



**Curing Global Crises:
Let's treat the disease not the symptoms**



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Curing global crises: Let's treat the disease not the symptoms

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Arthur Koestler's fascinating account of the development of scientific thought, *The Sleepwalkers*, describes how the great thinkers of the past, Kepler, Galileo and Newton among them, seem to have wandered around and around the concepts they were seeking until they eventually stumbled upon them. Robert Frost deftly generalises this intellectual process in a two-line poem: "We dance around in a ring and suppose. The secret sits in the middle and knows."

There's certainly a lot of sleepwalking and dancing around being done by those attempting to come up with solutions to the big problems of our time such as climate change, resource depletion, Third World debt and the growing gulf between rich and poor. Perhaps the reason for the confusion is that the searchers are too specialised, too close to the particular problems on which they are working to see the bigger picture. But it's the bigger picture that matters because the problems are inter-related. For example, increased energy use will almost certainly be required to alleviate hardship in the poorer parts of the world. Unfortunately, however, if the necessary energy comes from fossil sources it will contribute to climate change and cause droughts, storms and floods which will have a serious impact on the lives of exactly the people its use was designed to help.

In our view, the world is facing a single underlying systemic problem rather than a lot of totally independent ones. Put another way, global warming, the over-exploitation of natural resources and the extremes of wealth and poverty are the products of the economic system that has evolved over the centuries. As a result, any attempt to cure, say, the debt crisis by itself without changing the way the global economy works is bound to fail. Some poor countries debts would be wiped out but equally unpayable ones would crop up a few years later because of the way the current economic system works.

The need to transform the economic system may seem a depressing diagnosis because it has proved very resistant to calls for change in the past. However, this time around, the required changes are relatively easy to make and, if taken as a package, almost everyone gains – massively – from making them. We cannot overstress this. The barrier to progress until now has been that everyone has been thinking in terms of solving each problem by itself and their suggested solutions have all been zero-sum games – that is, arrangements by which one set of players would gain at the expense of another set. Since the countries cast in the role of losers were the most powerful nations on the planet, they refused to play and the games did not start. But if we tackle the root cause of the various problems rather than trying to ameliorate each of them individually, we can create a non-zero sum game in which everybody gains, not least because the Earth might be protected from catastrophic changes.

The deadlock that is currently preventing progress can be broken.

In *Non Zero*, Robert Wright's book on the way human culture has developed by finding non zero-sum games to play, he writes: "In highly non-zero-sum games, the players' interests overlap entirely. In 1970, when the three Apollo 13 astronauts were trying to figure out how to get their stranded spaceship back to earth, they were playing an utterly non-zero-sum game, because the outcome would be either equally good for all of them or utterly bad. (It was equally good.)" A similar game is being played today. Almost everyone reading this paper is likely to accept that our spaceship is in trouble and that the outcome will be quite good for all of us or very, very bad. And yet one group of prospective losers is refusing to pass another group the tools they need to make repairs, justifying their refusal with calculations designed to show how much they would lose financially by doing so. Yet if everyone passed tools back and forth as they were needed, we'd find that we still had them when the job was done, and that our spaceship might escape burning up in the atmosphere.

So what is needed is a coordinated package of policies that simultaneously tackles climate change, the over-exploitation of natural resources and global inequality by changing the global economic system so that it automatically works in a different way.

Climate change

Let's start with global warming. The steps we need to take to reduce this threat are already clear. First, since humanity cannot stop releasing greenhouse gases at 9 o'clock tomorrow morning, we need to estimate how much time we can safely allow ourselves to make reductions and how big those reductions need to be to stabilise concentrations in the atmosphere at a safe level.

The average global temperature has already risen by at least 0.6 degrees Celsius since fossil fuels began to be used in quantity at the start of the Industrial Revolution and the rate of the rise is accelerating. Consequently, the answer our questions boils down to assessing how much more of a temperature increase we dare risk. Although the scientists attached to the UN's Intergovernmental Panel on Climate Change have not suggested a temperature-rise limit, several research institutes and NGOs have done so instead and have come up with broadly the same figure. The Climate Action Network's estimate¹ is typical. It is that if our goal is to prevent dangerous changes in the climate then "global mean warming needs to be limited to a peak increase of below 2°C (above pre-industrial times)."

Even this is very risky. "2°C would be a death sentence for tens of thousands and perhaps millions of people, a commitment to

catastrophic losses of species and ecosystems, and, frankly, an invitation to a sharp exacerbation of geopolitical and military instability” writes Tom Athanasiou of the US organisation, EcoEquity². And that would be the best outcome. The worst would be if a two degree rise turned out to be enough to cause the world’s forests to burn, touching off a runaway warming effect, or if it stopped the Gulf Stream’s flow, plunging Europe into a new ice age.

Once a temperature target has been chosen, the next step is to convert the “acceptable” temperature rise into the quantities of greenhouse gases that can be released without breaching it. Again, there is no certain way of estimating these – it all depends on how sensitive the climate is to increases in the atmospheric concentrations of each gas and we don’t know enough about that yet. However, a guesstimate is better than having no figure, no order of magnitude at all, particularly if we can start an emissions-reduction process and then speed it up later if we find that our initial estimates were too generous and would take temperatures over the top.

Of the four main greenhouse gases – carbon dioxide, nitrous oxide, low-level ozone and methane – the first three are mainly the products of fossil fuel use, with CO₂ contributing around two-thirds of the heating effect. Methane is rather more complex. Roughly 20% of its emissions³ are the direct result of fossil fuel production, 30% are natural and the final 50% is due to other human activities, most of which fossil fuel use intensifies. So, all in all, if we control CO₂ emissions, fossil fuel use will fall and the production of the three other gases will drop too. Consequently the main task is to estimate the tonnage of carbon dioxide that can be released into the atmosphere without exceeding the temperature target. Once we have that figure, we can then decide how to share out the amount amongst the people of the world since it is, essentially, their fossil fuel ration.

