emissions credits" is automatically to talk property and access rights and politics. To talk rights and politics is automatically to affect climate in unquantifiable ways. To affect climate in unquantifiable ways is to wreck the possibility of emissions credits.

By suavely throwing around phrases such as "emissions credits", diplomats and politicians, together with the economists, brokers and scientists who advise them, quietly beg the question of whether such a commodity could exist.

They help make it normal to speak as if leaving fossil fuels in the ground really *were* the "same thing" as trading carbon or taking over land to plant trees.

***Neoclassical economists have dominated discussions of the social aspects of climate change from the beginning.***

## **Background to Breakdown**

How the assembly line for the fabrication of this second product came to be set up is a complex story with an interesting cast of characters. It begins perhaps with the late 1980s efforts of both the US and funding-hungry research bodies to shift the centre of gravity of engaged scientific inquiry into climate change from independent academics and the United Nations Environmental Programme to technocracies more closely tied to governments. These included the World Meteorological Organization and the Intergovernmental Panel on Climate Change (IPCC), which was formed in 1988.<sup>161</sup>

In 1990, it was the “natural science community” alone which was able to present to governments a “fully planned and coordinated research agenda” on climate.<sup>162</sup> This revolved largely around general circulation models (GCMs) of the atmosphere and the oceans run on powerful computers.

Of course, the social aspects of climate change could hardly be ignored. But they were studied only in a narrow way. Climate modelers canvassed socioeconomic data. Technocrats forecasted energy use and collected the social data needed for management “solutions”. Legal experts studied and proposed laws. On the whole, the tendency was to try to fuse “formal mechanistic models across the various distinct natural and social science disciplines.”<sup>163</sup> There was little incentive to study the history and politics of the interaction between various societies and climate change, investigate the limitations of official programmes of climate relief, research existing social resources for atmospheric care, or arrange conferences on rights and accountability. Prediction — not interpretation, discussion or democratic decision-making — was the order of the day.

Dominating the discussion of the social dimensions of the climate crisis were neoclassical economists. Global economic modelling became the key tool of social scientists working on climate change, just as GCMs were the key tool on the natural-science side. In the early 1990s, under the prodding of the US and “well-organized social science research interests”,<sup>164</sup> mainstream economists captured much of the agenda of the IPCC’s Working Group III, which was charged with defining possible responses to global warming.<sup>165</sup> This trend had already been reinforced in 1990 by the UN General Assembly’s decision to posit an imaginary dichotomy between climate policy-making (the province of diplomat-patrons) and climate research (the territory of natural-scientific adviser-clients).

In 1992 came the Framework Convention on Climate Change itself, which scholar Sonja Boehmer-Christiansen contends “was not negotiated primarily to reduce greenhouse gas emissions”, but rather:

“as part of a wider bargain between rich and poor countries, competing energy interests and governments faced with growing economic problems making investments in the future increasingly more essential but also more difficult.”<sup>166</sup>

As the climate negotiations became increasingly dominated by a corporate agenda through the late 1990s and the early years of the new millennium, the UN climate apparatus became if anything even more indifferent to its ostensible agenda. Outside the UN, as well, a carbocracy grew which functioned — sometimes despite the best intentions of the individuals involved — to transform environmentalist concern about climate change into scientifically spurious technical and economic fixes.<sup>167</sup>

Currently playing a central role in nursing the development of the new carbocratic vocabulary are institutions in the US. Here, huge resources are being deployed to create jobs for technocrats to imagine and legitimize schemes for loading climate change mitigation onto the biosphere, building new fossil-fuel plants with climate change subsidies, and so forth. One US Energy Department laboratory alone envisages spending over \$900 million on industry and academic carbon sequestration research and development by 2015.<sup>168</sup> Included are plans to dose soil with coal combustion byproducts to increase carbon uptake, inject carbon dioxide into deep ocean waters off the coast of Hawaii, and bury CO<sub>2</sub> hydrates under Monterey Bay.<sup>169</sup> US scientists have long contemplated spraying the stratosphere with fine metallic particles to reflect sunlight, perhaps using the engines of commercial jets for the job.<sup>170</sup>

Other US-inspired projects include seeding large areas of land with organisms genetically engineered to fix carbon “more efficiently”; establishing floating kelp farms thousands of square kilometres in size which, growing heavier as they consumed carbon dioxide, would eventually sink to the ocean floor; and using fleets of C-130 military transport planes to bomb Scotland and other countries with millions of metal cones containing pine saplings.<sup>171</sup>

Particularly notable is the extent to which the network of US national laboratories, including the old nuclear weapons technocracies, have moved into researching technical fixes for climate change.<sup>172</sup> The Los Alamos National Laboratory in New Mexico, for instance, recently proposed constructing a collection of calcium hydroxide ponds covering an area of 200,000 square kilometres to scrub fossil fuel-produced CO<sub>2</sub> from the air.<sup>173</sup>

Private firms are also helping construct the necessary technical discourse. For instance, the American Forest and Paper Association, an industry group, has tried to enlist fellow paper industry groups in Canada, Europe, Japan and New Zealand in a:

“new strategy to convince other nations of . . . the proven concept that sustainable forest management offsets and mitigates carbon dioxide emissions”.<sup>174</sup>

Given enough funding, universities are happy to lend a hand. To take just one instance, BP and Ford recently contributed US\$20 million to Princeton’s Carbon Mitigation Initiative, the largest corporate contribution in the university’s history. Headed by professors from two departments — mechanical and aerospace engineering, and ecology and evolutionary biology — the scheme aims to find ways to collect CO<sub>2</sub> at central processing sources, then store it deep underground. One ostensible objective is to help India and China “spend fossil fuels . . . without doing what we’ve done to the atmosphere”.<sup>175</sup> Economists from a wide range of universities have also helped out, producing a steady stream of new jargon which make Kyoto’s “flexible mechanisms” seem common sense. In academia and policy circles alike, journals proliferate, research programmes ramify, projects and forums accrete, and new experts are lured in.

Climate mitigation money could be an unprecedented source of finance for forest conservation and other projects, and some conservative US environmental organizations have also got into the act. Both The Nature Conservancy and Environmental Defense, with the help of respected forest specialists, have woven extraordinarily sophisticated, deeply unsound technical justifications for trading trees for smoke.

***The growing carbocracy transforms concern about global warming into scientifically spurious market solutions.***

***Some environmental organizations have also got into the act.***

***Both national governments and development institutions are trying to cash in on the emerging carbon market.***

***Clean Development Mechanism projects will affect people not only in the “project area” but also around the mines and factories whose operations the CDM licenses.***

Other NGOs also sometimes unwittingly join the party. Climate Action Network US, for instance, has tried to contain the damage the Clean Development Mechanism (CDM) (*see* p. 3) threatens by helping to draft regulations aimed at making it more “participatory”. Others fret that Northern governments may use the CDM merely as a new label for existing foreign aid, and demand that it provide new funds.

Like other instances of carbocratic discourse, such actions not only tend to undermine effective action on climate. They also oppose many popular movements: the institutions being lobbied have a well-documented capacity to turn such advice to purposes that thwart participation.<sup>176</sup> Moreover, the “local people” affected by CDM projects are to be found not only in the project area, but also around the faraway mines or factories or whose continued operation the CDM project helps to licence. The new climate idiom makes it easy to forget that a genuinely “participatory” CDM project in Colombia might well have to consult communities near oil wells in Nigeria, power generating plants in New Jersey, expressways in California, and coastlines in Bangladesh.

It’s not only US institutions, of course, that are constructing the new climate idiom. Governments from Australia to Costa Rica, Colombia and Chile — each with its own agenda — have also joined the effort to find words and numbers to make sense of carbon trading mechanisms.

For example, New South Wales Labor Premier Bob Carr, who hopes to see his state become a “world leader in carbon trading credits”, is seeking investment in carbon plantations from Italy, France, UK, Germany and The Netherlands. Carr is relying partly on technocrats in the Australian Greenhouse Office to forge the necessary discourse on “sinks, market trading instruments, carbon accounting and land management.”<sup>177</sup> Private carbon brokerages<sup>178</sup> and economic research institutes the world over are lending a hand at the same tasks.

The Centre for European Policy Studies, inspired by US think-tanks, has meanwhile attempted to make European Union political discourse more corporate-friendly by pressing for market-based climate mitigation mechanisms and Southern commitments for CO<sub>2</sub> reductions. Shell Oil, through a charity set up in June 2000, is now sponsoring Climate Strategies, a “network organization of of senior policy researchers” aimed at influencing policy.<sup>179</sup>

International development institutions have also poured resources into building technical vocabularies to link their interests with the “flexible mechanisms” gravy train. Eager as always to please the US government, the World Bank set up a Prototype Carbon Fund in July 1999 to reduce the costs of emissions reductions for the North. The Fund quickly attracted investment from Mitsubishi, Shell and other companies hoping to get “carbon credits” from energy and other projects.<sup>180</sup> Part of its work revolves around the unachievable task of “verifying” that climate projects really are making a quantifiable improvement on “business as usual”.

The United Nations Development Programme and the Food and Agriculture Organization, too, have attempted to get in on the ground floor of the carbon market by sponsoring research into “baselines” and sequestration.<sup>181</sup> Klaus Topfer, the executive director of the United Nations Environment Programme, meanwhile, infuriated many environmentalists in 2000 by trying to position his cash-strapped agency as a broker for CDM projects, including carbon “offset” forestry projects in Africa.<sup>182</sup>

## No Job for Amateurs

“Development, overseas aid . . . the patronage of South by North; these are the modern weapons of appropriation. Euphemisms like ‘modernization’, ‘basic needs’ and ‘LDCs’ (Less Developed Countries) provide the camouflage for the latest and most serious bout of commodity fetishism. But the real traitors, as always, are the clerks — the scientists.”

M. Thompson, M. Warburton and T. Hatley,  
*Uncertainty on a Himalayan Scale*<sup>183</sup>

“Discussions under the UNFCCC and the Kyoto Protocol have totally excluded the indigenous peoples to the extent that neither recognizes the right of indigenous peoples to full and effective participation and to contribute to discussions and debates.”

Third International Forum of Indigenous Peoples  
and Local Communities on Climate Change, July 2001<sup>184</sup>

Building up, day to day, the technical/political idiom needed for a market approach to climate is clearly no job for amateurs. It requires sustained efforts by financiers, economists, foresters, soil scientists, engineers, chemists, lawyers, climatologists, development experts, diplomats and non-government organizations. All work both within and outside the logic of their own disciplines. All help in their own ways to create scientific and pseudo-scientific talk about mitigating climate change which will link smoothly with neoliberal patterns of global investment, trade and development.

Such professionals are no more passive tools of their patrons than novelists are passive tools of their readers. Like all artists, they seek to please — but, if they can, on their own terms. They deploy their own creativity. They quibble about details. They advise on finance. They come up with their own theories about politics in the course of choosing or creating slots in which they can insert scientific “input”. They go out of their way to adapt or adulterate their own research in order to mate it with neoclassical economic assumptions or top-down development. As corporations and international agencies anxiously peer across old disciplinary fences in search of technical vocabularies that can further their own interests in a climate-obsessed world, thousands of technical experts and even NGOs are eagerly extending a hand toward them from the other side.

If the presence of such intellectuals has been crucial to the evolution of the new climate discourse, so too has the *absence* of people with other relevant qualifications (*see* Box: “Roots of Spurious Science: A Case Study”, pp. 20-21). Missing from most negotiations and technical discussions have been Southern farmers, indigenous peoples, community organizers, social activists and other non-professionals, as well as historians, logicians, anthropologists, sociologists, political scientists, property specialists and development critics.

This is why today’s official climate idiom has virtually no words or procedures for analyzing the crippling scientific and practical fallacies associated with the “flexible mechanisms” — or even giving them their proper names. People with the motivation, background or clout to help root out the relevant contradictions were simply not present at the idiom’s creation, even to protest it. The vision of Southern countries competing with each other to produce carbon for the North just as they produce bananas or palm oil has become entrenched at the centre of current climate discourse not because anyone ever convincingly argued that the practice could be climatically effective, but because so few people mobilized behind the truth that it could not.<sup>185</sup> This

***The professionals  
building the  
climate market are  
an exclusive group  
sharing a narrow  
cultural and class  
background.***

# The Carbocrat's Plight: The Case of Robert Watson

**"To the extent that modern science both constitutes and is constituted by particular forms of politics, it can scarcely provide an independently authoritative mechanism for dealing with the destructive consequences of that political order, such as environmental degradation or ungovernable technologies. Sharers in a common scientific worldview are more likely to perpetuate than deeply challenge the political structures to which they are tied by bonds of reciprocal legitimation."**

**Sheila Jasanoff,  
Harvard University<sup>186</sup>**

**"An alternative view . . . sees politicization of climate science as more or less inevitable. Scientists may as well accept that as a given and find ways to cope constructively with such a political reality."**

**Simon Shackley,  
Manchester University,  
and colleagues<sup>187</sup>**

The intellectual predicament of the carbocrat is well exemplified by the plight of Robert T. Watson, the World Bank bureaucrat who is also chair of the Intergovernmental Panel on Climate Change.

Trained as a chemist, Watson made valuable contributions to the science of ozone depletion as a young man. In the persona of "climate scientist", he plays a leading role today in explaining to diplomats, journalists and laypeople

the latest expert consensus on global warming.

This persona can be deceptive. A skilled political operator as well as reputable scientist, Watson has in fact spent most of his career in bureaucracies, not in the lab, the field or the classroom.

After spending 13 years at the US National Aeronautics and Space Administration (NASA), he moved to the White House Office of Science and Technology Policy, then to the Global Environmental Facility's Scientific and Technical Advisory Panel. While at NASA, he helped build a global scientific network geared to the needs of policymakers following the ozone scare of the 1980s.<sup>188</sup> An Ozone Trends Panel and Airborne Antarctic Ozone Experiment he helped organize drew scientists from around the world to confirm the links between chlorofluorocarbons (CFCs) and ozone depletion, helping to bring about the Montreal Protocol in 1987.<sup>189</sup>

Now that he is World Bank Chief Scientist and head of the Bank's Environment Department, Watson works with an even wider range of influential figures in development, business, government and the UN. Such institutions have incentives to formulate both problems and solutions in ways that help them look after themselves.

Watson deserves great credit for helping forge the social network which made it possible to construct an accepted body of conclusions about the threat of climate change. He deserves gratitude for forcefully and

repeatedly going before the public to affirm the seriousness of climate change and counter the assertions of industry-funded climate-change skeptics.

But the same institutions which make him effective in this role limit his ability to foster public understanding of climate change as a social problem and to support constructive and realistic solutions.

On the one hand, Watson handles the biophysical evidence within scientifically-acceptable bounds of rigour, nimbly negotiating official texts so that they speak to diplomats and the public without offending his climatologist colleagues.

On the other, he tends not to follow chains of scientific reasoning that don't reflect the survival imperatives of the institutions to which he belongs. When talking about solutions, he reveals his thinking to be rooted in conventional development ideology and its market-first pieties, revealing little understanding of the connections among biophysical change, the actions of agents of various cultures at the local level, and perturbations at the economic policy or legislative level.

The result is that the irresistible force of Watson's well-substantiated and cross-examined statements about the need for steep cuts in greenhouse gas emissions bump up against, and dodge around, a number of immovable unexamined objects in his institutions' own thinking.

While Watson uses his position at the World Bank to press home

exclusion is also ultimately responsible for the fact that many fruitful approaches to climate change — such as reviewing subsidies for fossil-fuel development — continue to occupy the margins of research.

Of course, there are limits to the ability of the carbocracy to make scientific sense of nonsense — in particular, of entrenched US, UN and corporate views on why and how climate change should be mitigated. But without popular action, the warp in the official climate vocabulary will continue to be largely self-reinforcing. The higher the scaffolding built on false premises grows, the greater the institutional cost of questioning them becomes.

The 1990s did see one early direct triumph for democracy over carbocracy, when carbocratic attempts to formulate cost-benefit



the message that the climate is changing, the Bank in turn uses Watson's status as a scientist to validate its mendacious efforts to turn climate change, like poverty, into yet another justification for its existence. It's helped in this manoeuvre by Watson's own uncritical stance toward mainstream assumptions.

Watson goes along, for example, with the assumption that carbon pricing as determined by a market will have a stabilising effect on climate.<sup>190</sup> He concurs that, whatever happens, "we should not have a strategy that results in premature retirement of capital stock".

He endorses carbon forestry "offsets" and other scientifically unsound projects. He has claimed that "all you have to do" to reconcile biodiversity conservation with carbon plantations is to get the UNFCCC to put its head together with with, say, the Convention on Biological Diversity.

Watson is also on record as having gone before appreciative industry audiences to advocate nuclear energy as one solution to climate change, making the extraordinary assertion that it is a less "inefficient" energy source than dung and woody materials.<sup>191</sup>

"What excites me is putting science to practical use," Watson says. The cliché is misleading in more ways than one.

It implies that climatologists automatically have a grasp of *all* inquiry relevant to climate change, including carbon economics and nuclear reactor technology and its carbon effects. It implies that science isn't itself shaped by the uses it's put to and doesn't itself

consist of practices. And it stifles the question of whose practices those are.