Allocating emissions rights

There are three basic ways in which the right to emit carbon dioxide can be shared out between countries. One is to have an international agency sell CO₂ emissions permits each year and use the proceeds for, say, financing the UN and paying for development projects in poor countries. This idea can be ruled out immediately since it would allow the industrialised nations that have caused the warming problem and have become rich through their overuse of fossil fuel to continue to use the lion’s share. Moreover, it would lead to a very top-down pattern of development.

Or should we say, as the Americans once did, that emissions rights should be ‘grandfathered’ and that all countries should cut back their current emissions at the same annual percentage rate – perhaps 5% a year – until the necessary reduction is achieved? This approach would, of course, mean that those countries which use most fossil fuel now would continue to use most in future while those using very little at present and have not caused the climate-change problem would have to learn to manage on even less. Such an arrangement would scarcely command worldwide support.

The third option would be to say, as a growing number of people now do, that the right to emit carbon dioxide should be considered a human right and that emissions permits should therefore be issued to all humankind on an equal basis. Contraction and Convergence, a surprisingly flexible plan advanced over the past ten years by the Global Commons Institute in London is based on this idea. Since it, or something very similar, is almost certainly going to have to be used for any structured, internationally co-ordinated response to the threat of climate change, we’ll assume its adoption for the rest of this paper.

Under C&C, annual global emission limits would be set on a rolling basis for at least two decades ahead so that industry can plan. The level of emissions allowed would decline steadily over the planning period and, each year, permits giving the right to burn whatever amount of fossil fuel the year’s limit represents are shared out among the nations of the world according to their populations.

In the early stages of this emissions contraction process, some nations would find themselves consuming less than their allocation and others more. An essential part of C&C is that the under-consumers have the right to sell their surplus to more energy-intensive lands. This feature of the scheme provides an income for some of the poorest countries in the world and gives them (and the over-consumers) a financial incentive to follow low-energy development paths. Eventually, however, it is likely that most countries will converge on similar levels of fossil energy use per head.

Four things should be noted about allocating emissions permits in this way. One is that since the emissions rights are human rights, the permits go to individuals, not to their governments, which merely oversee their distribution. This may seem a cumbersome arrangement but its intention is to keep the purchasing power the permits represent out of the hands of corrupt elites. We admit that this will be very difficult to do, particularly in those countries where the corrupt elite and the government are one and the same. To beat this, the international agency issuing the permits will have to have a team of monitors, just like those used to check on the fairness of elections, and if widespread abuse is detected, the country concerned would get a reduced allocation of permits the following year.

Issuing permits to individuals is also essential because it avoids the extreme hardship that restrictions on fossil energy use would otherwise cause. After all, when energy becomes scarce, its price will go up and this will increase the cost of everything everybody buys, including food. People already on the brink of starvation would face disaster unless they had emissions permits to sell to compensate.

The permits will, in fact, amount to a global Citizens’ Income. They are a step towards economic democracy. We can imagine Indian farmers dressed in white, queuing up in the hot sun outside the local district office to receive their permits and, when they reach the officials’ table, having their hands stamped with indelible ink to ensure they don’t queue up again. Dealers would set up booths ready to buy the permits when the recipients came out and most of the farmers would immediately sell theirs for rupees. The dealers would then sell the permits on to companies wishing to buy oil, gas or coal.

The second point is that if permits are issued to people rather than to governments, and if each child coming into the world consequently brought an income with it, families would have an incentive to have more children. To avoid this, emissions permits would only be issued to adults. Moreover, to ensure that governments continued with population limitation programmes, the share that each country got of the year's global issue of emissions permits would be based on its population in a base year, not its actual population at the time. A state agency would then divide the national share among the adult population.

This makes the choice of the base year a crucial issue but one on which C&C provides some flexibility, some scope for negotiation. 1990 is the base year used in many climate negotiations – Kyoto, for example – but if that year were chosen for C&C it would discriminate against countries with young populations where, whatever their governments do, numbers are bound to grow because so many young women have yet to have children. Such countries will naturally wish to see a later base year adopted. If they succeed, countries with stable or shrinking populations will get somewhat smaller emissions shares.

The third point also provides scope for negotiation. It is that people in different countries probably won't get the same allocation of emissions permits straight away. In other words, the goal of equal per capita entitlements may only be achieved over a period of time, say ten or twenty years. This is not a matter of principle – it's just practical politics. An immediate convergence on the same allocation would be very costly for the industrialised nations as, in order to keep their energy-intensive systems running until they could be changed, they would have to buy many more permits from the poorer parts of the world. The burden that these purchases would place on rich-country economies might be more than they could bear – politically, at least – and this aspect of C&C was developed to allow negotiators from the industrialised world a little wriggle room. True, delaying convergence to equal per capita emission rights introduces an element of grandfathering to the system. However, without such a concession to rich countries to ease their transition to strict C&C, they might never sign up.