The untenable science/policy dichotomy which Watson constantly invokes when in front of climate negotiators helps justify more research funding. ("Sound decision-making will require more investigations.") It's also a handy way of avoiding precautionary recommendations that may offend powerful corporate and Northern interests. ("We're only neutral data-providers; we aren't saying anything about policy.")

But it's contradicted by Watson's own partisanship of market policies detrimental to Southern interests and his own personal history. As Wolfgang Sachs notes, the view championed by many other members of the IPCC that:

"science is a value-free process that, through competition and discussion and mutual criticism, will arrive at a particular truth, which then can be transmitted to policymakers"

is a "pious illusion" when the topic is climate mitigation.<sup>192</sup>

While Watson's scientific colleagues help vet his statements about global warming trends, few people around him are capable of checking the accuracy of his claims about economics, politics, carbon sequestration and nuclear technologies, and the efficacy of international agencies in taking climate change action.

Nor have most environmentalists involved in the climate debate uttered a word of criticism.

In part, this deference has historical and class roots. In the

1980s, it was an "alliance of scientific research institutions and environmentalists predicting catastrophe" that was key in putting climate change on the international political agenda – and in promoting the "weak, research-intensive framework treaty" that resulted, which "reflects a political balance of power rather than any firm direction derived from science".<sup>193</sup>

Today, many environmentalists shy away from examining too closely the claims of figures such as Watson lest in doing so they wind up giving comfort to "contrarians" who argue that climate change is not a threat.

This passivity is increasingly dangerous. The institutions which employ individuals like Watson already strongly discourage any acquaintance with, or accountability to, the popular movements qualified to criticize their misstatements.

Watson's working environment, like that of many others of his professional class in the higher reaches of the development establishment, separates him from grassroots realities. It's also capable of encouraging a dismissive attitude toward negotiators from the South who raise well-reasoned objections to the IPCC's procedures and conclusions about flexible mechanisms.

If environmentalists reinforce such institutional pressures, they will be setting themselves up in opposition to both democracy and good science.

analyses of climate action collapsed. But this was due less to their own preposterousness than to political pressure applied by Southern countries outraged at the fact that the carbocrats' statistical valuation of human lives in the North was 15 times higher than their valuation in the North.<sup>194</sup> As Wolfgang Sachs observes, "the shape of the IPCC depends on the shape of the powers involved".<sup>195</sup>

Science scholar David Bloor observed many years ago that we do not stop reasoning scientifically:

"in order to protect our institutions from collapse under the pressure of logical criticism. Rather, it is because we routinely accept [their] activities . . . that we adjust our reasoning."<sup>196</sup>

**Carbocrats respect the views of carbon traders more than those of farmers in forests or flooded-out homeowners.**

**With its multiple power bases, the carbocracy will be hard to bring under democratic control.**

The activities “routinely accepted” by the carbocracy are those of carbon traders, with their needs for commensuration, quantification, prediction and centralization. Other activities — those of farmers in forests, homeowners in Ohio, or flood victims in Orissa, with their needs for discussion, consensus, new policies, and attention to their own ground-level realities — don’t get a look-in.

As carbocrats continue to refine fraudulent techniques in the wake of the Bonn agreement, there’s no particular point at which logic or “ordinary standards of scientific reasoning” can be expected suddenly to kick in. Where this dialectic ends depends not on how silly carbocratic thinking becomes, but on how soon Kyoto’s carbon market collapses and — more importantly — how soon a public confronted with sophistry makes a political decision that enough is enough.

## Democracy or Carbocracy?

*“Hasta que no haya una presion social, los gobiernos no responderan y se antepondra la riqueza material a la conservacion del planeta” (“Without social pressure, governments will not do anything and material wealth will prevail over the planet’s conservation.”)*

Jaume Matas,  
Minister of the Environment, Spain, November 2000

*“Environmentalists need to pay greater attention to the character of knowledge-making institutions and may in future need to grant demands for the re-design of such institutions a prominent place in their list of campaign objectives.”*

Steven Yearley,  
*Sociology, Environmentalism, Globalization, 1996*

*“The age of disabling professions . . . is now at an end, just as the age of energy splurges has ended. The illusions that made both ages possible are increasingly visible to common sense. But no public choice has yet been made.”*

Ivan Illich,  
*Disabling Professions, 1977*<sup>197</sup>

Its size and composite, undirected, partly de-centred character gives the carbocracy a special strength. While the new idiom it has developed has been partly nurtured by US dollars, it’s not reducible to the efforts of a North American elite to calculate its way out of a crisis, nor to those of business to seize the high ground. If it’s not a source of “neutral”, non-policy-prescriptive advice on which policy-makers can base a fair and scientifically-sound debate on action on climate change, neither is it a thin mask for US bullying. If the carbocracy orbits a US-dominated corporate world, it’s also capable of perturbing it.

With so many actors with such a different range of stakes, the carbocracy enjoys multiple power bases. If it can’t be straightforwardly manipulated by a single set of corporate powers, neither is there any single switch for turning off its intellectual production line. Were the carbocracy a conspiracy, it would be far less dangerous.

The carbocracy’s composite nature, moreover, gives it an extraordinary ability to diversify, adapt itself to new circumstances, and drain resources from more locations. Michael Grubb has warned that the Clean Development Mechanism, for example, has the potential to become:

*“not just a source of spurious emission credits, but 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”.*<sup>198</sup>

If the unsoundness of the premises the carbocracy has to work with provides it with an endless chain of new technical “problems” to solve, its diverse character ensures that new experts and institutions can always be found to tackle them. Its repeated failures to address climate change breed only more baroque flourishes and an ever odder mixture of implausibility and extreme “technical” sophistication. What doesn’t disrupt or democratize it is likely only to make it stronger.

The rise of the carbocracy since the late 1980s is a lesson in the extent to which antidemocracy can feed intellectual corruption. Just as the system of campaign finance is a permanent source of political corruption in the US, largely indifferent to the comings and goings of different individuals, governments and political parties, so the carbocracy is growing into a fount of scientific fraudulence largely unaffected by the day-to-day moves of individual diplomats, scientists, environmentalists and political leaders. Poised to become one of the routine Frankenstein monsters of the age, it’s now a powerful force for dismantling any constructive agreements that might otherwise be reached.

In the struggle against the carbocracy’s domination of the climate debate, individual experts’ efforts at resistance will play one part. Folke Bohlin of the Swedish University of Agricultural Sciences stresses, for example, how important it is “for researchers to say no to . . . research grants” for carbon sequestration projects.<sup>199</sup>

The limitation of such an approach is that it asks intellectuals to be indifferent to the social conditions which shape their lives and livelihoods. “The courage that is required to limit violence,” political psychologist Ervin Staub has written:

“is frequently not physical courage, the willingness to put one’s life on the line, but the courage to oppose one’s group and to endanger one’s status in the group or one’s career.”<sup>200</sup>

Few people from any walk of life should be expected to be so brave. What is needed more is a collective movement to strengthen those institutions in which heroism isn’t a prerequisite for reasonable behaviour, in which people without extraordinary courage can refrain from supporting the sort of institutionalized violence which the carbocracy’s new language of climate engenders.

Coming up with effective strategies for doing so is important especially in that the carbocracy is locked in an intimate dance of opposition with any serious attempt to mobilize popular climate movements. On the one hand, only widespread grassroots resistance can undermine the expansion of the carbocracy and its ability to seduce the environmental movement, because only widespread grassroots resistance is capable of forcing public scrutiny of the carbocracy’s material support. On the other hand, getting on with that resistance may benefit from trying to understand better both how the carbocracy’s intellectual façade is being built and how a start might be made on disassembling it. That’s been the aim of this briefing.

***The rise of the carbocracy since the 1980s is a lesson in the extent to which antidemocracy can feed intellectual corruption.***

# Appendix: Why Kyoto-Style Accounting Systems Fail

## I. Biophysics vs. the Tree Carbon Market

"We cannot compare the effectiveness of fossil fuel with land-use change and forestry activities with respect to reduced emissions", states the respected International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria.<sup>201</sup>

This finding — confirmed by both the Royal Society, the UK's independent national academy of science,<sup>202</sup> and Canada's David Suzuki Foundation,<sup>203</sup> as well as many eminent individual scientists<sup>204</sup> — is devastating for the Kyoto Protocol.

It means that it's impossible to trade surface-level carbon — in trees and soils — for CO<sub>2</sub> emissions from cars, industries and homes. The commodity which would be traded in such a market doesn't exist.

Of course, pieces of paper can be and are being exchanged claiming that some patch of wooded land "compensates for" some set of industrial emissions.

But in atmospheric terms, these documents are worthless. Buying and selling them can only further destabilize climate. With the Bonn agreement of July 2001, the Kyoto Protocol has lost "all environmental integrity". Any "confidence in the emissions trading system" is misplaced.<sup>205</sup>

### Uncertainty

The reason, explains IIASA, is that while fossil fuel emissions can currently be measured with fair certainty,<sup>206</sup> carbon flows involving the biosphere cannot:

"At present our incomplete knowledge about biospheric processes and data . . . makes it impossible to carry out rigorous calculations of net emissions."<sup>207</sup>

A number of things stand in the way ranging from limited or low-quality basic data, "poor understanding of biosphere-atmosphere fluxes" and incomplete knowledge about ecological processes to "monitoring difficulties" and inaccuracies resulting from extrapolating findings from local to regional levels.<sup>208</sup>

These uncertainties are hardly minor technical snags. They "greatly exceed likely changes in industrial emissions" over the period the Kyoto Protocol would be implemented.

For example, IIASA reckons the uncertainty of its estimate of "net" Russian emissions in 1990 (527 million tonnes of carbon) is 129 per cent — that is, 527 plus or minus 682 million tonnes.<sup>209</sup> In other words, mean net Russian carbon balance could be anywhere from -155 to +1209 million tonnes. This swamps probable *changes* in the total carbon flux balance in Russia between 1990 and 2010, which are expected to be only 142 to 371 million tonnes.<sup>210</sup>

Recent research in the US, meanwhile, suggests that the flux of carbon into forests is uncertain by a factor of two or three and annual variability as high as 100 per cent.<sup>211</sup> For the continental US, sink estimates range between 0.2 and 1.3 billion tonnes per year and for Europe, between 0.2 and 0.4 billion tonnes.<sup>212</sup> Canadian scientists have pointed out that uncertainty in estimates of the carbon balance in their country's forests could be greater than 1,000 per cent if even seemingly small factors such as increased CO<sub>2</sub> levels in the atmosphere are not taken into account.<sup>213</sup> Current analyses based on atmospheric data and models suggest a net change in terrestrial carbon

storage that, if correct, "implies errors as large as 500 per cent in the forest inventories of northern mid-latitudes".<sup>214</sup> And measurements of methane sources worldwide — rice fields, cattle, fossil fuel production — are uncertain by 20 to 150 per cent.<sup>215</sup>

Such uncertainties may well diminish over the decades with a better scientific understanding of the climate system. Other biophysical accounting difficulties, however, will remain.

### Accounting Boundaries

One problem is that the Kyoto Protocol, unlike the IIASA, doesn't even consider trying to keep track of all the atmospheric effects of changes in land use and forestry. Article 3.3 says that countries may use "land-use change and forestry activities" to compensate for some of their industrial-sector emissions if the associated changes in carbon stocks are "verifiable". But at the same time it limits these changes to "afforestation, reforestation and deforestation" and to regions where "human-induced changes have taken and/or are taking place".

But totting up biospheric carbon stocks and flows in only a few selected areas is hardly enough, since such areas "obviously affect carbon sources and sinks in parts of the biosphere not eligible under the Kyoto Protocol".<sup>216</sup> As Sten Nilsson of the IIASA asks:

"What happens when a fire . . . starts in a sink forest and then spreads to a forest not registered under the treaty?"<sup>217</sup>

It may be easier to monitor carbon on a ten-hectare site than on a

continental level, but the price paid for this increased local certainty is climatic irrelevance.

It's also impossible to limit the accounting required for carbon trading to specific carbon pools or time periods. For example, it does no good to monitor the carbon in the trees in a plantation, however accurately, if the changes in carbon in the soil underneath the plantation aren't also tracked. Even if it could be verified that forestry activities sequestered carbon over the implementation period of the Kyoto Protocol, the fact that they may release even greater quantities of CO<sub>2</sub> over the long term means monitoring has to continue.<sup>218</sup>

For example, fast-growing monoculture plantations may well be certified as soaking up carbon if accounting is confined to the first five to ten years of rapid tree growth and to above-ground plant growth.

Yet if the accounting includes the time preceding and following tree-planting as well, and covers the soil as well as above ground carbon, it may show a net release of carbon to the atmosphere. Preparing the site for the plantation may have resulted in high releases of carbon from the soil, as well as from the machinery used and from the processes used to manufacture the agrochemicals applied. In the medium to long term, an industrial plantation is likely to be less effective in sequestering large amounts of carbon than regrowth with varied native tree species.<sup>219</sup>

## Permanence and Verification Times

In order to match the residence time in the atmosphere of industrial emissions, accounting periods for biospheric carbon projects would need to be on the order of decades to a century. As Darwin Anderson of the University of Saskatchewan and colleagues point out, "if carbon is sequestered in soils or forest for only a decade, the overall impact on the atmosphere is negligible", whereas a "one-year reduction in fossil fuel emissions will lead to a centuries-long reduction in concentrations of CO<sub>2</sub> in the atmosphere":

"Although achieving a one tonne emission reduction by

reducing fossil fuel combustion might appear to be equivalent to removing one tonne of CO<sub>2</sub> from the atmosphere and storing it as organic carbon in a terrestrial ecosystem, they are, in fact, different."<sup>220</sup>

The IPCC conjectures that if a tonne of carbon is sequestered for only 46 years, the cumulative impact on warming over 100 years will be only 37 per cent of an actual emission reduction.<sup>221</sup>

Because of natural variability and the fact that ecosystems adjust slowly, it would often take far longer to verify that a carbon change had occurred than a carbon trader could wait. IIASA reckons that verifying changes in emissions from large-scale forestry projects with 90 per cent confidence could take five decades.<sup>222</sup> Few of the signatories of the Kyoto Protocol are prepared to carry out such accounting procedures, which might need to be even longer if they were to monitor properly the development of ecosystems, which have widely-varying carbon absorption capacities.

## Effects of Warming

The obstacles to long-term accounting are heightened by the fact that global warming itself will affect future carbon flows from and into forests and soils. Some evidence exists that terrestrial ecosystems have taken up more carbon in the 1990s than in the 1980s, as forests are "fertilized" by rising CO<sub>2</sub> levels.<sup>223</sup> But it's probable that "feedbacks between carbon and other biogeochemical and climatological processes will lead to weakened sink strengths in the foreseeable future",<sup>224</sup> releasing "large amounts of carbon" over the next century, accelerating future climate change.<sup>225</sup> Climate change is likely to increase respiration, for example, turning tree plantations into net sources of CO<sub>2</sub> over the long term.<sup>226</sup>

Unexpected side effects of large-scale tree-planting efforts, meanwhile, are showing up all the time. In July 2001, for example, Richard Betts of the UK's Meteorological Office released calculations showing that establishing new tree plantations across northern North America and

Siberia would heat the planet rather than cool it. The dark-coloured trees would absorb so much more heat than the unafforested landscape, Betts reported, that any cooling effect due to the trees soaking up carbon dioxide would be overwhelmed.<sup>227</sup>

What's more, the effects of global warming, as well as global warming itself, are likely to unfold in a nonlinear fashion. That makes accounting techniques based on linear projections even more transparently nonsensical.

For example, when dry seasons become long enough, desiccation of large areas of forest such as those of the Amazon may abruptly result in catastrophic fires, releasing biospheric stores of carbon into the atmosphere all at once. If other forests followed suit, the upper limit of temperature increases during the next century could rise from six to eight degrees Centigrade or more.<sup>228</sup> Global warming is also likely to "increase fire danger at all sites" in Australia.<sup>229</sup> The attempts of countries such as Canada or the US to try to increase short-term forest carbon sequestration mainly through fire suppression and pest management are likely only to increase the magnitude and unpredictability of the ultimate releases.<sup>230</sup>

If the oceans are warmed beyond a certain degree through such mechanisms, there may also be sudden, catastrophic releases of methane from methane hydrates on the sea floor previously kept quiescent through high pressures and low temperatures.<sup>231</sup> The geological and ice-core record strongly suggests that such discontinuities have been rife in the past.<sup>232</sup> At times they may have driven up average global temperatures by as much as eight degrees Centigrade in the space of a human lifetime.<sup>233</sup>

These obstacles, of course, don't apply to carbon trading which doesn't involve the biosphere. But signatories of the Bonn agreement of July 2001 have already committed themselves to trying to set up a quantifiable climatic equivalence between above-ground and below-ground carbon. In doing so, they have made the Kyoto treaty, in the words of IIASA, "completely unverifiable."<sup>234</sup>

## II. Accounting and Accountability

The Kyoto Protocol's carbon market makes possible all sorts of credits for keeping greenhouse gases out of the atmosphere. There are credits for planting trees. Credits for managing forests. Credits for switching from coal to gas. Credits for not ploughing soil. Credits for not letting methane form in garbage. Credits for having had an economic slump in the 1990s. Possibly even credits for rearranging the timing of traffic signals.

But in all the excitement over the Bonn agreement, there's one question that hasn't quite been cleared up. Who is to get all these credits? And who decides who is to get all these credits? It's hard to trade something you don't own, and until everybody agrees who all the credits belong to, it's going to be difficult to keep a market afloat.

The puzzles begin at a basic level. What sort of carbon-conserving actions are human groups — any human groups — entitled to take credit for in the first place? What sort of actions are they not entitled to take credit for?

At first, UN diplomats and their technical advisers tried to answer this question by appealing to a human/nature dichotomy. In articles 3.3 and 3.4 of the Kyoto Protocol, they wrote that any "changes in greenhouse gas emissions by sources and removals by sinks" eligible for credit had to be "human-induced" as opposed to "natural". But in fact, as the UN's own experts have pointed out after giving the matter a bit of thought, when it comes to terrestrial ecosystems, "the phrase 'human-induced' has no scientific meaning".<sup>235</sup>

The reasons the IPCC experts cite in support of this conclusion are, as usual, somewhat self-serving. Noting problems in deciding which actions are intentional, and which omissions should be counted as actions (for example, is failure to suppress a fire an action?), they go on to represent the problem as one of incomplete science. They suggest that with a little more research money the matter can be cleared up by scientists themselves:

"For activities that involve land-use changes (e.g., from grassland to forest), distinguishing *with present scientific tools* the portion of the observed stock change that is directly human-induced from the portion that is caused by indirect and natural factors is very difficult, if not impossible".<sup>236</sup>

But in fact the matter is a little more complicated than that.<sup>237</sup> More scientific research might help resolve, say, the question of how much increased growth in today's forests is being caused by human-caused increases of CO<sub>2</sub> in the atmosphere.<sup>238</sup> But no foreseeable scientific advances are going to be able to disentangle "human" from "natural" changes in the biosphere. Virtually all ecosystems are products of millennia of human action.<sup>239</sup> The fire-dependent ecosystems of Australia's landscape are "human-induced" as, long before the coming of Europeans, was the North American forest-grassland mosaic. Disentangling "natural" from "human-induced" changes hasn't been possible for many thousands of years.<sup>240</sup>

It follows that "human-induced" can only be defined arbitrarily. The IPCC admits this, urging only that countries be consistent in how they construe the word.

### Which Humans?

But arbitrary definitions lead to their own problems. In line with its cultural and class biases, the IPCC suggests defining "directly human-induced" activities as those resulting from the decisions of "land managers". Alternatively, "afforestation, reforestation and deforestation" on certain lands (for example, "managed lands") could be defined as directly human-induced, with activities on "unmanaged lands" being defined as "natural".<sup>241</sup>

That means that hiring an airplane for a day or so and scattering a few particles of fertilizer over its vast landholdings could give US timber company Weyerhaeuser, say, or the US government, the right to

claim credit for the carbon in the forests below.<sup>242</sup> On the other hand, the indigenous and settler peoples who had a hand in the earlier shaping of such ecosystems — ecosystems that store and often sequester many millions of tonnes of the earth's carbon, get no credit. Nor do the millions of ordinary farmers who happen to look after lands classified by experts as "unmanaged".

Behind the numbers of IPCC carbon accounting are concealed political acts of appropriation. Hidden in the mathematics is an enduring Orientalism: we who wear suits and lab coats are active; the "natives" are passive. Once exposed, these appropriations are bound to stir continuing controversy.

### Which Accounting System?

The choice of whom you attribute actions affecting carbon stocks and flows to is always going to be contested. 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? Climatology and economics have no answers to such questions. Different agents will be held responsible in different accounting systems.

If you adopt a carbon accounting system that tabulates the amounts of fossil fuels mined by different companies, you're implicitly assigning heavy responsibility for global warming to corporations. If, after quantifying the amount of carbon stored in forests, you then divide up those forests according to which groups of indigenous people inhabit them, you're implicitly assigning credit to them for having looked after it. No such accounting system can be unambiguously "correct" or "incorrect". But the assumptions about responsibility

made by each scheme need to be made explicit and opened to public discussion. They shouldn't continue to remain hidden behind professional jargon.

The UN system, of course, tends to count carbon by nation-state. As a result, there's a lot of talk about improving the scientific precision of "national carbon accounts". But no amount of refinement of monitoring techniques can get rid of the need for open discussion about when and whether national borders provide an appropriate way of dividing up responsibility for climate change and climate solutions.

Saying that that a certain number *n* represents "Mali's" or "Guyana's" "net emissions" is to imply that the relevant national governments are *responsible* for carbon saved or lost within their countries' boundaries.<sup>243</sup> But Southern negotiators have argued that "inventories should focus on the location of economic demand" for carbon-intensive practices "rather than on the site of production:

"the carbon released from tropical deforestation for traded timber [s]hould be located in consuming countries such as Japan and the US rather than in producing countries such as Malaysia or Brazil".<sup>244</sup>

Similarly, should India be held responsible for polluting energy stations pushed on it by the World Bank and foreign corporate consultants — or for patterns of development tied up with colonial history? Should Uruguay, a very sparsely-forested country whose grasslands support millions of methane-belching cattle essential to its economy be held responsible for this ecological and historical happenstance?

Conversely, how much carbon storage or sequestration that happens to occur within their borders should nation states be allowed to take credit (or accept debit) for? UN statistics show that over 200 million tonnes of carbon a year are being sequestered in Northern countries. Much of this is due to increasing wooded area and tree growth. But some probably stems from increased CO<sub>2</sub> concentrations, temperature increases and nitrogen deposition — in other words, industrial pollution itself.<sup>245</sup> Increased forest area within a nation's borders may

also be due (as in the case of Japan) to its having exploited forests in other parts of the world, leading to CO<sub>2</sub> emissions there. To award Northern governments full credit for all this domestic carbon would have touched off the UN equivalent of rioting in the streets. Yet the Bonn agreement has already handed Canada, Japan and Russia substantial credits for "managed" forest and plantation growth occurring since 1990 — without spelling out what "managed" means.<sup>246</sup> Northern proposals are also afoot to allow countries credit for wood products within their borders regardless of where they came from.

Germany and the UK are the beneficiaries of other carbon-credit windfalls. Germany is on course to meet its emissions reduction targets largely because an internal East-West border was erased in 1990. This led to the breakdown and restructuring of the former East German economy and lowered CO<sub>2</sub> emissions.<sup>247</sup> And if the UK comes close to meeting its targets, it'll be partly because former Prime Minister Margaret Thatcher's aggressive anti-unionism in the 1980s led to the collapse of the coal industry and the rise of less-polluting natural gas as a fuel.

Russia and Ukraine, for their part, negotiated emission targets in Kyoto which, due to the collapse of the post-Soviet economy in the 1990s, are way above their likely level of emissions in 2012. Because of this historical accident, the two countries will have billions of dollars of carbon credits to sell which most observers regard as unearned.<sup>248</sup> Australia inserted a clause in the Kyoto Protocol that allows industrialized countries with net positive land-use emissions to include them in their 1990 inventories. That means that Australia, which practically alone among industrialized countries is experiencing a net loss of forest carbon, has permission to emit 19 per cent more in 2012 than it would have had permission to emit without the clause — a "windfall" of perhaps US\$10 billion in carbon credit.<sup>249</sup>

## Discrimination

But if nation-states can claim carbon credits for these non-actions, why not others? What

exactly *are* the scientific criteria distinguishing a "windfall" from a legitimate claim to carbon credits? No one has suggested a general answer to this question.

Douglas Korsah-Brown of Friends of the Earth Ghana has argued that Southern countries have effectively "loaned their ecological space to developed countries . . . but . . . have received no credit for avoiding emissions to date." They "should be rewarded for not having adopted dirty technology in the first place". Other environmentalists have proposed that Brazil be compensated massively for maintaining its extensive forests.<sup>250</sup> Saudi Arabia has put forward a parallel if much-derided demand for credits should the Kyoto Protocol force it to maintain some of its oil in the ground rather than drilling it.

So far, however, the beneficiaries of the way accounting categories are currently set up are Northern countries. The Bonn agreement gives Russia carbon credits for economic stagnation, but not Congo.

Other discriminatory effects of nation-centred accounting systems may be less apparent to the naked eye. Popular movements fighting hydrocarbon development, for example, may succeed in halting substantial releases of CO<sub>2</sub> to the atmosphere in particular countries.

But under the UN's favoured accounting system, the movements won't get the associated carbon credits. States will. And these will more than likely be the same states who have been battling in favour of more and more burning of fossil fuels.

Finally, who decides which Clean Development Mechanism projects will be implemented and how much greenhouse gas emissions they "make up for"? Southern countries are concerned about the "creation of a supranational authority structure that would effectively limit sovereign decision-making with regard to CDM projects".<sup>251</sup> Financiers are concerned about the integrity of any board deciding how many "certified emissions reductions" [sic] CDM projects yield.

What with disputes over history, political jockeying, and a poor scientific basis for carbon accounting, the issue of who deserves credit for how much is likely to remain hopelessly contested.

### III. Vocabularies and Quantities

**"The policymaking process, the range of policy tools, and associated definitions of policy-relevant research bring with them a particularly narrow understanding of the social world."**

Steve Rayner and Elizabeth Malone<sup>252</sup>

Carbocrats need two different vocabularies if they are to measure how much carbon the Kyoto Protocol's carbon projects remove from, or keep out of, the atmosphere. The first is *biophysical*. The second is *social*.

The reason is simple. The atmospheric effects of any project — whether a tree plantation or an efficient gas-fired power plant — are mediated by long chains of cause and effect. All of these can be described in the language of physics and biology. But some must also be described in the language of social processes — a language containing words like "belief", "incentive", "property", "policy" and "outrage". To adapt the words historian Stephen Pyne uses to describe fire ecology, carbon accounting "has to incorporate the pathways of human institutions and knowledge as fully as biogeochemical cycles of carbon and sulphur".<sup>253</sup>

For example, try calculating how much carbon a tree plantation project absorbs from the atmosphere. Using biophysical techniques, you can measure how much carbon goes into the trees. You can subtract from that how much carbon goes out of the soils. You can even trace the effects of the changed runoff patterns from the plantation area on the carbon output of landscapes outside the plantation boundary.

But try to trace some of the other effects of the project on the carbon cycle, and you need more than biophysics.

For one thing, as Philip Fearnside of the Instituto Nacional de Pesquisas da Amazonia notes, plantation projects of the kind envisaged under the Kyoto Protocol will increase supplies and lower prices of wood products. Competitors unsubsidized by the Protocol:

"would clearly sustain losses. Any reduction in plantation and wood product pools elsewhere by the losers in this competition would reduce the net carbon benefits of the plantation subsidy program."<sup>254</sup>

Adds Alan Thatcher, a New Zealand researcher on climate, plantation projects may also "work against the adoption of better energy technology." Older power plants whose emissions have been supposedly "compensated for" by trees will more easily undercut newer, more efficient ones, reducing incentives to invest in better generation technology.<sup>255</sup> The need to quantify such "opportunity costs" related to changes in incentive structures makes it even more difficult to compute the net carbon effects of forestry projects.<sup>256</sup>

#### Carbon Behaviour

It gets harder still. For instance, as Fearnside observes, plantation projects will also "cause effects in other locations through . . . migration of human population".<sup>257</sup> Suppose a plantation project evicts 5,000 farmers from the site, who torch the trees, move to Florida, lose their skills at caring for the soil, buy sports utility vehicles, and are responsible, following a close-run campaign, for the re-election of President George W. Bush. Or, alternatively, suppose the project attracts 5,000 fossil-fuel dependent farmers from neighbouring regions and recruits them to a more carbon-conserving lifestyle within its precincts.

Again, the necessary accounting can't be done with biophysics alone. It won't do just to describe the 5,000 farmers as if they were billiard balls rolling around over the landscape, their molecules colliding with trees, steel and concrete. It won't work just to measure the carbon coming from all the trees and cars they touch, or just to record their physical motions at polling stations. That won't reveal that it was (for example) frustration over the plantation which caused the

farmers to set fire to it. It won't reveal which cars the farmers touch in Florida are owned by them. It won't reveal that their physical movements in a polling station were "votes". It won't reveal that these votes caused the promulgation of a new climate policy subsidizing more oil drilling.

Trying to use biophysics alone in carbon accounting, in short, quickly leads to enormous quantitative errors in calculating the effects of the plantation project on global carbon cycles.

It might seem that this problem could be tackled by bringing in social scientists to monitor and analyze the social effects of the plantation. Understanding how local farmers react to the project ought to make it easier to grasp and control the project's total impact on the carbon cycle. Yet this understanding doesn't bring with it any better ability to *quantify* social actions in the way a carbon market would require.

There's no way to assign numbers to the degree to which a plantation project has, say, provoked a local movement to actions which cause a forestry company to go bankrupt or national transportation policy to change.<sup>258</sup> Nor is there any way to quantify the underlying causes of deforestation insofar as they require looking at how social relationships within villages are affected by economic policies enacted by faraway political elites.

Yet without such numbers, a commodity market is impossible. Carbon investors must at least pretend an interest in how much climate mitigation they get for each dollar. What can be calculated needs to be rigorously separated from what cannot. Once this is done, the notion of Kyoto-style carbon exchange is exposed — for yet another reason — as a scientific fraud.

#### We Don't Want to Know about It

One example demonstrating the effects of failure to deploy fully a social vocabulary when doing



carbon accounting comes from the work of forest scientist Sandra Brown of Winrock Institute, an influential member of the IPCC's panel on Land Use, Land Use Change and Forestry.<sup>259</sup> Brown tried to tally up the carbon credits associated with a project near Noel Kempf Mercado National Park in Bolivia designed to prevent forest land from being logged and converted to agriculture.

As researchers Kenneth Richards and Krister Andersson have noted in a trenchant critique,<sup>260</sup> Brown carried out a "highly detailed analysis of the observable carbon stocks" on the site, using 625 sample plots designed to provide pre-project estimates of above-ground, below-ground and understory biomass, litter and soil carbon inventories with a 95 per cent confidence level. She also used control plots to estimate the difference in live biomass between logged and unlogged sites.

Brown then tried to work out how much deforestation the project would avert. In attempting to compute the likely quantity of wood that would have been logged from the area in the absence of the project, she relied on information from a recent Bolivian forestry law that dictates what size trees may be harvested in a particular area, and how often, and also consulted data from logging operations. To estimate how much agricultural conversion the project would prevent, she relied on "projected human demographics" in adjacent areas.

Brown's accounting system assumed both that the rate of population increase was fixed throughout the region and that the ratio between numbers of people and cleared land was determinate and stable, like the relationship between gas pressure and gas volume. This "billiard ball" view of human beings was by itself a recipe for inaccuracy.

What was worse, however, was that Brown's accounting made "no attempt to estimate" the effect that the project would have on the underlying social forces driving logging and land conversion.<sup>261</sup> Accordingly, it was powerless to calculate the extent to which the project would simply displace deforestation elsewhere in the region and in so doing dissipate its own "carbon seques-

tration effects due to human and market responses outside the project".<sup>262</sup> Even on a highly conservative view, such displacement can result in 100 per cent or more of the carbon supposedly "saved" by a project actually being emitted elsewhere.<sup>263</sup>

Carbocrats tend to ignore such critiques, continuing to assert that "simple yet credible baselines" can be set using "remote sensing data, land-use change models, forest growth models, and field measurements":

"Changes in land use are not a random phenomena [sic], but rather predictable based on biophysical [sic], presence of transportation networks, access to markets, and agroclimatic suitability."<sup>264</sup>

They thus find it difficult to communicate with advocates of a more complete and scientific approach to carbon flows.

## Autism and Adjustment

Some light may be shed on this lack of communication by considering what may seem a startling parallel: the politics of autism.

Autism has been interpreted as an inability to attribute thoughts and beliefs to others, or to oneself — and thus as an inability to grasp the role of thoughts and beliefs as causes and effects of behaviour.

While often skilled at making sense of mechanical cause-effect sequences, autistic individuals find it difficult to interpret or anticipate the reactions of others, and their conversation can appear to others to be fragmented.

Severely autistic infants tend to play alone in a repetitive and stereotyped way, passing a toy from hand to hand repeatedly or lining blocks up systematically. Adults with a milder form of the condition called Asperger's syndrome often develop deep interests in the detail of a narrow, usually impersonal topic, opting for fields that are highly systematized and predictable rather than those which involve human relations.<sup>265</sup>

The carbocracy's tendency to treat interpretations of belief, desire and outrage as a distraction from, rather than an essential aspect of, attempts to assess

carbon flows has similar effects. Restricting social analysis to generic variables like population or "access to markets" gives carbocrats scope to quantify, but makes them unable to trace cause-effect chains involving human reactions and social processes. Like autistic children stacking blocks in precise rows, carbocrats can be meticulous in counting up local molecules, but from the point of view of many others they miss what's going on in the rest of the room.