The fourth point takes us into the next area in which changes need to be made. What currency or currencies are the over-consuming

How Contraction and Convergence would allocate Special Emissions Rights (SERs)

The top part of the graph shows how many SERs would be being issued now to people in various parts of the world if C&C had been introduced in 2000 and a 30-year convergence period had been agreed. The Americans, for example, would be seeing their allocation gradually cut from an initial six tonnes a head, the countries of the Former Soviet Union (FSU) would be coming down from 3 tonnes and the rest of the industrialised world from 2 tonnes. Meanwhile, people in China, India and the rest of the world would be getting a slightly larger allocation each every year until, in 2030, every adult in the world would get exactly the same number of permits. After that, the number of permits all adults would get would be steadily reduced each year until humanity's total emissions were cut to an amount which stabilised the CO₂ level in the atmosphere, or even caused the level to slowly fall.

The lower part of the graph shows how total annual CO₂ emissions rose in the past and how they might fall if C&C was put into effect. Although the chart does not show

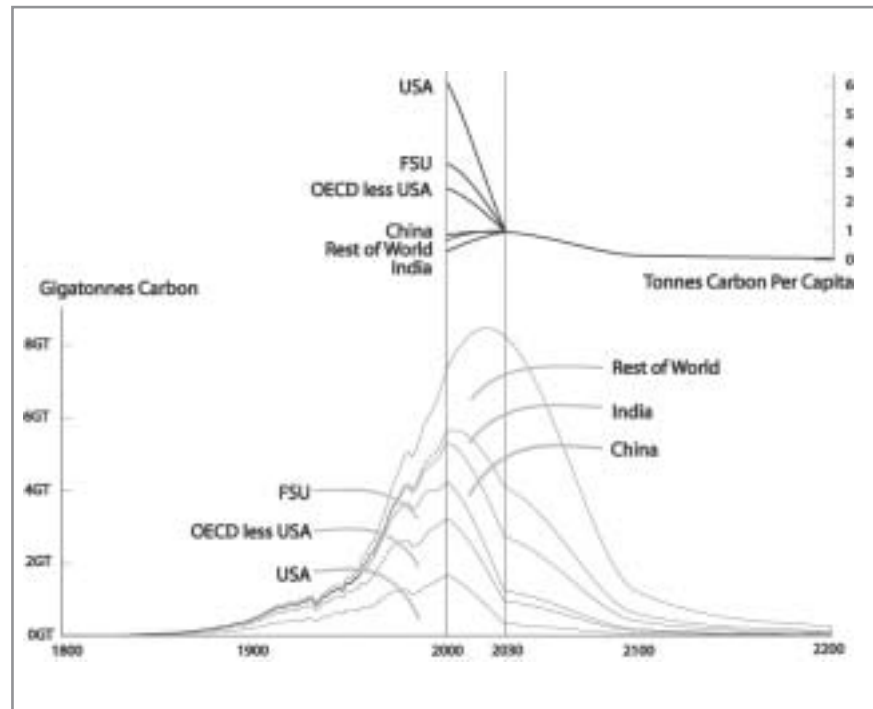


Fig 1. Source: Global Commons Institute, 2003

atmospheric concentrations, the rate of overall emissions contraction it adopts would limit the rise of CO₂ concentrations in the atmosphere to about 70% above the pre-industrial level by around 2100, or 450 parts per million by volume. Neither part of the chart projects the actual emissions by any country because no-one can predict exactly how C&C would be set up (what would be the popula-

tion base year, for example) and how many SERs each country would buy or sell.

An excellent series of moving images showing how C&C works and how it can be adjusted to allow for, say, a shorter convergence period, or the discovery that the situation is worse than was thought, can be found at [www.gci.org.uk/images/CC_Demo\(pc\).exe](http://www.gci.org.uk/images/CC_Demo(pc).exe)

nations going to use to buy extra CO2 emission permits? This question has to be asked because if the overconsuming nations were allowed to purchase using money they created themselves, namely their own national currencies, those with the more internationally acceptable ones – the dollar, the euro, sterling, the yen and the Swiss franc – would be able to buy permits at a significant discount for a lot of the time. More importantly, since all those major currencies are created as debts, and rapid economic expansion requiring extra energy use is necessary if those debts are to be repaid, there would be a constant conflict between the need for extra energy to produce enough economic growth to maintain the money system and the need to reduce fossil energy use to reduce emissions. Consequently, unless a way of putting money into circulation without creating debt can be found, any efforts to control greenhouse emissions under C&C or, indeed, any other conceivable scheme are likely to break down. We'd better explain.

Global monetary reform

The US dollar is the currency used for the majority of international trade and dollars make up around 70% of all the reserves held by the world's central banks. When we said just now that dollars are created as a debt we meant that they appear when borrowers spend loan facilities they have been granted by financial institutions. Equally, the dollars involved are extinguished when those loans are repaid. This means that, for every dollar (or pound or yen or euro) in someone's bank account anywhere in the world, someone else is a dollar (or pound, yen or euro) in debt. The dollars created through debt have no physical form. They are simply account entries. Only coins and actual dollar bills are spent rather than lent into circulation and these make up a small and declining part of the money Americans use.

Creating the majority of world's money on the basis of debt has four serious defects. The first is that it is almost inevitable that some countries will find themselves with severe debt problems. The debt created when money is borrowed into existence has to be held by someone and it would be unreasonable to expect that a lot of it would not end up in economically-weak parts of the world. This is why, if Highly Indebted Poor Countries (HIPC) were to be forgiven their debts without the money system being changed, the debts would quickly recur.

But the debt feature of the world's money system has been wonderful for the countries that issue the currencies used as global money. Collectively, these countries hold a controlling shareholding in the World Bank and have used that institution to impose 'structural adjustment' policies on indebted nations. When a country that borrowed, say, to build a dam falls behind with its repayments, the Bank has typically required it to 'adjust' by increasing its output of crops and minerals for export. This might be a reasonable demand for the Bank to make of one country, but it's either stupid or grossly exploitative for it to insist that ten or twenty indebted countries all exporting much the same things increase their exports simultaneously. The competition that results just forces export prices down leaving the countries worse off than before. On the other hand, the lending nations and the rest of the OECD bloc are better off since the cost of their imports from some of the world's poorest countries has

fallen appreciably in terms of what they have to supply in exchange.