Attempts to "normalize" (or, rather, "abnormalize") people diagnosed with autism may often make their lives — and the lives of others they share space with — more difficult. (The title of a recent book by Liane Holliday Willey, who has Asperger's syndrome — *Pretending to Be Normal*<sup>266</sup> — suggests the struggles involved.)

Similarly, to treat carbocrats' institutional attachment to an unfeasibly narrow methodology as a "disability" is to ignore the multiple virtues of a type of patient and recursive discipline which, in the right circumstances, can benefit society. It's also probably to overestimate the degree of flexibility inherent in the carbocracy itself.

An alternative course would be for all sides to carve out, through mutual adjustments, an appropriate place for both the autistic individual and the "mind-blind" carbocracy so that each can contribute fully to society without harming others or being harmed.

In the case of autistic individuals, who tend to be a disadvantaged group, it's society which must make the greater concessions. With carbocrats, the power relations are reversed. In today's debate over climate change, it's they who carry influence, especially with politicians and diplomats in the North. Instead of being branded as a "handicap", the carbocracy's isolation from social reality acts as a shield protecting it against politically inconvenient scientific facts.

Here the way forward lies not in expanding the role of the carbocracy in politics, but in limiting its power to wreak havoc in a world in which understanding "flights of particles" and "observable carbon stocks" involves also grasping the diverse processes wrought by human minds.

## IV. "What Would Have Happened Otherwise?"

(Enter MR. PINK, who sees that MR. ORANGE has been shot in the stomach.)

MR. PINK: Is it bad?

MR. WHITE: As opposed to good?

Quentin Tarantino,  
*Reservoir Dogs*

Under articles 6 and 12 of the Kyoto Protocol, the North is encouraged to accumulate carbon credits by financing tree plantations, renewable energy schemes, and other projects abroad.

How much credit should these projects receive? There's only one way of finding out. You have to prove exactly how much better the atmosphere is with them than without them. It won't do any good to set up a plantation that absorbs less carbon dioxide from the atmosphere than the vegetation and soil it replaces. Or a project which results in more CO<sub>2</sub> absorption, but in amounts which can't be specified.

In other words, Kyoto's carbon market has to be able to specify a single "business as usual" story line. It then has to subtract any greenhouse gas savings associated with that story line from the savings associated with the scenario which includes the new Kyoto carbon projects.

How is this to be done? How will market bureaucrats determine "what would have happened without the Kyoto project"? And how will they assign a single precise number to this hypothetical narrative? The problem is far harder than it looks and ultimately involves the Kyoto Protocol in insoluble self-contradictions.

### An Accounting System Built on Sand

**"The idea that 'there is no alternative' is the familiar slogan of the corporate version of globalization."**

Noam Chomsky,  
Massachusetts Institute of Technology

Many writers have pointed out that "what would have happened" without a Kyoto project "can never be observed", "is inherently

unknowable", and is impossible to determine objectively.<sup>267</sup> Even carbocrat Ken Newcombe of the World Bank's Prototype Carbon Fund admits that such story lines aren't "clear-cut".<sup>268</sup>

This is all true, and by itself spells technical disaster for the Kyoto Protocol. If carbocrats cannot single out one "correct" baseline, they will also be unable to associate a single number with the carbon benefits of a project, and thus will have no commodity to trade. To calculate credits for a gas-fired power station, the Clean Development Mechanism would have to assume implausibly that (say) another coal station would have been the *only* conceivable "investment alternative".<sup>269</sup>

The CDM would also have to stipulate that current social and political systems be viewed as a neutral background without alternatives — another untenable assumption. As Hermann Ott and Wolfgang Sachs of Wuppertal Institute point out, the course followed by any particular country is not determinate. Rather, "development is a contested terrain":

"It is neither possible nor desirable to normalise a development path . . . in the medium and long run there is likely to be a plurality of baselines, all of which have different implications in terms of climate policy. Countries are not likely to follow a pre-stabilised course; in what direction they move will depend on resource endowment, socio-economic conditions, relations of power, and cultural outlooks. . . . *what* development path, one might ask?"<sup>270</sup>

But this is just the beginning of the problem. Not only is there no single truth of the matter about "what would have happened otherwise". Behaving as if there were creates feedback effects which themselves affect the plausibility of any "what would have happened otherwise" scenario.

To adapt the concept used by philosopher of science Ian

Hacking, this "looping effect" guarantees that once a counterfactual scenario:

"is counted as true and becomes common knowledge, it will change the very individuals . . . about whom it was supposed to be the truth."<sup>271</sup>

In particular, as soon as actions are defined by their contrast with "business as usual", there will be incentives to make business as usual appear as bad as possible. As Ott and Sachs note:

"the more conventional the baseline, the more additional funds or credits . . . can be recovered from the flexibility operation."<sup>272</sup>

This game has already been played for years. In the climate negotiations, Bulgaria, Hungary, Poland and Romania, for example, took care to choose early "base years" by which to measure their "improvement" under the Kyoto Protocol, putting themselves in a position to snag an easy US\$20 billion in the process.<sup>273</sup> After all, as Michael Grubb points out, everyone wants CDM money for the activities they're already engaged in:

"this is in danger of becoming one of those truths that is unmentionable: everyone is doing it, but is not really supposed to."<sup>274</sup>

But if it's advantageous to make "business as usual" *appear* bad, it's even more advantageous to *make* it bad. Kyoto provides strong incentives to step up pollution or degrade forests now<sup>275</sup> in order to make more carbon money later.

What's more, experience suggests that even many sincerely-formulated unfavourable predictions about "what would happen" without a CDM project are likely to function as self-fulfilling prophecies.<sup>276</sup>

European, South Asian and Southeast Asian forest history is full of examples of destructive state or commercial projects legitimized by the claim that without them, the so-called "tragedy of the commons" would result in despoliation as growing swarms of individualistic farmers

loot a landscape unprotected by private property rights.

Yet once projects legitimized in this way go into operation, they often undermine commons regimes which function in ways which prevent such looting.

In other words, the projects end up encouraging the destructive, no-holds-barred local behaviour they claim to have opposed.

In short, the attempt of the Kyoto accounting system to fix "business as usual" scenarios paradoxically transforms the scenarios into moving targets, making honest carbon accounting impossible. Specifying such standard narratives, far from being detached and "objective", may make the climate worse.

## A Self-Contradictory Mathematics

But Kyoto's accounting system is not just incoherent. It's also inconsistent. While it treats everyone else as subject to determinism, it elevates its carbon project managers into free agents capable of changing the course of history.

To meet Kyoto's technical accounting requirements, a world *without* the CDM and other "flexible mechanisms" must be lumped into a single deterministic, calculable story line. It's only *with* these mechanisms that alternative narratives suddenly, miraculously, begin to flower. While CDM projects can make a difference, popular movements or the existing activities of Southern societies and individuals can't.

Turning everybody else into a static backdrop to the heroic decisions and efforts of a few wealthy carbon financiers and project managers has many ironic consequences.

For example, as Ott and 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."<sup>277</sup>

But such an environmentally-responsible pattern of "business as usual" gets no recognition under the Kyoto Protocol. No money is to

be made in improving it. Parties with more exploitative environmental records, meanwhile, get rewarded with special treatment. Once again, privilege roots itself in the deepest structures of the Kyoto Protocol's seemingly "neutral" carbon accounting.

## Who Decides?

Such objections deal another decisive blow to any notion of viable Kyoto carbon accounting and thus to Kyoto's projected carbon market.

Yet even if precise numerical accounting were *not* required for a market, the Kyoto bureaucracy would *still* be in no position to evaluate hypothetical non-project scenarios.

For one thing, any plausible narratives detailing "what would have happened" without a given plantation project would require a great deal more than short-term linear extrapolations from biological data collected on the site or on "control plots".

Extrapolations would have to be so long-term that they would exceed the abilities of current science<sup>278</sup> (see "Biophysics vs. the Tree Carbon Market", pp. 36-37). Also required would be sociological, political and psychological knowledge about the long-term capabilities of various groups of people living on and off the project site (see "Vocabularies and Quantities", pp. 40-41).

Being unquantifiable, such knowledge is of no use to the carbon market. But even to get an *unquantified* picture of a *range* of possible responses of local communities to various circumstances in the absence of carbon projects, the communities themselves would have to participate in the accounting process.

It's they, after all, who know best the political possibilities and constraints in their local areas (see BOX: "The Limits of Centralized Carbon Projects", pp. 14-15).

Yet no moves have been made so far to include their knowledge in carbon accounting. Instead, it is only carbocrats who are allowed to decide "what would have happened" in the absence of carbon projects: that is, only more or less well-off economists, scientists, engineers, lawyers, government officials and development experts.

The dangers of relying exclusively on the judgements of any such single group are obvious. Technocrats in development organizations have a well-documented record of trying to justify failed projects and policies by claiming, often in the absence of evidence, that at least they were better than "what would have happened otherwise".

World Bank officials, for example, consistently use this reasoning to justify their agency's decades-long political intervention in Zaire in support of the dictator Mobutu Sese Seko, who openly stole hundreds of millions of dollars from his country.<sup>279</sup>

Justifying climatically-damaging carbon projects in the same way will be child's play by comparison.

Finally, in order for credit to be assigned to tree-carbon projects involving policy changes, explanations of deforestation or forest degradation would have to be developed "that are capable of producing scenarios with and without different policy changes".<sup>280</sup>

As Philip Fearnside emphasizes, this requires estimating the effects of, for example, land speculation and land prices, various economic incentives, 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.<sup>281</sup>

The UN isn't in a position to provide such explanations. NGOs have struggled for more than a decade, with mixed results, to convince its agencies that international action on deforestation must be based on a better understanding of its underlying causes, including landlessness, development projects, logging, and economic and trade policies.<sup>282</sup>

Without this understanding, carbocrats are unlikely to be able to tell an even remotely plausible story about "what would have happened" to nearby forests in the absence of a CDM project (or, for that matter, in the absence of "management" of a domestic forest).

Climate negotiators have not even called for the basic step of a review of the deforestation effects of past CDM-like or domestic forest "management" schemes.

# V. Lemons for Sale

**"Without proper procedures and institutional embedding of verification and sufficient penalization for uncertainty, overreporting of claimed emission reductions will lead to the disintegration of the carbon market."**

**Michael Obersteiner et al.,  
International Institute for Applied  
Systems Analysis<sup>283</sup>**

Because the type of carbon accounting envisaged under the Kyoto Protocol is impossible, Kyoto's carbon market is certain to be flooded by certificates whose value can't be verified.

Credits from land use changes — both those within Northern countries and those instituted in the South under the CDM — will never be able to be quantified. And unless very strict rules are imposed, the Clean Development Mechanism's use of power

projects, retrofits and demand-side management will serve "primarily as an instrument for generating spurious credits".<sup>284</sup>

As carbon traders recognize that "it will be impossible to either prove or disprove [inflated] claims", the Kyoto Protocol will become what the IIASA calls a "cheat's charter".<sup>285</sup>

Countries will use the "unfavourable verification conditions"<sup>286</sup> associated with carbon-sink projects to make exaggerated claims for the projects and gain advantage over countries which try to tackle climate change directly by managing fossil-fuel emissions. Bad credits will drive out good.

By itself, of course, none of this need matter to government officials and corporations who are unconcerned about climate change. For them, the point of the

carbon market was never to address climate change anyway, but to make money and fool the public.

Nor need climatic ineffectiveness be a concern for foresters and conservationists who see the Kyoto Protocol mainly as a new source of funding.

But this insouciance is no proof against market collapse. Institutional economics teaches that the race to peddle bogus certificates, falling prices, decreasing demand for a shoddy product, the ability to score fraudulent credits from domestic forests, and so on, are likely to lead to the self-destruction of the carbon trade.<sup>287</sup>

Unfortunately, this breakdown may well occur only after the trade has done a great deal of damage to the cause of climatic stabilization.

## Notes and References

1. Frankfurt, H., *On the Importance of What We Care About*, Cambridge University Press, Cambridge and New York, 1978, p.132.
2. At least 55 countries must ratify the Protocol, including nations accounting for 55 per cent of industrialized countries' emissions. As of mid-2001, 30 governments had ratified the Protocol, all from the South.
3. The most important greenhouse gas is carbon dioxide (CO<sub>2</sub>), which is responsible for perhaps three-quarters of global warming. Others include methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), chloroflourocarbons, hydrochloroflourocarbons, perflourocarbons, sulfur hexaflouride (SF<sub>6</sub>) and water vapor.
4. Malone, E.L. and Rayner, S., "Ten Suggestions for Policymakers" in Malone and Rayner (eds.) *Human Choice and Climate Change*, Battelle Press, Seattle, 1998, vol. 4., p.114. As Sonja Boehmer-Christiansen observed in 1994, the research agenda of the Intergovernmental Panel on Climate Change (IPCC) "tends to treat society as a single species"; implementable policy "requires a far better understanding of society than is assumed in the linear, apolitical model of the policy process adopted by the IPCC" ("Global Climate Protection Policy: The Limits of Scientific Advice", Parts 1 and 2, *Global Environmental Change* 4, 2, pp.140-59 and 4, 3, pp.185-200, 1994, pp.192, 200).
5. Watts, M., *Silent Violence: Food, Famine and Peasantry in Northern Nigeria*, University of California Press, Berkeley, 1983, pp.462-3.
6. Victor, D., *The Collapse of the Kyoto Protocol and the Struggle to Slow Global Warming*, Princeton University Press, 2001, pp.14-17.
7. Jasanoff, S., "Science and Norms" in Hampson, F.O. and Reppy, J. (eds.) *Earthly Goods, Environmental Change and Social Justice*, Cornell University Press, 1996, p.196. See also Litfin, K. T., *Ozone Discourses: Science and Politics in Global Environmental Cooperation*, Columbia University Press, 1994, pp.52-176.
8. Litfin, K. T., op. cit., pp. 92-93; Jasanoff, S. and Wynne, B., "Science and Decision-Making" in Malone, E.L. and Rayner, S., (eds.) op. cit. note 4, vol. 1., p.33.
9. Jasanoff, S., op. cit. note 7, p.196.
10. Agrawala, S., "Context and Early Origins of the Intergovernmental Panel on Climate Change", *Climatic Change* 39, 1998, pp.612, 614.
11. Malone, E.L. and Rayner, S., loc. cit. note 4.
12. Kelly, M., "Smoke and Mirrors", *Tiempo* 36/37, September 2000, p.34.
13. Anderson, D., Grant, R., and Rolfe, C., *Taking Credit: Canada and the Role of Sinks in International Climate Negotiations*, David Suzuki Foundation, Vancouver, July 2001, p.20.
14. On the generous assumption that plantation lands can sequester five tonnes of carbon per hectare per year, Jutta Kill of the European pressure group FERN calculates that the Bonn agreement sanctions the use of 10 million hectares of Southern land as carbon disposal zone. Other estimates are higher.
15. United Nations, FCCC/CP/2001/L.7, 24 July 2001.
16. Hare, B. and Meinshausen, M., *Cheating the Kyoto Protocol: Loopholes in Den Haag*, Greenpeace International, The Hague, November 2000; Victor, D., op. cit. note 6, p.63.
17. United Nations, op. cit. note 15.
18. *Financial Times*, 15 April 1999 and 29 November 2000. The Intergovernmental Panel on Climate Change reported early in 2001 that temperatures are likely to rise between 1.4 and 5.8 degrees Celsius by 2100, a faster rate of warming than has occurred at any time in the last 10,000 years. The social meaning of such trends will vary from place to place, but are likely to be severe nearly everywhere. The German Federal Environment Agency, for example, sees up to 28 per cent of natural vegetation around the globe threatened by 2100 even if emissions of industrialized countries are cut to less than half of 1990 levels by 2030. See "Serious Global Warming Impacts Expected Even with Strict GHG Controls, Report Says", *International Environment Reporter*, 20 September 2000.
19. Malone, E.L. and Rayner, S., op. cit. note 4, vol. 4, p.111.
20. Hewett, C., Letter to *Financial Times*, 1 December 2000.
21. MacEwan, A., *Neoliberalism or Democracy? Economic Strategy, Markets and Alternatives for the 21st Century*, Zed, London, 1999, p.100.
22. Baer, P., Harte, J. Haya, B. et al., "Equity and Greenhouse Gas Responsibility", *Science*, 289, 29 September 2000, p.2287.
23. Bernow, S., Kartha, S., Lazarus, M., and Page, T., *Free-Riders and the Clean Development Mechanism*, World Wildlife Fund, Gland, Switzerland, 2000, p.4.
24. Booth, W., "Johnny Appleseed and the Greenhouse: Replanting Forests fo Mitigate Global Warming", *Science* 242, 4875, October 1988, p.197; Walsh, B. W., "World Forests", *American Forests* 95, 11/12, November 1989, p.28; Sedjo, R. and Solomon, A.M. "Climate and Forests" in Rosenberg, N. J. et al. (eds.) *Greenhouse Warming: Abatement and Adaptation*, Resources for the Future, Washington, 1989.
25. Mike Mason of Carbon Storage Trust, quoted in *The ENDS Report*, Environmental Data Services, Ltd., London, March 2000.
26. Falkowski, P., Scholes, R.J., Boyle, E. et al., "The Global Carbon Cycle: A Test of Our Knowledge of Earth as a System", *Science* 290, 13 October 2000, pp.291-96. See also Noble, I. and Scholes, R. J., "Sinks and the Kyoto Protocol", *Climate Policy* 1, 2001, pp. 5-25 and Houghton, R.A., "Counting Terrestrial Sources and Sinks of Carbon", *Climatic*