The second defect is that if a currency is debt-based, then interest has to be paid on that debt and, if the money supply is not to contract, the money required to pay the interest has to be borrowed too and interest paid on that loan as well. And then interest needs to be paid on the sum borrowed to pay interest. And so on and so on. A spiral of borrowing is set up and, unless the economy using the currency grows sufficiently rapidly or an inflation is allowed to occur, the debt burden increases in relation to national income until it eventually becomes insupportable and causes an economic and social breakdown.

The third defect of a debt-based money system is that it makes national economies – and thus the world system - very unstable. If money only comes into existence when people borrow, severe problems arise whenever a lot of potential borrowers begin to think that the future looks so uncertain that it would be better if they didn't take out loans. A few months later there will be less money in circulation because more loans will have been repaid than fresh ones taken out. This causes the money supply to contract which in turn makes business conditions difficult so that the level of trading and profit declines. This makes it even more foolish to borrow. The caution of those who refused to borrow previously will prove to have been justified by a crisis they helped to create.

Japan is in exactly this trap at present. Until the Bank of Japan changed its policies in March 2001 and began pumping money into the economy by buying back government debt, the money supply had been contracting for four years. No one wanted to borrow despite the fact that some key interest rates had been 0.5% or less for over five years. There were two reasons for this. One was that Japan's population is aging and increasing numbers of its people were reaching an age when they were more interested in clearing old debts and saving for retirement than taking on new ones. The second was that many firms were already carrying high levels of debt and, facing slack demand and falling prices, could find no opportunities appealing enough to warrant them borrowing even more.

The compulsion to grow

The money creation system's defects one, two and three combine to create a growth compulsion. When an economy grows, demand, profits and optimism all rise. As a result, businesses, their profits up and their capacity under pressure, are happy to increase their borrowings. This creates a positive feedback. The additional borrowing puts more money into circulation. The extra spending power creates extra demand and hence a need for more loans to enable firms to increase their output to satisfy their customers. This virtuous circle can go round and round until, perhaps, labour or some other factor of production becomes scarce. This causes prices to rise and the central bank, fearing inflation, will step in to curb borrowing by putting interest rates up.

By contrast, if growth falters, firms are left with surplus stocks and idle productive capacity. They feel that it is time to be cautious.

They postpone their investment plans and attempt to pay off outstanding loans. As a result, the money supply contracts, making it harder for everyone to do business. With less investment, less construction goes on and jobs begin to be lost. This causes consumers to lose confidence. They defer their borrowing for cars or new furniture, and this reduces the money supply too. A recession begins to set in.

Governments will do almost any thing to avoid a recession during their terms of office as if one happened it would make it unlikely they would be re-elected. They therefore work closely with the business sector to ensure that the economy (and the money supply) continues to grow. Indeed, they find themselves forced by the way money is put into circulation to pursue economic growth with little regard for the damage its creation might be doing to society or to the environment. And since economic growth is very closely linked with fossil energy use as the graph

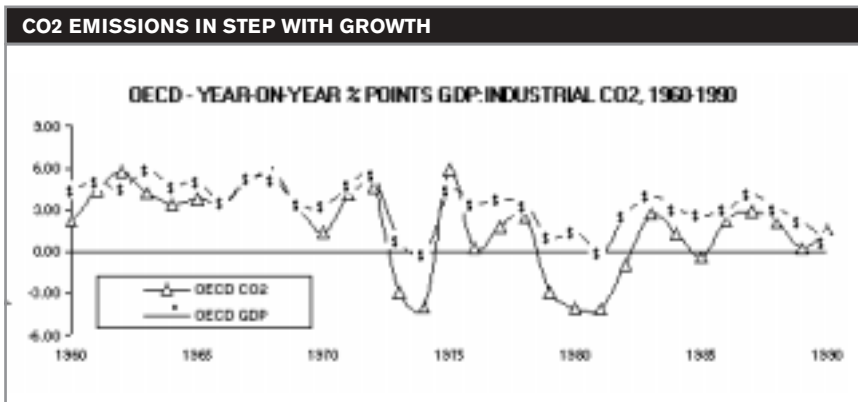


Fig 2. The percentage increase in the emissions of CO2 from industry in OECD countries moved closely in step with those countries' percentage rate of economic growth between 1960 and 1990

below shows, no government is going to be able to contemplate massive cuts in carbon dioxide emissions unless the money creation system is changed. This is why the solutions to economic instability and the climate problem need to be linked.

How the United States gets a subsidy from the rest of the world

The fourth defect of the present system of money creation is the one that accounts for America's military strength. When gold was the world currency, wealth was created wherever the gold was found. Today, wealth is created in the countries which issue the dollar, the euro, the pound, the Swiss franc and the yen – the so-called reserve currencies – when their banks make more loans. The wealth created in this way is considerable. According

to IMF figures, the dollar holdings of the world's non-US central banks increased by approximately \$145 billion in 1999 alone. But the dollars held by central banks are only part of the story since the US currency is also held by companies, institutions and millions of people around the world, either in notes in a wall safe, as deposits in a US bank account, or as some form of security – perhaps as a bond such as a Treasury bill or in shares traded on Wall Street.

The total gain from having a reserve currency (the technical term is seignorage) is the cumulative balance of payments deficit on the import-export account that the issuing country is able to run up. In early 2004, the US gain was increasing at around \$1.3 billion every day and the total stood at around \$3,000 billion, a sum which the US had either lent or spent abroad since 1986, the year the country became a net debtor to the rest of the world. Americans had received goods and

services in exchange for this \$3 trillion of course, but they had not sent anything tangible back in exchange. In other words, they had created money out of nothing and used it to buy goods and services which had taken the global economy a lot of hard work and real resources to produce. They were – and are – getting a massive subsidy the rest of the world, one which enables them to import half as much again as they export. It is this huge, cost-free seignorage gain that accounts for America's power.

We say cost-free because although a high proportion of the \$3bn. has

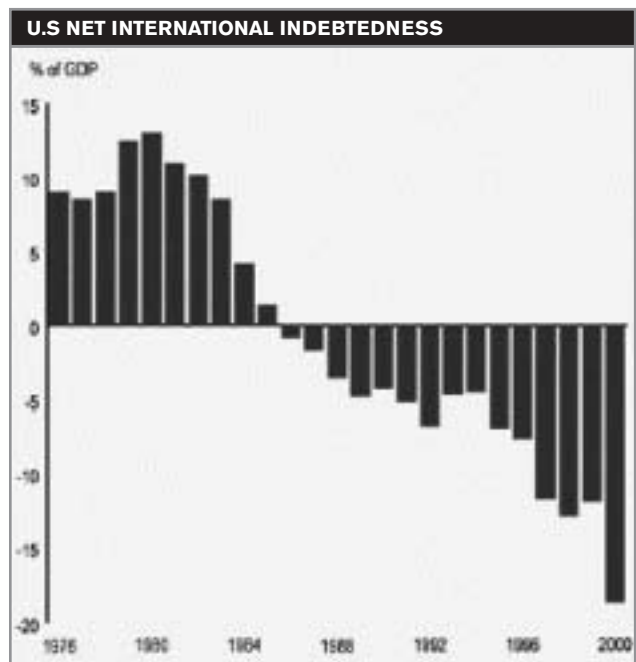


Fig 3. From being the world's biggest creditor country, the US is now the world's biggest debtor. Over the past 20 years, it has sucked in half the world's total savings.

Source: Bank of Montreal Economic Briefing. 23 May, 2002

been invested by the rest of the world in the United States and interest or dividends are being paid on those investments, the payments are being made in dollars created by bank bookkeeping operations and simply increases the total amount of dollars held by foreigners. A cost would only arise to America as a whole (as opposed to those who paid the interest or dividends) if the foreign recipients actually used the payments to buy goods or services from the US. However, no such cost has been incurred since the country went into a mild recession in 1991, the only year in the past twenty in which the US supplied more goods and services to the rest of the world than it took in. In the other 19 years, the US ran a deficit on its import-export account and became increasingly indebted internationally. Its \$3 trillion plus debts will remain cost-free for as long as the US is able to continue to pay interest in dollars and increase the amount it owes.

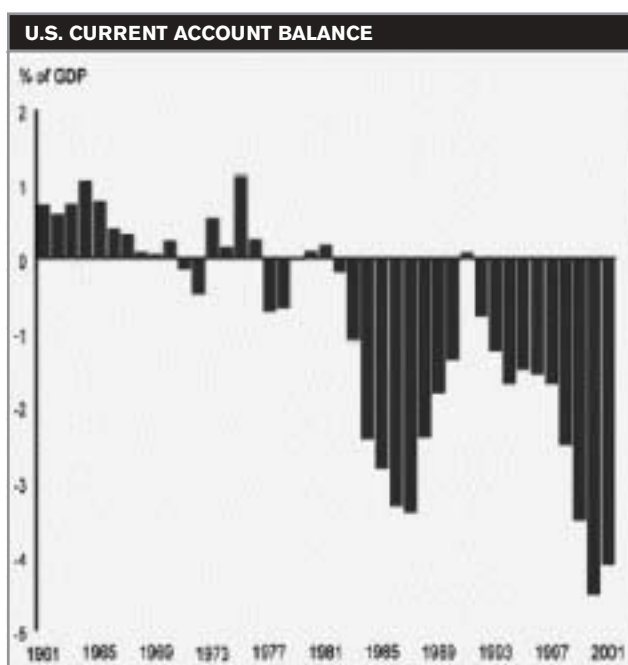


Fig 4. Since the beginning of the 1980s, the US has been able to import far more than it exports. It has been getting a massive subsidy from the rest of the world

Source: Bank of Montreal Economic Briefing. 23 May, 2002

The massive gains from seignorage

We can get a good idea of how big the \$3,000bn subsidy has been by recalling that in 1998, the United Nations Development Programme estimated that the expenditure of only \$40bn a year for ten years would enable everyone in the world to be given access to an adequate diet, safe water, basic health care, adequate sanitation and pre- and post- natal attention. A handful of other countries benefit from seignorage too but to a much more limited extent. Britain's balance of trade with the rest of the world has been negative in every year since 1985 with the result that the country's net financial liabilities stood at £69.8 billion at the end of the third quarter of 2001. The government statistics office described⁴ this as 'a relatively large figure historically speaking' although it was only 4% of what the US owed. On a per capita basis, each Briton owes about \$2,000 to the rest of the world while each American owes \$10,600.