- Change* 48, 2001, p.526: "the net annual flux of carbon between terrestrial ecosystems and the atmosphere is small, between 0 and 1.4 PgC per year, and thus (arguably) not worth measuring or counting for the Kyoto Protocol". While uptake of carbon by the biosphere may have increased over the 1990s, Falkowski et al. caution that "sink strength will almost certainly weaken" as time goes on. (p.293).
27. United Nations, op. cit. note 15, V. 3. (d), p. 6.
  28. Leggett, J., *The Carbon War: Dispatches from the End of the Oil Century*, Allen Lane, London, 1999, p.58-62. See also *Greenpeace Responds to the Bush/Cheney National Energy Task Force*, Greenpeace, Washington, May 2001.
  29. The Brazilian government has argued, for example, that while the North is responsible for 75 per cent of current annual greenhouse gas emissions, it is responsible for 80 per cent of total accumulated emissions, and 88 per cent of global temperature increase. Brazil has claimed that while carbon dioxide emissions from the South are predicted to equal those of the north within two or three decades, the impact of the South's emissions on increasing global temperatures will not equal the North's until 2162 (Johnson, K., "Brazil and the Politics of the Climate Change Negotiations", *Journal of Environment and Development* 10, 2, June 2001, pp.178-206, p.189).
  30. Baer, P. et al., op.cit. note 22.
  31. One model for Kyoto has been the sulfur dioxide market set up in the US in the 1980s, in which most of the rights to give off sulfur dioxide were given away free to the worst-polluting companies. Official thinking held that this was the only way of getting them to go along with emissions cuts (Victor, D., op. cit. note 6, pp.45-47).
  32. Berry, W., *Standing on Earth*, Golgonooza Press, Ipswich, UK, 1991, p.112.
  33. United Nations, FCCC Decision 1/CP.6: Implementation of the Buenos Aires Plan of Action: Note by the President of COP 6, United Nations, 2000, p.9. David Victor comments: "These statements . . . will have little impact on practice. . . . The tendency for an allocation to become politically locked into place—difficult to adjust, such as through increasing the number of parties in the trading system—is the central issue, not whether diplomats declare it to be a non-issue" ("Commentary on Pronk", [http://www.cfr.org/Kyoto/Victor\\_Commentary-on-Pronk.html](http://www.cfr.org/Kyoto/Victor_Commentary-on-Pronk.html)).
  34. Read, P., "Comment on 'The Dyson Effect' by Larry Lohmann", Economics Department, Massey University, New Zealand, <http://econ.massey.ac.uk/apr>.
  35. *The Economist*, 2 December 2000. See also Hanbury-Tenison, R., "The Greens Must Not Be Allowed to Ruin Our Planet", *Daily Telegraph* (London), 19 July 2001 and Victor, D., op. cit. note 6.
  36. Sathaye, J.A., "Carbon Cycle: Project Opportunities and Challenges", n.d.
  37. Read, P., op. cit., note 34. For a similar view see Lomborg, B., *The Skeptical Environmentalist*, Cambridge University Press, Cambridge, 2001.
  38. Kelly, P. M. and Adger, W.N., "Theory and Practice in Assessing Vulnerability to Climate Change and Facilitating Adaptation", *Climatic Change* 47, 2000, p.325. Local power also matters. As the Economic and Social Research Council of the UK puts it, "the ability to cope with environmental change is best developed at the local level . . . International experts are . . . no substitute for local commitment" (ESRC, *Who Governs the Global Environment?*, Brighton, 2000).
  39. Victor, D., op. cit. note 6, pp.26-29.
  40. Christian Aid, *Who Owes Who?*, London, 1999, <http://www.christian-aid.org.uk/>. On parallel reasoning, there also exists a "carbon debt" owed by the rich within each society to the poor.
  41. Friends of the Earth International in cooperation with World Rainforest Movement, FERN and The Future in Our Hands, *Tree Trouble*, Asuncion, 2000, p.48-54.
  42. Climate Neutral Network, *Business and the Environment*, XI, 5, May 2000, [http://www.climateneutral.com/press\\_bus\\_env.html](http://www.climateneutral.com/press_bus_env.html). TransAlta is paying several million US dollars for the feed, through which it hopes to earn 30 million tonnes of carbon credits.
  43. Friends of the Earth International, op. cit. note 41, pp.55-61.
  44. Victor, D., op. cit. note 6.
  45. As Victor notes (op. cit. note 6), international law is too "weak" to enforce the current distribution of atmospheric property rights — a genteel way of saying that it isn't such an effective tool of Northern elites that it can secure a system of such blatant inequality involving a resource as intangible as the atmosphere.
  46. So-called "clean coal" technologies use higher quality coal, washed coal, or improved combustion techniques in an attempt to reduce CO<sub>2</sub> emissions. However, coal is by nature a dirty, high-emitting fuel (it currently accounts for over 40 per cent of annual carbon dioxide emissions while supplying only around 23 per cent of global energy). Such techniques, insofar as they "succeed" (washed coal may actually be less efficient due to residual moisture in the fuel), are essentially justifications for business as usual.
  47. Nilsson, S., "Editorial", *Options*, International Institute for Applied Systems Analysis, Laxenburg, Austria, Autumn 2000, p.1.
  48. Oilwatch, Position Paper: *Fossil Fuels and Climate Change*, The Hague, November 2000.
  49. Knight, D., "US Unrivalled as Top Carbon Polluter", Third World Network, July 2001, citing research by the World Resources Institute.
  50. Swedish Society for Nature Conservation, *The Challenging Communities*, Stockholm, 2000.
  51. Kenny Anthony, Prime Minister of St. Lucia, presentation at the Sixth Conference of the Parties of the Framework Convention on Climate Change (UNFCCC), The Hague, 16 November 2000.
  52. New Economics Foundation, *Collision Course: Free Trade's Free Ride on the Global Climate*, London, 2000.
  53. *The Economist*, editorial, 2 December 2000.
  54. The Bonn agreement of July 2001 blandly requests UN carbocrats to "address" difficulties in carbon accounting but stops short of asking them to determine whether it's actually possible or not in the form the agreement envisages (United Nations, op. cit. note 15).
  55. Climatologist R. A. Houghton considers that while "consideration of fossil fuels alone addresses 75-100 per cent of the net anthropogenic emissions of carbon to the atmosphere . . . the elimination of deforestation would reduce global emissions by an estimated 1.7 billion tonnes of carbon yearly" (op. cit. note 26, pp.526, 528). Anderson, D. et al., op. cit. note 13, Technical Summary, p.1, hold that a third of carbon emissions since 1850 have resulted from "human impacts on ecosystems", while forest specialist P. M. Fearnside reckons that tropical land use emissions of carbon are "equivalent to approximately 29 per cent of the total anthropogenic emissions including fossil fuels" ("Global Warming and Tropical Land Use Change: GHG Emissions from Biomass Burning, Decomposition and Soils in Forest Conversion, Shifting Cultivation and Secondary Vegetation", *Climatic Change* 46, 2000, p.115).
  56. Lohmann, L., "Carbon Con? Group Charges 'Intellectual Corruption' over Global Warming Proposal", *Multinational Monitor*, September 2000, p.26.
  57. Ibid.
  58. See, for example, Wysham, D., *The World Bank and the G-7: Still Changing the Earth's Climate for Business*, Institute for Policy Studies, Washington, 1998.
  59. Flavin, C. and Dunn, S., *Rising Sun, Gathering Winds: Policies to Stabilize the Climate and Strengthen Economies*, Worldwatch Institute, Washington, 1997, p.138.
  60. On effects of plantations, see <http://www.wrm.org.uy>. See also Carrere, R. and Lohmann, L., *Pulping the South: Industrial Tree Plantations and the World Paper Economy*, London, Zed Books, 1996. Under the Clean Development Mechanism, in addition, Northern investors can export subsidized technologies to the South in return for carbon credits, taking away market share from local, non-subsidized technology firms who may well be producing technology which is more locally appropriate. As Tim Forsyth points out, the result may be a net loss in the diversity and effectiveness of the "climate technology" available.
  61. Kates, R.W., "Cautionary Tales: Adaptation and the Global Poor", *Climatic Change*, 45, 2000, pp. 5-17. Wolfgang Sachs adds that a "claim for equity on the basis of conventional development" — a perennial interest of ruling elites in the South as well as the North — "is simply not credible", since development doesn't lead to equity (Interview in *Climate Equity Observer*, 12 May 2001, [http://www.ecoequity.org/ceo/ceo\\_3\\_4.htm](http://www.ecoequity.org/ceo/ceo_3_4.htm)).
  62. The dominant approach to climate change also disempowers the public by turning the official negotiations into jargon-fests on obscure "market mechanisms" (see Bunting, M., "The Hot Air Balloon", *The Guardian*, 27 November 2000, p.19).
  63. Editorial, *New Scientist*, 7 April 2001, p.3; "Calling the Tune", *New Scientist*, 7 July 2001, pp.47-9.
  64. Frankfurt, H., op. cit. note 1, p.133.
  65. Victor, D., op. cit. note 6.
  66. Anderson, D. et al, op. cit. note 13, p.2.
  67. *Tiempo*, September 2000, p.38.
  68. Malone, E. and Rayner, S., op. cit. note 4.
  69. Thompson, M., Warburton, M. and Hatley, T., *Uncertainty on a Himalayan Scale*, Milton Ash, London, 1986, p.71. The authors' observation on development aid applies equally well to climate action: "the classic development approach has been to sound the alarm and then, confident that the country's attention has been gained, to tell it what will have to be done . . . It has not worked because it has ignored (as if it were some mere detail of implementation) the deep political, economic and cultural structure that is, in fact, what determines the country's attention and lack of attention. What is needed is . . . an approach that places the 'mere details' . . . at the very centre of the stage and relegates to the wings the alarm bell-ringers and their immaculate prescriptions" (pp. 87-88). "There can be no bottom-up development projects," the authors state on p.106.
  70. The modeling and accounting procedures through which this assertion has been maintained over the past 25 years await the

- careful analysis perhaps only social and intellectual historians could provide. Against the assertion have stood long-standing engineering conclusions (Lovins, A.L., *Making Sense and Making Money*, Rocky Mountain Institute, Snowmass, CO, USA, <http://www.rmi.org>); analysis of cross-sector benefits such as increased overall employment, fewer premature deaths and lower health care costs due to reduced pollution (Last, J., "Taking Our Breath Away: the Health Effects of Air Pollution and Climate Change", David Suzuki Foundation, Vancouver, October 1998; Russell, D., "Keeping Canada Competitive", Suzuki Foundation, October 1997); and calculations of risks of delayed investment in solar and renewables as well as risks of future catastrophic biospheric releases of carbon dioxide (see Appendix: Why Kyoto-Style Accounting Systems Fail, pp.36-44).
71. Haites, E. and Missfeldt, F., "The Potential Contribution of Sinks to Meeting the Kyoto Protocol Commitments", paper presented to the European Association of Environmental and Resource Economists, June 2001, cited in Anderson, R., op. cit. note 13, p.27.
  72. Corporate Europe Observatory, *Greenhouse Market Mania: UN Climate Talks Corrupted by Corporate Pseudo-Solutions*, Amsterdam, November 2000, available at <http://www.xs4all.nl/~ceo/greenhouse/index.html>. See also Climate Justice Network, the website of the US NGO Corporate Watch: <http://www.corpwatch.org>. For another view see Foster, J.B., "Capitalism's Environmental Crisis — Is Technology the Answer?", *Monthly Review* 52, 7, December 2000, pp. 1-13.
  73. Corporate Europe Observatory, op. cit., p.40.
  74. Ibid., pp.39-40.
  75. *The Guardian*, 24 November 2000.
  76. Unruh, G.C., "Understanding Carbon Lock-In", *Energy Policy* 28, 2000, p.820.
  77. Ibid., pp.820-25.
  78. Smith, M., *The US Paper Industry and Sustainable Production: An Argument for Restructuring*, MIT Press, Cambridge, USA, 1997; Lifset, R. (ed.), "Roundtable on the Industrial Ecology of Pulp and Paper", *Journal of Industrial Ecology* 1, 3, 1998, pp.87-114; Kerski, A., "Pulp, Paper and Power: How an Industry Reshapes Its Social Environment", *The Ecologist* 25, 4, August 1995, pp.142-9.
  79. Romm, J., *Cool Companies*, Island Press, Washington, 1999; Krause, F., "The Cost of Mitigating Carbon Emissions: A Review of Methods and Findings from European Studies", *Energy Policy* 24, 10/11, pp.899-915; von Weizsacker, E. and Lovins, A.L., *Factor Four: Doubling Wealth, Halving Resource Use*, Earthscan, London, 1997.
  80. US Department of Energy, Office of Energy Efficiency and Renewable Energy, *Scenarios for a Clean Energy Future*, Washington, 2000. See also Raeburn, P., "It's Perfect Weather to Fight Global Warming", *Business Week*, 11 December 2000, p.36.
  81. Working Group III contribution to Third Assessment Report, IPCC, 2001.
  82. Unruh, G.C., op. cit. note 76, pp.825-28.
  83. "Climate Protection for Fun and Profit", *Rocky Mountain Institute Newsletter*, 13, 3, Fall/Winter 1997, p.3.
  84. Corporate Europe Observatory, op. cit. note 72, p.27. Some Nordic governments, possibly influenced by their countries' powerful forestry industries, were key in the capitulation of the EU to demands to allow "carbon sinks" in the CDM. One lead co-chair of the UNFCCC working group on carbon sinks hails from Iceland, where a proposed aluminium smelter may need to rely on "off-setting" forestry projects abroad.
  85. European Commission, *Green Paper on Greenhouse Gas Emissions Trading within the European Union*, Brussels, 2000; Intercooperation, "LULUCF Activities Under the CDM: Opportunity or Threat to Biological Diversity Conservation?", side event at The Hague negotiations, 14 November 2000.
  86. Corporate Europe Observatory, op. cit. note 72. See also Rampton, S. and Stauber, J., *Trust Us, We're Experts: How Industry Manipulates Science and Gambles with Your Future*, Putnam, New York, 2000.
  87. "Corporate America and the Kyoto Climate Treaty", Greenpeace Briefing, Amsterdam, 2001, p.3. The influence of such extremist approaches is declining, however, under the influence of shrewder pro-business strategists such as Eileen Claussen of the Pew Center on Global Climate Change (see note below for Pew's reliance on oil and mining money). US firms such as United Technologies, Intel and DuPont now admit that evidence for human-caused climate change is convincing. See "Changing the Climate of Opinion", *The Economist*, 12 August 2000. The Global Climate Coalition now accepts that global warming is a problem that needs to be addressed, but advocates voluntary reductions in greenhouse gases by its members rather than adherence to strict timetables. For the links between the fossil fuel industry and "contrarian" climate scientists, see Gelbspan, R., *The Heat Is On*, Perseus, New York, 1998.
  88. The Pew Charitable Trust was set up in 1948 with an endowment totalling US\$3.4 billion, largely based on profits made by the Sun Oil Company (Sunoco) and Oryx Energy. Its income also derives from investments in forestry firms such as Weyerhaeuser and International Paper and mining and oil firms such as Phelps Dodge and Atlantic Richfield. According to Alexander Cockburn and Ken Silverstein, in recent decades Pew, through its donations to environmental NGOs as well as its own activism, has played a large role in directing the US environmental movement. See Cockburn, A. and Silverstein, K., *Washington Babylon*, Verso, London, 1996, pp.210-14.
  89. This influence, of course, is not confined to the Senate. George W. Bush received more money from the oil and gas sector during the US presidential election than any other federal candidate over the last decade (Greenpeace, op. cit. note 87, p.4).
  90. Moore, C., "Who Owns Your Congressman? A Step-by-Step Guide to Tracking Political Payola", Sierra Club, Washington, September/October 2000.
  91. United States Senate, Joint Hearing of the Senate Foreign Relations committee and the Senate Energy and Natural Resources Committee, *Federal News Service*, 28 September 2000.
  92. Pearce, F., "A Real Roasting", *New Scientist* 7 April 2001, p.11.
  93. US Public Interest Research Group, "Paying to Pollute: Air Polluter Campaign Contributions and the Fight Against Clean Air", September 2000, [http://www.pirg.org/reports/enviro/payingtopollute/Paying\\_to\\_Pollute.pdf](http://www.pirg.org/reports/enviro/payingtopollute/Paying_to_Pollute.pdf).
  94. United States Senate, op. cit. note 91.
  95. Agarwal, A., "Making the Kyoto Protocol Work: Ecological and Economic Effectiveness, and Equity in the Climate Regime", Centre for Science and Environment, New Delhi, n.d.
  96. "Bush Plans Cut Most Climate Program Spending", Greenhouse Network, 23 April 2001, <http://www.greenhousenet.org/news/april2001/bushplancuts.html/>.
  97. Exceptions include International Paper, the world's largest pulp and paper firm, which stands to benefit from Kyoto's support for supposedly carbon-absorbing forestry projects.
  98. The institute, spurred by Exxon, Chevron and others, planned, in the wake of Kyoto, a two-year, US\$6 million campaign to undermine scientific warnings about climate change ("Industrial Group Plans to Battle Climate Treaty," *New York Times*, 26 April 1998). In July 2001, after attending The Hague climate negotiations for the Global Climate Coalition, the institute's Philip Clooney was appointed as Chief of Staff of the Council for Environmental Quality of the executive branch of the US government.
  99. The US branch wrote a public letter to President Bush on 11 April 2001 supporting his rejection of the Kyoto Protocol (Greenpeace, loc. cit. note 87).
  100. Corporate Europe Observatory, op. cit. note 72, p.35. BP Amoco, which has recently begun to present itself as a leader in renewable energy and CO<sub>2</sub> reductions (having even changed its name to "Beyond Petroleum"), meanwhile contributes heavily to US politicians opposing any commitment to reduce emissions (ibid.).
  101. Feynman, R., *What Do You Care What Other People Think?*, Harper and Row, New York, 1988.
  102. Watson, R.T., Noble, I., Bolin, B. et al., (eds.) *Land Use, Land Use Change and Forestry* (a Special Report of the IPCC), Cambridge University Press, Cambridge, 2000.
  103. German Advisory Council on Global Change, *The Accounting of Biological Sinks and Sources under the Kyoto Protocol — A Step Forwards or Backwards for Global Environmental Protection? WBGU, Bremerhaven*, p. 39.
  104. Jonas, M., Nilsson, S., Shvidenko, A. et al., "Full Carbon Accounting and the Kyoto Protocol: A Systems-Analytical View", Interim Report IR-99-025, International Institute for Applied Systems Analysis, Laxenburg, Austria, p.35. The authors note with understandable puzzlement on p.20 that the issue of whether or not existing IPCC Guidelines can serve as the main accounting and legal compliance system for the Kyoto Protocol is "unresolved" and "has not yet been perceived as" an issue "and discussed widely".
  105. Most panel members were either climatologists or mainstream foresters and economists. Many were affiliated with environmental consultancies, industry associations such as the American Forest and Paper Association, and mainstream forestry institutes that view the carbon sink business as a welcome boost to the profession's status. Some were authors of investigations or Ph.D. theses justifying using trees to ameliorate climate change.
  106. Watson, R.T. et al., op. cit. note 102, p.181.
  107. An amusing example is the *Financial Times* leader of 27 November 2000, which, with no trace of irony, sanctimoniously informs "green lobbyists and some excessively green ministers" that they "must learn to recognise that the US can only proceed at the pace of public opinion. That is the price of democracy." In fact, opinion polls suggest that even in the US a majority supports domestic action to ease global warming, even if other countries fail to act. See, e.g.,