The other countries in a position to benefit from seignorage have not done so. Japan, for example, has run a trade surplus for many years. So have Switzerland and the countries in the eurozone but the latter intend to change. One of the main reasons for the launch of the euro was the hope that the participating countries would be able to wrest a greater share of the annual global seignorage gain from the US. Why else did the European Central Bank print millions of 500-euro notes, a denomination which very few shoppers will ever use? To become the currency of choice for drugs dealers and arms merchants wishing to move large sums of money around the world in attaché cases, of course. The biggest dollar bill is only \$100, so, in terms of value for volume, the European contender performs 4.4 times better and, once these notes are passed out by banks, very few will ever be lodged back again. We're not joking. Nor was Ken Rogoff, the chief economist at the IMF, when he wrote a serious paper⁵ on this topic.

A true international currency

Rather than allowing a select group of countries to benefit by providing the world with its money, it would be better to have an international institution do so in order to share the seignorage gains among the currency's users. Remarkably, such a currency already exists. The press called it 'paper gold' when it was first issued by the IMF in 1969. This was understandable since its official name, Special Drawing Rights (SDRs), was somewhat boring.

SDRs came about because it did not make sense to mine gold and keep it in bank vaults to use as the basis of the world's money when account book entries could do just as well. Each SDR's value was based on a weighted average of the value of the currencies of the largest exporting IMF members and each issue was shared out among IMF members according to a quota based on the country's national income and the amount of international trade it did.

No SDRs have been issued since 1981 although a majority of the member countries of the IMF would have liked to see that happen. Each country's vote in the IMF is weighted according to its quota and 85% of the total weight of votes has to be in favour of a proposal before it is considered passed. As the US has 17% of the total voting weight, SDRs cannot therefore be issued without its approval. That will never be given because if the reserve currency system carries on as it is, the US can expect to be able to get an indefinite cost-free loan of perhaps 70% of the world's new money. If, on the other hand, SDRs are issued, the US share of the money given out internationally will be its quota, a measly 17%.

Essentially, SDRs are a version of the international currency, the bancor, (i.e., bank gold) proposed by John Maynard Keynes and the British delegation at the Bretton Woods Conference in 1944. Like SDRs, bancors were to be reserved for exchanges between central banks but, rather than their value being fixed in terms of a basket of other currencies, they were defined in terms of gold. The US also went to Bretton Woods with a plan for a world currency, the unitas, but as the Nobel-prize-winning economist Robert Mundell once put⁶ it "academic internationalist idealism fell prey to economic national self-interest" and the rival schemes were dropped. Instead, the US imposed a system under which the liquidity required for world trade was to be provided

by gold and by dollars linked to gold at a fixed rate, \$35 dollars an ounce. By so doing, America effectively made itself the world's bank although as another institution with that name was set up under the Bretton Woods agreement, the public naturally became confused about what had gone on.

The link between the dollar and gold was broken unilaterally by the US in 1971 after it had spent many more dollars into circulation internationally to pay for the Vietnam war than it had gold in Fort Knox to back them. Fearing that the dollar's value had become unsustainable, holders led by President de Gaulle of France rushed to convert them to gold before devaluation happened. A run on the bank began and the manager, President Nixon, responded by refusing to honour the promissory notes the US had issued every time more dollars had been lent into circulation. He defaulted by 'closing the gold window', thus ending any fixed relationship whatever between the dollar and gold. This destroyed the key feature of the Bretton Woods system that, looking back, seems to have served the world reasonably well. What emerged in its place was a totally unthought-through arrangement that allowed the defaulter, the world's richest and most powerful country, to reap a massive benefit by creating the majority of the global money supply with no formal constraints at all.

The perversion of the international economic system caused by the US default needs to be corrected but replacing the dollar and the other reserve currencies with SDRs is not the best solution. This is because, while the gains from seignorage would be more widely spread, they would still go predominantly to the richer countries because of the way IMF quotas are calculated. What's needed instead is an international currency that is given to each country on the basis of its population rather than its economic strength.

Basing money on the scarcest resource

Moreover, reviving SDRs would be a missed opportunity. To deliver the maximum level of human welfare, every economic system should try to work out which scarce resource places the tightest constraint on its development and expansion. It should then adjust its systems and technologies so that they work within the limits imposed by that constraint. In line with this, an international currency should be linked to the availability of the scarcest global resource so that, since people always try to minimise their use of money, they automatically minimise their use of that scarce resource.

What global resource do we most need to much use less of at present? Labour and capital can be immediately ruled out. There is unemployment in most countries and, in comparison with a century ago, the physical capital stock is huge and under-utilised. By contrast, the natural environment is grossly overused especially as a sink for human pollutants. We believe that the scarcest resource is the planet's ability to absorb greenhouse gases and that a new world currency should therefore be based on CO₂ emissions rights.

How could that be done? We've already seen that, under Contraction and Convergence, emissions permits would be issued to every adult in the world. Let's make an ironic bow to

the IMF and call these permits Special Emission Rights or SERs. As we saw, these would essentially be ration coupons. They would be issued by an international Issuing Authority, distributed to individuals, bought up by dealers and sold on to fossil energy distributors such as electricity companies and oil and coal merchants. These companies would then pay over SERs in addition to normal money to fossil fuel producers whenever they bought fresh supplies. An international inspectorate would monitor the fuel producers to ensure that their sales did not exceed the number of SERs they received. This would be surprisingly easy to do as nearly 80 per cent of the fossil carbon that ends up as manmade carbon dioxide in the earth's atmosphere comes from only 122 producers of carbon-based fuels⁷. Once a producer's sales had been checked, the inspectors would remove and destroy the SER coupons the producer had collected. Any not used would lapse at the end of a year.

Besides the SERs, the Issuing Authority would supply governments with a new international money called ebcus (emissions-backed currency unit) to be used for all international trade, not just for buying permits. Like SERs, ebcus would be issued to each country on the basis of its population but, unlike the SERs, they would be given to each country's central bank rather than to individuals. The ebcu issue would be a once-off, to get the system started, and the Issuing Authority would announce that it would always be prepared to sell additional SERs at a specific ebcu price. This would fix the value of the ebcu in relation to a certain amount of greenhouse emissions. It would make holding the unit very attractive as rival monies such as the dollar have no fixed value and everyone would know that SERs would become scarcer year by year as fewer and fewer were going to be issued.

If a buyer actually used ebcus to buy additional SERs from the Issuing Authority in order to be able to burn more fossil energy, the number of ebcus in circulation internationally would not be increased to make up for the loss. The ebcus paid over would simply be cancelled and the world would have to manage with less of them in circulation. This would cut the amount of international trading it was possible to carry on and, as a result, world fossil energy consumption would fall. On the other hand, there would be no limit to the amount of trading that could go on within a country provided its fossil energy use was kept down. We recognise that selling these additional emissions permits would lead to the C&C emissions limit being exceeded in each year that sales took place. However, because a fixed amount of ebcus would be put into circulation at the start of the scheme and no more would ever be issued, the total excess over the years could never exceed the amount of SERs that the original sum of money could buy.

Essentially, the system is a version of the Bretton Woods arrangement that President Nixon destroyed except that the right to burn fossil energy replaces gold and ebcus play the role of the US dollar. Its introduction would ensure that the level of economic activity around the world was always consistent with the ability of the Earth to cope with it, at least as far as greenhouse emissions were concerned. It would re-link the money system to reality and the world.

The combined C&C/ebcu arrangement would not end economic

growth but it would mean that growth could only proceed in countries that increased the economic value they extracted per tonne of CO2 emitted at a faster rate than they were having to cut their CO2 emissions back. There is no point in denying that this requirement would make global growth very difficult. Incomes in many countries would fall back although whether the quality of life would do so is another matter. However, some sectors of most national economies would grow very quickly – those connected with saving energy and capturing power from renewable sources, for example – and businesses ought to be able to get good returns on investments made in those sectors.

By encouraging people to borrow enough to maintain the money supply, these profit opportunities would reduce the risk of continuing to operate a national debt-based money systems during the period of emissions contraction. After that, however, the rate of change would become much slower and countries would be wise to gradually switch to using a money stock that was spent into circulation by the state. This type of money is described in James Robertson and Joseph Huber's NEF book, *Creating New Money*. Its advantage is that growth and continual borrowing are not required to keep an adequate amount of it in circulation. This helps to ensure a very stable economy because, if one sector goes into decline, there is still the same amount of purchasing power about and other sectors will expand to compensate.

The massive investment required to free the 'advanced' countries from their reliance on fossil fuels should be the last act of the growth-reliant economic system. As roughly half of all energy gets used to achieve economic growth, it is absolutely imperative that richer countries adopt a money system that doesn't require them to keep growing to avoid an economic collapse. This is not only because they will have to buy fewer emissions permits if they cease to grow but also because they would free resources for use by much poorer countries.

In any case, economic growth in the richer countries is bringing negligible results in terms of increases to human welfare and happiness. The American economist Herman Daly thinks that growth has become uneconomic in a lot of rich countries because it is increasing costs more rapidly than benefits. In other words, it is proving damaging rather than beneficial. The Index of Sustainable Economic Welfare, which Daly developed, shows that this is the case in almost every country for which it has been calculated, even though the calculations ignored the damage potential of CO2 emissions. If estimates for this damage are factored in, the case for saying that rich country growth is seriously damaging becomes overwhelming.

But, as Daly pointed out in a speech to the World Bank in 2002,

The current policy of the IMF, the World Trade Organisation and the World Bank, however, is decidedly not for the rich to decrease their uneconomic growth to make room for the poor to increase their economic growth. The concept of uneconomic growth remains unrecognized. Rather the vision of globalization requires the rich to grow rapidly in order to provide markets in which the poor can sell their exports. It is thought that the only

option poor countries have is to export to the rich, and to do that they have to accept foreign investment from corporations who know how to produce the high-quality stuff that the rich want. The resulting necessity of repaying these foreign loans reinforces the need to orient the economy towards exporting, and exposes the borrowing countries to the uncertainties of volatile international capital flows, exchange rate fluctuations, and unrepayable debts, as well as to the rigors of competing with powerful world-class firms.

The whole global economy must grow for this policy to work, because unless the rich countries grow rapidly they will not have the surplus to invest in poor countries, nor the extra income with which to buy the exports of the poor countries.

In other words, the present system makes it impossible for the poor to rise out of poverty. We are not merely playing a zero-sum game in which the gains of the winners equal the loss of the losers. We are playing a negative sum game in which even the people who think themselves winning are, in reality, losing out. Stopping damaging growth in the rich countries is not a cost but a gain.

The Third World debt crisis

We've already noted that under the C&C/ebcu arrangement, the central banks of each country participating would be supplied with a quantity of ebcus based on the size of its population. Most poor countries would find that the amount they received was more than enough to enable them to repay all their foreign debts. Under the treaty putting C&C into effect they would be required to do so immediately and to exchange their ebcus for the necessary foreign currency. This is important for the success of the ebcu system because when the dollars and the other currencies were repatriated and the loans that created them paid off, the money involved would cease to exist. This would limit the extra purchasing power created by the issue of the new currency and also create the space for it to operate internationally by getting the reserve currencies out of the way. Indeed, national currencies would lose reserve status. Under the C&C treaty, not only would ebcus be the only currency permitted as central bank reserves but countries would undertake not to use third-party currencies for international transactions. In other words, trade between India and France could be carried out in the euro, the rupee or the ebcu, but never the pound sterling or the dollar.