- Whiteley, P., "In the Grip of Vested Interests", *The Guardian*, 24 November 2000, p.23.
108. Grubb, M., *The Kyoto Protocol: A Guide and Assessment*, Royal Institute for International Affairs, London, 1999, p.xxxvi.
109. *Ibid.*, p.246. The sole exception is that the US has so far been unable to get official limits set to Southern emissions.
110. In this context, the term "degraded lands" is a descendant of the colonial-era administrative term "waste", used to signify what were in fact common lands under intense and varied use. For the deployment of this term in the British Raj, see, for example, Davis, M., *Late Victorian Holocausts: El Nino Famines and the Making of the Third World*, Verso, London, 2001, p.326 ff. For the contemporary variant, see, e.g., Houghton, R.A., et al., "Current Land Cover in the Tropics and its Potential for Sequestering Carbon", *Global Biogeochemical Cycles* 7, 2, 1993, pp.305-320; Dixon, R. et al. (eds.) *Assessment of Promising Forest Management Practices and Technologies for Enhancing the Conservation and Sequestration of Atmospheric Carbon and their Costs at Site Level*, *Environmental Protection Agency*, Washington, 1991; Grainger, A., "Modelling the Impact of Alternative Afforestation Strategies to Reduce Carbon Dioxide Emissions", in *Proceedings of the Conference on Tropical Forestry Response Options to Global Climate Change*, 1990; and Trexler, M. and Haugen, C., *Keeping it Green: Tropical Forestry Opportunities for Mitigating Climate Change*, World Resources Institute, Washington, 1995.
111. For a prescient article, see McCully, P., "The Case against Climate Aid", *The Ecologist* 21, 6, 1991, pp.244-51.
112. Lohmann, L., loc. cit. note 56.
113. The panel's mandate didn't oblige the authors to assume that carbon accounting and quantitative carbon project monitoring were feasible. If it turned out that the "sequestration potential" they were assigned to explore couldn't be commensurated with carbon emissions, there was no obstacle to their saying so. Similarly, Article 3.4 of the Kyoto Protocol raises the question of "which additional human-induced activities related to changes in greenhouse gas emissions by sources and removals by sinks in the agricultural soils and the land-use change and forestry categories shall be added to, or subtracted from, the assigned amounts for Parties included in Annex I". Strictly speaking, this left the possibility open for the authors to say that no additional human-induced activities should be added to or subtracted from those assigned amounts, given the difficulties with quantification and commensuration, without contradicting the Protocol's text, since the limiting case of possible answers to the question "which ones?" is "none".
114. Ironically, it's fallen to delegates from Southern countries such as Uganda, Kenya and Guatemala to raise scientific questions the expert panel neglected, including questions about methods of incorporating opportunity costs into project-based carbon accounting, about how to account for the extent to which forestry projects reinforce the ability of carbon-intensive energy sources to displace carbon-light ones, about the scientific basis of discount rates, and about the effects of unequal access to quantification techniques.
115. Lohmann, L., loc. cit. note 56.
116. Watson, R. T. et al. (eds.), op. cit. note 102, p.58.
117. *Ibid.*, p.139. The report also notes, but fails to draw conclusions from, the climatic irrelevance of the accounting system proposed by the Kyoto Protocol for tallying up carbon flows associated with afforestation, reforestation and deforestation (*ibid.*, pp.167, 176).
118. *Schnews* (Brighton), 1 December 2000.
119. Sachs, W., op. cit. note 61.
120. The definition is that of the Association of American Medical Colleges, cited in Beach, D., *Responsible Conduct of Research*, VCH Verlagsgesellschaft, Weinheim, 1996, pp. 27-28, emphasis added. To take one example of the application of this principle, the review panel evaluating the claim that polio vaccine tested in Africa may have transferred the AIDS virus from non-humans to humans has excluded any laboratory from the testing programme that might be seen to have a financial interest in the outcome.
121. "Crying No Wolf: Why Economists Don't Worry about Climate Change, and Should: An Editorial Comment", *Climatic Change* 47, 2000, pp.225-32.
122. Watson, R.T. et al. (eds.), op. cit. note 102, Foreword.
123. Malone, E.L. and Rayner, S., op. cit. note 4, vol.4, p.117.
124. In 2000, a top official of the UNFCCC Secretariat reportedly admitted privately that the Kyoto Protocol "is not an environmental treaty, it's an economic treaty".
125. Corporate Europe Observatory, op. cit. note 72.
126. This list could be extended. For example, Robert T. Watson, chair of the IPCC and principal editor of the report produced by the panel, serves as Chief Scientist and Director for Environmentally and Socially Sustainable Development at the World Bank (see BOX: "The Carocrat's Plight: The Case of Robert Watson", pp.32-33). The Bank has backed expansion of fossil fuel power in China, India and other countries; subsidizes fossil fuel companies' production expenses (as with a recent pipeline project in Chad); and all the while hosts the Prototype Carbon Fund, set up to help create a market to "counteract" such activities' climatic effects. Panel member Ian Noble, senior lead author and co-facilitator of a meeting with government representatives to discuss the LULUCF report's "Summary for Policy Makers", was actually an Australian government negotiator during The Hague negotiations in November 2000. Australia, of course, is one of the countries pressing for maximum use of "carbon sinks" to avoid emissions reductions.
127. Lohmann, L., op. cit. note 56, pp.27-28.
128. Cited in Beach, D., op. cit. note 120, pp. 27-28, emphasis added. As Arnold Relman, former editor of *The New England Journal of Medicine* and emeritus professor of medicine at Harvard University writes, "conflict of interest is the potential for abuse that derives from conflicting commitments", regardless of whether any temptation to bias was actually yielded to ("Trust Me, I'm a Scientist", *New Scientist*, 171, 2309, 22 September 2001, pp.46-7). "The time has come", Relman insists, when editors of medical journals shouldn't "publish research where these conflicts exist . . . Disclosure is not enough".
129. Gusterson, H., "Nuclear Weapons Testing: Scientific Experiment as Political Ritual", in Nader, L., *Naked Science: Anthropological Inquiry into Boundaries, Power and Knowledge*, Routledge, London, 1996, p.146.
130. Gupta, J., "North-South Aspects of the Climate Change Issue: Towards a Negotiating Theory and Strategy for Developing Countries", *International Journal of Sustainable Development* 3, 2, 2000, pp.125-26.
131. Sachs, W., op. cit. note 61.
132. Thompson, M. et al., op. cit. note 69, p. 7.
133. The United Nations Framework Convention on Climate Change which came out of the 1992 Earth Summit legitimized the "policy relevance and hence public support of global change research efforts organized by an influential section of the global research community" (Boehmer-Christiansen, op. cit. note 4, p.152).
134. The international climate science community was "coordinated by a 'Northern' science bureaucracy . . . extracting data and knowledge from a globally dispersed research base increasingly dependent on multinational research funding" (*ibid.*, p.142). Strenuous efforts were subsequently made to secure the "participation" of Southern researchers (Agrawala, S. "Structural and Process History of the IPCC", *Climatic Change* 39, 1998, pp.628-32). But "most IPCC communications are dealt with by one specialized agency (such as the Department of Meteorology) within many developing countries" (*ibid.*, p.632).
135. Shackley, S. and Wynne, B., "Representing Uncertainty in Global Climate Change Science and Policy: Boundary-Ordering Devices and Authority", *Science, Technology, and Human Values* 21, 3, Summer 1996, pp.275-302; Shackley, S., Risbey, J., Stone, P. and Wynne, B., "Adjusting to Policy Expectations in Climate Change Modeling: An Interdisciplinary Study of Flux Adjustments in Coupled Atmosphere-Ocean General Circulation Models", *Climatic Change* 43, 1999, pp.413-454; Wynne, B. and Shackley, S., "Environmental Models: Truth Machine or Social Heuristics?", *Weather* 21, 1994, pp.6-8. As of late 2000, researchers were still struggling with the challenge of quantifying uncertainty and probability estimates in GCMs (see Met Office [UK], *Climate Change: An Update of Recent Research from the Hadley Centre*, Bracknell, November 2000, p.10). Michael Thompson and colleagues remark (op. cit., note 69, p.23): "Just as it would be naive to expect lawyers to tidy up the law, or the police to eradicate crime, so we should not place too much faith in the ability of 'hard' science to tell us what the facts . . . really are." And: "The institutions, you might say, have got there ahead of the scientist and have interposed themselves between him and the facts he is so anxious to uncover" (p.62).
136. Kristen Andersson and Kenneth Richards find it necessary to state that "unless it can be shown that an international land-use change and forestry-based carbon-trading programme can be implemented successfully, it should not be launched in the first place. The international dialogue should start by identifying a workable programme and then create a supportive institutional context, not vice versa" ("Implementing an International Carbon Sequestration Programme: Can the Leaky Sink Be Fixed?", *Climate Policy* 1, 2001, p.175). Darwin Anderson and colleagues remark that the design of proposals of all parties on carbon sinks "reflects politics, not science" and thus that the accounting systems "create loopholes and reduce the effectiveness of

- the Kyoto Protocol” (op. cit. note 13, p.11).
137. “More Hunger and Poverty May Be Enduring Impact of Climate Change”, World Bank press release, 14 June 2001.
  138. Grubb, M., op. cit. note 108, p.229. Grubb and colleagues go on to mention the “danger that the CDM could become a mechanism for weakening action in the industrialized world *without* any offsetting *additional* activity in the developing countries” (loc. cit.). They note that “frequently different companies make wildly divergent assessments of the same projects . . . Is the bureaucracy of CDM really supposed to assess competing claims about long-term project viability that are contingent upon perhaps confidential predictions of costs and performance, and inherently unknown prices?” (p.228). Paradoxically, the smaller the “carbon subsidy” required by a project, the more uncertain it is that it “would not have been implemented” without the Kyoto Protocol.
  139. *Ibid.*, p.230. Impossibilities are typically made tractable in the carbocracy by reinterpreting them as problems of determinate uncertainty, inaccuracy, imprecision, large error bars, insurance, discounting or “learning by doing” — a favourite carbocratic buzzword. This move has something in common with the “boundary-ordering devices” analyzed by Simon Shackley and Brian Wynne in “Representing Uncertainty in Global Climate Change Science and Policy”, op. cit. note 135. Shackley and Wynne show how advisory scientists transform various concepts of “uncertainty” in ways which maintain the authority of scientists yet can also be used by policymakers. For example, at one point in the climate discussion scientist-advisers tried hard to get percentage estimates of the uncertainty of Global Circulation Model scenarios — something it was not in the nature of GCMs to supply (p.282). The use of “carbon-dioxide equivalents” is another example of such a translating device. Although there are many scientific questions surrounding it, it is convenient for policymakers and climate marketers because it allows carbon dioxide to be commensurated with other greenhouse gases.
  140. Grubb and colleagues (op. cit. note 108) do speculate, p.230 that while “policy should not be based on the chimera of accurate quantification”, nevertheless the practice of assigning chimerical numbers may somehow have a value “as a lever for achieving desirable public policy goals.” It’s doubtful whether this is meant to be an argument, however.
  141. *Ibid.*, pp.245-6.
  142. *Ibid.*, pp.236, 238.
  143. Haites, E. and Yamin, F., “The Clean Development Mechanism: Proposals for Its Operation and Governance”, *Global Environmental Change* 10, 2000, pp.27-43: “The baseline should reflect what should happen in the absence of the project. This can never be observed, so it is not possible to determine the ‘right’ baseline.”
  144. *Ibid.*: “Thus, it is possible only to agree on a reasonable baseline. . . . the Executive Board will make a decision on the baseline. This decision will become a precedent for baseline decisions for future projects.”
  145. Grubb, M., op. cit. note 108, p.229.
  146. Many carbocrats also yo-yo between calling for full carbon accounting (bad because it’d mean calling into question the Kyoto Protocol; good because it’s more relevant to climate and would require lots of funding for research) and calling for partial carbon accounting (bad because it’s irrelevant to climate; good because it doesn’t upset paymasters loyal to the Protocol). The Protocol’s scientifically preposterous dichotomy between human- and non-human induced changes in biospheric carbon dioxide production induces further schizophrenia. Resorting to an arbitrary human-induced/natural distinction seems as unscientific as does claiming the distinction is real, and may lead to countries wanting “to claim all sinks as anthropogenic” (Houghton, R.A., op. cit. note 26, p.530). On the other hand, arbitrarily identifying the relevant “humans” as UN-approved managers has the merit of helping to keep employment levels up in the carbocracy.
  147. Agre, P.E., *Computation and Human Experience*, Cambridge University Press, Cambridge, 1997, p.12.
  148. For a parallel dynamic in the mainstream development industry, see “Missing the Point of Development Talk: Reflections for Activists”, Corner House Briefing Paper No. 9, 1998.
  149. The quotation is from an early draft of Watson, R.T. et al. (eds.), op. cit. note 102, circulated on the internet.
  150. An even more sophisticated attempt to get around the above-ground/below-ground dilemma is adopted by Philip Fearnside. Fearnside argues for an analogy between underground fossil fuel deposits and the Amazon forest, urging that even attempts at saving the forest which are extremely unlikely to succeed should be given quantifiable credit.
  151. Andersson, K. and Richards, K.R., op. cit. note 136, p.173. Developing “relatively simple yet credible baselines” is the impossible dilemma of carbon accountants — and it is almost always the drive for simplicity which wins out (Brown, S., Prance, G., Myers, N., et al., “Carbon Sinks for Abating Climate Change: Can They Work?”, ms., 2001, p.8; see also the columns of Richard Sandor in the magazine *Environmental Finance*).
  152. Bernow, S., et al., op. cit. note 23, p.8.
  153. *Ibid.*, p.17.
  154. In the words of Bernow’s team, “to the extent that the CDM generates unwarranted free-rider credits, it will cause a net *increase* in global carbon emissions . . . 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. In economic terms, 600 million tonnes of free-rider credits would be worth US\$6 billion at \$10 per tonne of carbon or \$60 billion at \$100 per tonne of carbon. These free riders would amount to a multi-billion dollar cross-subsidy to CDM project participants at the expense of the global environment” (*ibid.*, p.17).
  155. *Ibid.*
  156. Anderson, D. et al., op. cit. note 13, p.26.
  157. *Ibid.*, p.16.
  158. *Ibid.*, p.18.
  159. As Michael Thompson and colleagues remark, “professional foresters, conservationists, agronomists and so on . . . need serious (but *curable*) environmental problems every bit as badly as anti-poverty campaigners need poor (but *deserving*) clients”. Thompson, M. et al., op. cit. note 69, p.60, emphasis added.
  160. This, of course, has already happened. See Victor, D., op. cit. note 6, pp.29-30.
  161. Boehmer-Christiansen, S., op. cit. note 4, pp.186-9, Agrawala, S., op. cit. note 134.
  162. Boehmer-Christiansen, S., op. cit. note 4.
  163. Wynne, B. and Shackley, S., “Environmental Models”, op. cit. note 135, p.7. See also Boehmer-Christiansen, S., op. cit., p. 192.
  164. *Ibid.*, p.149.
  165. The first chairs of Working Group III of the IPCC were US State Department bureaucrats. The Group was early on dominated by legal experts and government negotiators (Boehmer-Christiansen, S., op. cit., p.149; Agrawala, S., op. cit. note 134, pp. 624-5).
  166. Boehmer-Christiansen, S., op. cit. note 4, p.198.
  167. *Ibid.*, p.200.
  168. US Department of Energy (DoE) and National Energy Technology Laboratory, “Carbon Sequestration, Overview and Summary of Program Plans” (draft), Pittsburgh and Morgantown, WV, April 2000. Industry and academia have already proposed partnerships on carbon sequestration research alone amounting to US\$125 million to the DoE, which would pony up \$75 million.
  169. Project executors include the United States Forest Service, the Naval Research Laboratory, Oak Ridge National Laboratory, Massachusetts Institute of Technology, Ohio State University, and the University of Hawaii.
  170. Special issue of *Climatic Change* 33, 1996.
  171. Brown, P., “Aerial Bombardment to Reforest the Highlands”, *The Guardian*, 4 October 1999. Australian academics have meanwhile teamed up with Japanese companies to propose that Chile stimulate its coastal waters into increased carbon-absorbing biological activity by lacing it with extra nitrogen. See Pearce, F., “A Cool Trick”, *New Scientist*, 8 April 2000, p.18.
  172. Early studies of CO<sub>2</sub> in the atmosphere undertaken by US nuclear laboratories such as Oak Ridge were “motivated, at least in part, by the desire to defend nuclear power against vocal critics” (Boehmer-Christiansen, S., op. cit. note 4, p.153). Similarly, institutes from pro-nuclear European countries made early common cause with environmental activists from the US and members of UN scientific bureaucracies in organizing the Villach conference on climate change in 1985 (p.156).
  173. Samuel, E., “Scrub the Planet Clean”, *New Scientist* 31 March 2001, p.14. See also the programme for the First National Conference on Carbon Sequestration, 14-17 May 2001, Washington, DC, available at [http://www.netl.doe.gov/events/01conferences/carbseq/cs\\_agenda.pdf](http://www.netl.doe.gov/events/01conferences/carbseq/cs_agenda.pdf). Among Los Alamos’ other projects is a study of geologic sequestration of carbon dioxide undertaken with Chevron, Texaco, Pan Canadian Resources, Shell, BP-Amoco and Statoil, together with Lawrence Berkeley, Lawrence Livermore, and Oak Ridge National Laboratories.
  174. Paperloop, <http://www.paperloop.com>, 5 December 2000. Such forestry firms, of course, enjoy close ties with academic forestry faculties and professional associations, who have likewise joined the carbon forestry bandwagon.
  175. “New Initiative Aims to Curb Global Warming”, *Princeton*, Winter 2001, pp.1.3.
  176. “Same Platform, Different Train: The Politics of Participation”, Corner House Briefing No. 4, 1998.
  177. Brencchley, F., “Forest Ire”, *The Bulletin* (Australia), 6 March 2001, p.43. See also Cadman, T., *The Clearcut Case: How the Kyoto Protocol Could Become a Driver for Deforestation*, Greenpeace International,



- 2000, <http://www.greenpeace.org> or <http://www.panda.org>, on how the Greenhouse Office of the Australian government "has developed a voluntary programme with greenhouse producers . . . and is developing a 'National Carbon Accounting System' to track carbon sequestration measures for the domestic carbon trading market in advance of formal intergovernmental agreements" (p.7).
178. These include Cantor Fitzgerald Environmental Brokerage Services, Carbon Storage Trust, C\*Trade, EcoSecurities, Edinburgh Centre for Carbon Management, Environmental Financial Products, Inc., Forests for the Future, Societe Generale de Surveillance and Trexler & Associates.
179. Corporate Europe Observatory, op. cit. note 72, p.29; Muller, B., Michaelova, A. and Vrolijk, C., "Rejecting Kyoto", Climate Strategies, London, 2001. Michael Grubb is one of the experts associated with Climate Strategies.
180. Newcombe, K., presentation during the meetings of the Subsidiary Body on Science and Technology Assessment, Bonn, 6 June 2000. See <http://www.prototypecarbonfund.org>.
181. United Nations Development Programme and World Resources Institute, *Promoting Development while Limiting Greenhouse Gas Emissions: Trends and Baselines*, UNDP, New York, 1999; Food and Agriculture Organization, "Carbon Sequestration Options under the Clean Development Mechanism", World Soil Resources Report 92, Rome, 2000.
182. *Equity Watch*, Centre for Science and Environment, New Delhi, 15 November 2000.
183. Thompson, M. et al., op. cit. note 69, p.125.
184. "The Indigenous Peoples' Bonn Declaration", Bonn, 15 July 2001, <http://www.wrm.org.uy/actors/CCC/IPBonn.html>.
185. Compare the claim from a recent article by Canadian economists on energy policy that "it will be virtually impossible to reach the Kyoto objectives within the North American electricity industry" because there are no historical precedents for the rates of change of market share which would be required. Such arguments survive in the climate debate partly because so few non-economists step forward to point out that on the same reasoning, temperatures cannot have risen 0.6 degrees Celsius over the last century, since there is no precedent for such rates of change in the historical era.
186. Jasanoff, S., op. cit. note 7, p. 194.
187. Shackley, S. et al., op. cit. note 135, p.448.
188. Sonja Boehmer-Christiansen noted in 1994 that climate change research "is increasingly influenced by space agencies using public funds and, with the end of the Cold War, in search of new tasks" (op. cit. note 4, p.195).
189. Jasanoff, S. and Wynne, B., op. cit. note 8, pp.32-34; Litfin, K., op. cit. note 7.
190. *The Economist*, 22 January 2000.
191. "Climate Change: The Nuclear Opportunity?", *Mining Week*, 13 November 1998, p.383.
192. Sachs, W., op. cit. note 61.
193. Boehmer-Christiansen, S., op. cit. note 4, p.192.
194. IPCC Working Group III's Second Assessment Report tried to calculate the "social costs" of climate change using a neoclassical economic model which set US\$1.5 million as the statistical value of a human life in the North and \$150,000 as the statistical value of a human life in the South. The report "consequently failed to get plenary approval in July 1995, a dubious first for the IPCC" (Agrawala, S., op. cit. note 134, p.626).
195. Sachs, W., op. cit. note 61.
196. Bloor, D., *Knowledge and Social Imagery*, University of Chicago Press, Chicago, 1991 [1976], pp.141, 146.
197. Yearley, S., *Sociology, Environmentalism, Globalization*, Sage, London, 1996. p.151; Illich, I., *Disabling Professions*, Marion Boyers, London, 1977, p.11.
198. Grubb, M., op. cit. note 108, p.246.
199. Lohmann, L., op. cit. note 56, p.28.
200. Staub, E., "The Psychology of Perpetrators and Bystanders," *Political Psychology* 6, 1985, p.66n.
201. Nilsson, S., Shvidenko, A., Stolbovoi, V. et al., "Full Carbon Account for Russia", Interim Report IR-00-021, IIASA, Laxenburg, 22 August 2000, p.115, <http://www.iiasa.ac.at>.
202. Read, D. et al., *The Role of Land Carbon Sinks in Mitigating Global Climate Change*, The Royal Society, London, July 2001: "There is considerable uncertainty associated with the estimates derived using the techniques that will be required to monitor, quantify and verify land carbon sinks established under the Kyoto Protocol. There is an urgent need to increase the accuracy of these techniques before land carbon sinks are utilized to any significant extent" (emphasis added).
203. Anderson, D. et al., op. cit. note 13: "Changes in carbon storage must . . . be calculated to include all components of the production systems affected by the changes. . . improved methods for measuring and calculating changes in the amount of carbon stored in terrestrial ecosystems need to be developed and applied. Such methods will be vital to the verification and accurate crediting of terrestrial carbon sinks in both agriculture and forestry" (Technical Summary, p.1). Climate negotiators have repeatedly ignored such independent advice regarding verification. For instance, the Verification Research, Training and Information Centre, an experienced, independent body promoting effective verification of international agreements, stressed in vain in October 2000 that domestic forestry and land use "must not be allowed to be used to meet emissions reductions commitments, at least in the first [Kyoto] commitment period . . . 'changes to carbon stocks' will rarely be 'verifiable' . . . parties seem to be losing sight of this fundamental requirement in pursuit of more immediate gains." (Tenner, C., "Verification of the Kyoto Protocol: A Fundamental Requirement", VERTIC Briefing Paper 00/6, October 2000, pp.1, 3, 5).
204. Houghton, R. A., op. cit. note 26, p.525: "methods . . . do not currently exist for attributing measured changes [in terrestrial carbon stocks] to human-induced, as opposed to natural, processes".
205. Tenner, C., op. cit. note 203, p.6.
206. Jonas, M., Nilsson, S., Obersteiner, M. et al., "Verification Times Underlying the Kyoto Protocol: Global Benchmark Calculations", Interim Report IR-99-062, IIASA, Laxenburg, 1 December 1999, p.29, <http://www.iiasa.ac.at>: "Partial Carbon Accounting restricted to CO<sub>2</sub> emissions from fossil-fuel combustion and cement production represents the only 'clean' global-scale carbon accounting approach for implementing the Kyoto Protocol that does not built upon crucial assumptions and does not result in unfavorable verification conditions"; Victor, D., op. cit. note 6, p.57: "Monitoring would not be a severe problem if an emission trading system were restricted to carbon dioxide emitted from fossil fuels."
207. Nilsson, S. et al., op. cit. note 201; Jonas, M., Mayr, B., Schidler, S. et al., "Land-Use Change and Forestry in Austria: A Scientific Assessment of Austria's Carbon Balance in Light of Article 3 of the Kyoto Protocol", Interim Report IR-98-028, IIASA, Laxenburg, May 1998, p. 3: "Austria's emissions from the use of fossil fuels can be determined adequately, while it is not yet possible to assess biosphere uncertainties and nonlinearities equally well." In the view of Ian Noble of the IPCC, "biospheric net fluxes are currently known with less absolute and relative certainty than fossil fuel emissions. CO<sub>2</sub> emissions resulting from the combustion of fossil fuels are known with an accuracy (expressed as the 95 per cent confidence range) of + 0.6 billion tonnes of carbon per year at the global scale, which is equivalent to about + 10 per cent, and with a similar percentage error range at the local scale. Net biospheric fluxes are known with an error of + 30 per cent at the global scale (+1.0 billion tonnes of carbon), and in many cases only with much higher relative uncertainty at the local scale." The net flux of carbon between the atmosphere and the biosphere is tiny compared to the size of carbon pools and highly sensitive to errors in estimating the gross fluxes.
208. Nilsson, S. et al., op. cit. note 201; Tenner, C., op. cit. note 203. Even in Europe, "considerable uncertainty remains as to regional [soil organic carbon] variability and the distribution of carbon between vegetation and soil . . . in strongly heterogeneous mountain landscapes" ("Contemporary Carbon Stocks of Mineral Forest Soils in the Swiss Alps", *Biogeochemistry* 50, 2000, pp.111-136).
209. Nilsson, S. et al., op. cit. note 201, p.110.
210. Ibid. This is not even to take into account biases caused by random or systematic errors, some of which may be unknown and which, all indications are, would decrease the dependability of these figures yet further. In the US, meanwhile, existing flux estimates for agricultural soils have an uncertainty range of plus or minus 40 per cent (Lal, R., Kimble, J.M, Follett, R.F. et al., *The Potential of US Cropland to Sequester the Greenhouse Effect*, Sleeping Bear Press, Chelsea, MI, USA, 1998). No country has demonstrated an ability to assess carbon fluxes from agricultural soils with the certainty necessary for a carbon market (Subak, S., "Agricultural Soil Accumulation in North America: Considerations for Climate Policy", Natural Resources Defense Council, Washington, 2000, <http://www.nrdc.org/globalwarming/depth.asp>). Many countries are "unable to monitor carbon dioxide absorbed in trees and soils within a factor of ten" (Victor, D., op. cit. note 6, p.61).
211. Victor, D., loc. cit. note 6.
212. Schulze, E.-D., Wirth, C., Heimann, M., "Managing Forests after Kyoto", *Science* 289, 22 September 2000, p.2058.
213. Chen, W., Chen, J., Liu, J. et al., "Approaches for Reducing Uncertainties in Regional Forest Carbon Balance", *Global Biogeochemical Cycles* 14, 3, 2000, p. 833. The Canadian government's own estimates of how much carbon its forests are emitting or absorbing are plagued by over 100 per cent uncertainty "in every case" (Anderson, D., et al. op. cit. note 13, p.18).
214. Houghton, R.A., op. cit. note 26, p. 531.
215. Victor, D., op. cit. note 6, p. 59. It should be added that no countries other than Japan and the UK even "have any experience in estimating and reporting carbon flux

- from agricultural soils at the national level . . . the uncertainties themselves will not be known precisely" (Tenner, C., op. cit. note 203).
216. "Carbon Accounting and the Kyoto Protocol", *Options*, Autumn 2000, p.FOR-4.
217. Pearce, F., "Smokescreen Exposed", *New Scientist*, 26 August 2000, p.18.
218. As Anderson et al., op. cit. note 13 observe, "carbon in forests and in the upper layer of soils can be quickly re-released to the atmosphere as a result of forest fires, logging, the cessation of practices such as conservation tillage, and climate change itself" (p.18).
219. Schulze, E.-D. et al. note that terrestrial forest ecosystems "act as net carbon sinks until high ages" and hypothesize that accumulation of carbon in a permanent pool increases exponentially with age, because "time without disturbance is required to channel carbon through its cycle into a nonactive pool of soil organic carbon and the production of black carbon depends on biomass" (op. cit. note 212, p.2059). The replacement of unmanaged old-growth by "young Kyoto stands", they warn, "will lead to massive carbon losses to the atmosphere mainly by replacing a large pool with a minute pool of regrowth and by reducing the flux into a permanent pool of soil organic matter". The Bonn agreement appears to preclude the replacement of native forest with carbon plantations, but industrial plantation interests have often denied replacing native forest even where there is persuasive evidence to the contrary, and have also prevented its regrowth. See Carrere, R. and Lohmann, L., op. cit. note 60 and World Rainforest Movement Plantations Campaign, <http://www.wrm.org.uy>. Recent research, meanwhile, indicates biodiversity and carbon storage capacity are strongly related. For example, Anderson, P., Carey, E.V., Sala, A. et al., "Are Old Forests Underestimated as Carbon Sinks?", *Global Change Biology* 7, 2001, pp.339-344, found that Net Primary Production in a Rocky Mountain subalpine forest is 50 to 100 per cent higher than predicted by a model of an even-age forest composed of a single species.
220. Anderson, D., et al., op. cit. note 13, p. 20, Technical Summary, p.1. But see also Fearnside, P.M., "Forests and Global Warming Mitigation in Brazil: Opportunities in the Brazilian Forest Sector for Responses to Global Warming under the 'Clean Development Mechanism'", *Biomass and Bioenergy* 16, 1999, pp.171-189.
221. Watson, R.T., et al. (eds.), op. cit. note 102, pp.87-89.
222. Jonas, H. et al., op. cit. note 104, p. 7. See also Schulze, E.-D. et al., op. cit. note 212, pp.58-9.
223. Chen, W. et al., op. cit. note 213, p.833. The Bonn agreement calls for plant growth due to carbon dioxide and nitrogen fertilization of be excluded from the carbon credits awarded for land use change and forestry (FCCC/CP/2001/L.7, VII, 1. (h), p.10).
224. Houghton, R.A., op. cit. note 26, p.526.
225. Falkowski, P., R.J. Scholes, Boyle, E. et al., "The Global Carbon Cycle: A Test of Our Knowledge of Earth as a System", *Science* 290, 12 October 2000, p.295.
226. As Will Steffen of Sweden's Royal Academy of Sciences, chair of the International Geosphere-Biosphere Programme, puts it, forestry is an "insecure way of storing carbon out of harm's way".
227. Pearce, F., "The Heat Is On", *New Scientist*, 14 July 2001.
228. Peter Cox and John Mitchell of Britain's Meteorological Office made these findings public in July 2001. See Pearce, F., "Violent Future", *New Scientist*, 21 July 2001. See also the IPCC's Third Assessment Report, 2001, Working Group II, Section 2.6. Already in 1998 the German Advisory Council on Global Change had warned that "due to their complex nonlinear dynamics, the time scales associated with terrestrial ecosystems differ greatly from those of energy-related processes" (*The Accounting of Biological Sinks and Sources under the Kyoto Protocol: A Step Forwards or Backwards for Global Environmental Protection?*, Bremerhaven, 1998, chapter 7).
229. Williams, A.A.J., Karoly, D.J. and Tapper, N., "The Sensitivity of Australian Fire Danger to Climate Change", *Climatic Change* 49, 2001, p.171.
230. As Anderson et al., op. cit. note 13 point out, "fire suppression may enhance sequestration in the short term but can also create tinderbox conditions that increase the risk of fire and subsequent release of large amounts of CO<sub>2</sub> into the atmosphere" (p.20). Kauppi, P. et al. of Working Group III estimate in the IPCC's *Third Assessment Report* that such practices would account for 80 per cent of Canada's carbon-management efforts in forestry, and 70 per cent of those of the US. See also Hadley Centre for Climate Prediction and Research, "An Update of Recent Research from the Hadley Centre", UK, November 2000; Gurney, K. and Neff, J., "Carbon Sequestration Potential in Canada, Russia and the United States under Article 3.4 of the Kyoto Protocol", World Wide Fund for Nature, Washington, July 2000, p.13 and Pyne, S., *Fire in America*, University of Washington Press, Seattle, 1999.
231. Leggett, J., op. cit. note 28. If the Gulf Stream shuts down due to a large influx of freshwater from the northern polar regions, as many scientists think possible, more unexpected effects could result.
232. Hadley Centre, op. cit. note 230.
233. Ibid. Smaller climatic discontinuities during the last millenium may have been responsible for sudden droughts in northern lowland South America, leading to repeated human dispersals (Meggers, B.J., "Archaeological Evidence for the Impact of Mega-Nino Events on Amazonia during the Past Two Millenia", *Climatic Change* 28, 1994, pp.321-38).
234. Pearce, F., op. cit. note 217, p.19. It's sometimes argued that uncertainty and indeterminacy in carbon accounting are not reasons for calling into question the carbon market, since uncertainty in climate models is not a sufficient reason for failing to take precautions about climate. This is to ignore the fact that while the precautionary principle argues *in favour* of taking climate models seriously despite their uncertainties, it argues *against* putting faith in a carbon market undermined by uncertain accounting.
235. Watson, R.T. et al. (eds.), op. cit. note 102, pp.79-80. This is one of the few instances when a critique of the human/nature dichotomy — long under assault by indigenous peoples, anthropologists and sociologists of science, as well as critics of deep ecology and the wilderness ideology — has been made by the techocratic mainstream.
236. Ibid., p.58, emphasis added. See also Houghton, R.A., op. cit. note 26: "There are at present no direct methods at any scale that enable the net uptake of carbon in forests to be divided by anthropogenic and non-anthropogenic causes. If logging or agricultural abandonment were the only activities that led to forest growth, measured growth could be attributed to human activity. But the regrowth of forests may also result from natural disturbances (fire, insects, disease) that are not attributable to human influence, and rates of growth may vary in response to both human-induced and natural variations in the environment" (pp.529-30).
237. The human/nature dichotomy appealed to by UN climate negotiators is one of the stranger artifacts of recent European history. See, e.g., Williams, R., *The City and the Country*, Oxford University Press, New York, 1973; Haraway, D.J., *Modest\_Witness@ Second\_Millennium. Female\_Man\_Meets\_Oncomouse: Feminism and Technoscience*, Routledge, London, 1997; Latour, B., *We Have Never Been Modern*, Harvard University Press, Cambridge, 1994; Guha, R., "Two Phases of American Environmentalism", in Apffel-Marglin, F. and Marglin, S.A., *Decolonizing Knowledge: From Development to Dialogue*, Clarendon Press, Oxford, 1996; Gomez-Pompa, A. and Kaus, A., "Taming the Wilderness Myth", *Bioscience* 42, 4, 1992, pp. 271-9; Arnold, D., *The Problem of Nature: Environment, Culture and European Expansion*, Blackwell, London, 1996; Langston, N., *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West*, University of Washington Press, Seattle, 1995; Rackham, O., *The History of the Countryside*, Dent, London, 1989; Neumann, R.P., *Imposing Wilderness: Struggles over Livelihood and Nature Preservation in Africa*, University of California, Berkeley, 1998.
238. Houghton, R.A., op. cit. note 26, p.530.
239. See, e.g., Pyne, S., *A Brief History of Fire*, University of Washington Press, Seattle, 2001; Leach, M. and Fairhead, J., *Misreading the African Landscape*, Cambridge University Press, Cambridge, 1996; Posey, D., "Indigenous Management of Tropical Forest Ecosystems: The Case of the Kayapo Indians of the Brazilian Amazon", *Agroforestry Systems* 3, 2, pp.139-58.
240. The 2001 Bonn agreement says that accounting of carbon to be credited must exclude removals of carbon from the atmosphere which result from, among other things, the "dynamic effects of age structure resulting from activities and practices before the reference year" (FCCC/CP/2001/L.7, VII, 1. (h), p.10). In fact, in long-established forests *all* these "dynamic effects" are arguably due to activities and practices before the reference year, some dating back centuries. Realistically interpreted, the Bonn agreement should thus make carbon crediting for forested land illegal. A human/natural distinction is also incapable of filtering out "business as usual" projections from scenarios which include climate mitigation projects.
241. Watson, R.T. et al. (eds.), op. cit. note 102, p.140.
242. Fry, I., report on The Hague negotiations in *Forest Cover* (Global Forest Coalition newsletter) 2, 2001. See also Johnson, K., op. cit., note 29 for Brazil's argument that "simply putting a fence around an already existing forest does not change the level of

- greenhouse gas emissions” (p.198).
243. Of course, it doesn't follow that an emitter identified by the accounting system is therefore held responsible for making good these losses. International negotiators have reached a general consensus that an accounting system should be used that places Northern countries in, so to speak, the “debit” column. Yet many if not most US government officials, while conceding that the US is responsible for outsized releases of CO<sub>2</sub> to the atmosphere, claim that the US is *entitled* to the extra atmospheric “space” needed as a result, as a reward for industrial initiative and the resulting multiple “benefits” to the world economy.
  244. Grubb, M., op. cit. note 108, p.98.
  245. This point is due to the IPCC's Ian Noble, Australian National University.
  246. FCCC/CP/2001/L.7, 24 July 2001, pp.12-13.
  247. Schleich, J., Eichhammer, W., Boede, U. et al., “Greenhouse Gas Reductions in Germany — Lucky Stroke or Hard Work?”, *Climate Policy* 1, 2001, p.363.
  248. Victor, D., op. cit. note 6, p.9.
  249. *Ibid.*, p.63.
  250. Fearnside, P. M., op. cit. note 220, p.177.
  251. Johnson, K., op. cit. note 29, pp.195-6.
  252. Malone, E. and Rayner, S. op. cit. note 4, vol. 3, p.319.
  253. “Fire Planet: The Politics and Culture of Combustion”, Corner House Briefing No. 18, 2000. See also Anscombe, G.E.M., *Intention*, Cambridge University Press, 1958 and Davidson, D., *Essays on Actions and Events*, Oxford University Press, 1984, pp.207-25. Understanding “leakage” — the carbon effects of projects outside their boundaries — is not only a matter of measurement but also of adopting what Daniel Dennett calls the “intentional stance” toward the inhabitants of a region in which carbon storage or sequestration projects are located and indeed toward the participants in the entire world market which surround it (*The Intentional Stance*, MIT Press, Cambridge, 1987). “Managing” leakage, correspondingly, means close control or intimate “management” of large numbers of human beings for very long time periods on the order of a century.
  254. Fearnside, P., “Plantation Forestry in Brazil: The Potential Impacts of Climatic Change,” *Biomass and Bioenergy* 16, 1999, pp.91-102. The production of carbon plantations designed to “compensate” for even a small percentage of the world's output of greenhouse gases would equal the entire global wood market.
  255. Similarly, misnamed “clean coal” technologies (see note 46), as Anil Agarwal has pointed out, are likely, other things being equal, to undercut genuinely clean energy technologies. The “carbon effects” of this turn away from renewables then also have to be calculated into the coal project's account.
  256. This was stressed by the Ugandan delegation at the Bonn 2000 round of the climate negotiations. The notion that tree plantations can “buy time” to find ways of replacing fossil fuels ignores the fact that plantations have social effects which themselves can slow the pace of replacement. For example, if plantations legitimize fossil fuel consumption, they may make replacement economically more difficult.
  257. Fearnside, P., “Forests and Global Warming Mitigation in Brazil: Opportunities in the Brazilian Forest Sector for Responses to Global Warming under the ‘Clean Development Mechanism’”, *Biomass and Bioenergy* 16, 1999, pp.171-189.
  258. This sort of analysis requires what anthropologist Clifford Geertz calls a “thick”, interpretive description of local social reality. Even if the market-mandated need to quantify didn't exist, of course, there would still be problems in integrating the biophysical and social approaches. As Michael Thompson and colleagues have observed of efforts to analyze Himalayan ecosystems, the “understanding of the systems that operate at each of . . . three levels — the biophysical, the micro-social, and the macro-social — is really most impressive (in qualitative terms, at least). The understanding of the systemic connections between these three levels is abysmal — non-existent almost (the one disciplinary exception being the forest historian)” (op. cit. note 69, p.83).
  259. Brown, S., *Guidelines for Inventorying and Monitoring Carbon Offsets in Forestry-Based Projects*, World Bank Working Paper, World Bank Group, Washington, DC, 1999.
  260. Richards, K.R. and Andersson, K., “The Leaky Sink: Persistent Obstacles to a Forest Carbon Sequestration Program Based on Individual Projects”, *Climate Policy* 1 (2001), 41-54.
  261. For Brown, as Richards and Andersson comment, “there are only two types of human activity: ‘logging’ and ‘not logging’”. Her “control plots provide no information on the number of hectares of logging that would have occurred in the reference case” (op. cit. note 260, pp.48-9). In fact, the social forces driving deforestation are staggeringly complex. They include patterns of land tenure and land speculation, indebtedness, timber and paper demand, road-building projects, the effectiveness of governments in implementing logging laws, and changes in prices and profitability for agricultural commodities, as well as the responses all these engender among human societies constantly trying to learn and adapt. Fearnside notes that carbon accounting would require “functional (causal) models” incorporating such factors “disaggregated by socioeconomic group and by location”, and comparing scenarios with and without different policy changes or projects (op. cit. note 220, p.183). Of course, many carbocratic attempts to specify “without-project scenarios” are not up even to Brown's standards. Forest Stewardship Council member Tim Cadman, investigating a Tasmanian carbon plantation, “found no evidence” that the executing company had “developed independent, third party auditing procedures to verify previous land use on any of its properties” (op. cit. note 177, p.12).
  262. Richards, K.R. and Andersson, K., op. cit. note 260.
  263. Alig, R., Adams, D., McCarl, B., “Ecological and Economic Impacts of Forest Policies: Interactions across Forestry and Agriculture”, *Ecological Economics* 27, pp.63-78. Richards and Andersson contend that estimates of changes in human activities may have error bars of plus or minus 50 per cent. A genuinely scientific handling even of purely biophysical data, of course, also requires examining the human institutions which produced it. As Michael Thompson and colleagues point out, expert estimates of per capita fuelwood consumption in the Himalaya vary by a factor of 67, and of sustainable yield from forest production by a factor of 150, making them use-
  - less on their face (op. cit. note 64). See also Collins, H.M., *Changing Order: Replication and Induction in Scientific Practice*, London, Sage, 1985.
  264. Brown, S. et al., op. cit. note 151. See Watson, R.T. et al. (eds.), op. cit. note 102, Table 5-4, p.306 for more examples of carbon accounting in which baselines were “established” by nothing more than simple linear extrapolations from “observed trends”. Carbocrats challenged at the climate talks in Lyon in September 2000 to examine the carbon effects of migration connected with one of their projects had four responses: “you can't expect us to look at carbon effects mediated by society”; “if migration occurs, it's not part of our project”; “even if it is, the effects ought to be small”; and “no migration effects are anticipated”.
  265. Astington, J.W., *The Child's Discovery of the Mind*, Harvard University Press, Cambridge, 1993, pp.138-59; interview with Simon Baron-Cohen, *New Scientist* 14 April 2001, pp.42-45. This interpretation of autism is one derived partly from the application to developmental psychology of the later work of Wittgenstein, filtered through the subsequent writings of philosopher Daniel Dennett.
  266. Willey, L.H., *Pretending to Be Normal*, Jessica Kingsley Publishers, London, 1999.
  267. Haites, E. and Yamin, F., op. cit. note 143; Bernow, S. et al., op. cit. note 23, p.8; Jonas, H. et al., op. cit. note 206, p. 7. Most carbocrats, however, resist the truth that “what would have happened otherwise” is indeterminate. Leif Gustavsson, Gregg Marland, Bernard Schlamadinger and colleagues, for instance, write blithely of a “true baseline path” (“Project-Based Greenhouse-Gas Accounting: Guiding Principles with a Focus on Baselines and Additionality”, *Energy Policy* 28, 2000, p.941). See also Pfaff, A.S.P., Kerr, S., Hughes, R.F. et al., “The Kyoto Protocol and Payments for Tropical Forest: An Interdisciplinary Method for Estimating Carbon-Offset Supply and Increasing the Feasibility of a Carbon Market under the CDM”, *Ecological Economics*, 35, 2000, pp.203-21. Watson, R.T. et al. (eds.), op. cit. note 102, also treat baselines as “objective” (p.81), if temporarily “uncertain” (p.9).
  268. Newcombe, K., op. cit. note 180.
  269. Outside the UN process, one carbon “storage” project justifies the credits it creates by guaranteeing that without the intervention of a forestry project, only one thing could have possibly occurred: “the forest concerned will be sold for agricultural development” (Programme for Belize, *Rio Bravo Carbon Sequestration Pilot Project. Offsets Attributable to Project Actions for Project Year 2 [1996]*, report to the US Initiative on Joint Implementation and the Government of Belize, Belize City, Belize, 1997). See also Grubb, M., op. cit. note 108, p.227.
  270. Ott, H.E and Sachs, W., “Ethical Aspects of Emissions Trading”, Wuppertal Papers No. 110, Wuppertal Institut für Klima, Umwelt, Energie, Wuppertal, May 2000.
  271. Hacking, I., “The Making and Molding of Child Abuse,” *Critical Inquiry* 17, Winter 1991, p.254. See also *Rewriting the Soul: Multiple Personality and the Sciences of Memory*, Princeton University Press, 1995.
  272. Ott, H. and Sachs, W., op. cit. note 270.
  273. Victor, D., op. cit. note 6.

274. Grubb, M., op. cit. note 108, p.229.
275. Anderson, D. et al., note that several US NGOs have "proposed rules eliminating credit for reforestation on land deforested before 2000, but these proposals have not been promoted by any country" (op. cit. note 13, p.25)
276. Adopting a "business as usual" scenario may also swing a good deal of legitimacy-bestowing international bureaucratic machinery behind whatever policies are assumed to be the background to "business as usual". The result may be to suppress discussion of better policies and practices not visible to the experts who single out the scenario.
277. Ott, H. and Sachs, W., op. cit. note 270, pp.20-21.
278. Jonas, H. et al., op. cit. note 206, p.7.
279. Wrong, M., *In the Footsteps of Mr Kurtz*, Fourth Estate, London, 2001, pp.189-209.
280. Fearnside, P.M., op. cit. note 220, p.183.
281. Ibid.
282. See <http://www.wrm.org.uk>.
283. Obersteiner, M., Ermoliev, Y., Gluck, M., et al., "Avoiding a Lemons Market by Including Uncertainty in the Kyoto Protocol: Same Mechanism — Improved Rules", IASA Interim Report IR-00-043, Laxenburg, 21 July 2000, p.14.
284. Bernow, S. et al., op. cit. note 23, p.17. "Free-rider credits awarded spuriously to [power sector] projects that would have happened even without the CDM could be as great as 600 million tonnes of carbon, [enough to] satisfy almost a quarter of the projected OECD emissions reduction requirement of 2600 million tonnes of carbon during the first budget period. Significant free-rider credits could also arise from other categories of CDM projects such as power supply retrofits, demand-side management and land-use sinks, whose emissions impacts are especially difficult to estimate."
285. Pearce, F., op. cit. note 217, pp.18-19.
286. Jonas, H. et al., op. cit. note 206, p.29.
287. For the technical arguments see Obersteiner, M., et al., op. cit. note 283, pp.3 ff.: "Transparency and verification can only be achieved if uncertainties of the reported emissions reductions are quantified and if these uncertainties are taken into account in the process of the mutual recognition of emission reductions and in the system of emission trading". Otherwise, Kyoto "might only prove to be an interesting socioeconomic experiment. However, in its core business of contributing to solving the climate problem, it will have limited success and the parties will necessarily lose their commitment for continuation in a post-Kyoto process" (pp.11-12). See also Akerlof, G.A., "The Market for Lemons: Quality Uncertainty and the Market Mechanism" in *An Economic Theorist's Book of Tales: Essays that Entertain the Consequences of New Assumptions in Economic Theory*, Cambridge University Press, Cambridge, 1984, pp.7-22.

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