Some people might say that HIPCs should not use their issue of ebcus to pay off illegitimate debts that should be cancelled anyway. While we have a lot of sympathy with this view, we see the introduction of the C&C/ebcu system as a single, all-embracing act of re-balancing and reconstructing the world's money and trading system. In the bargaining process over the date of convergence on equal per capita entitlements and the base year for populations, the moral responsibility for the currently unpayable debts would be taken into consideration, along with the ecological debt that the over-consuming countries have run up. The compensation for these would be part of the overall package.

Moreover, moral issues aside, the underconsuming countries

will be well able to pay off the debts because they will immediately get their ebcus back in payment for their surplus SERs. Indeed, if the under-consumers declined to clear their debts, the over-consumers would not have the money to purchase the SERs and the whole system would lock up. In our view, then, the poor countries should just regard the ebcu issue as a windfall, a get-out-of-debt-free card. They should have no reservations about using the money for clearing their debts since they will be earning more ebcus from the sale of their new export crop, SERs, year after year, and those earnings will be available to be used for development purposes.

Oil and gas depletion

There is no doubt that energy-use limits under C&C would restrict growth in the North and that northern countries would have to supply a lot of goods and services to the South each year in order to earn the ebcus they required to purchase emissions permits from the southern allocation. An evening-up between the rich and poor parts of the world would begin. The gap between rich and poor within countries would begin to narrow too as, besides getting an income from emissions permit sales, the poor would find that, with fossil energy more expensive, their labour would be in greater demand.

Fortunately, there would be no danger that the industrialised economies would find the size of the income flow they were providing to the South to be so high as to be unacceptable. This is because oil and gas are running out and if the C&C/ebcu arrangement is not introduced, the price the oil and gas producing countries will charge for fuel will rise considerably as scarcity bites yielding the producers massive windfall gains. Under the new system, however, the scarce item will be SERs rather than fuel and the gains will go to the poorer countries instead. Here's why.

The world's oil production from conventional sources is widely expected to peak within the next five or six years. Output will then fall away so that by 2050, it will be just over half its 2010 level as Figure 5 shows. Even if the serious environmental problems with unconventional oil sources like the Athabaska tar sands can be overcome, it would only ease supplies for a few more years. With gas, world output is expected to peak around 2040 and then go into a steep decline, as Figure 6 illustrates.

If we put the two graphs together to show the

total amount of energy that oil and gas can be expected to deliver over the next century we get Figure 7. This shows that the rising amount of energy available from gas will be unable to compensate for the declining amount from oil after 2015 or thereabouts. After that, in roughly twelve years' time, the overall decline will begin and prices will rise sharply.

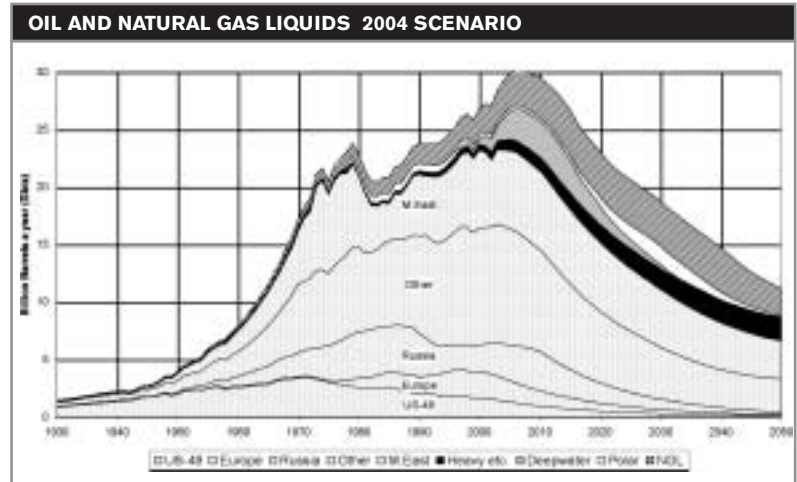


Fig 5. The world's total production of oil from conventional sources is now at, or near, its peak. Even increasing output of oil from tar sands or wells in deep water will not be able to stem the decline.

Source: Association for the Study of Peak Oil.

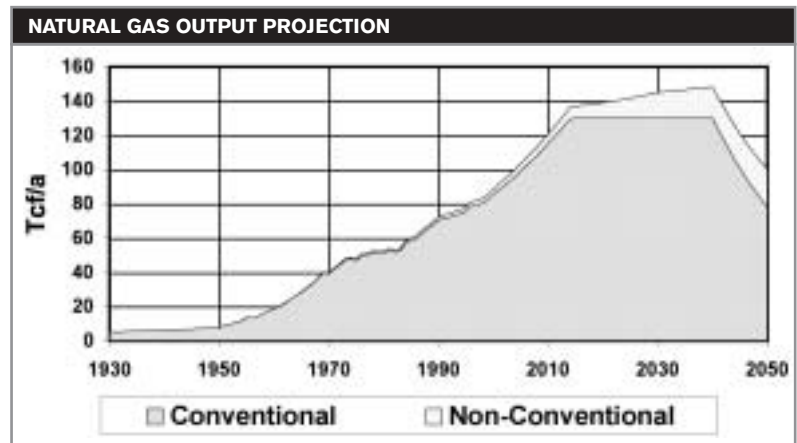


Fig 6. The world's output of natural gas from conventional sources will plateau in about ten years' time. By about 2040, the amount of gas available from all sources will fall sharply. Source: Association for the Study of Peak Oil.

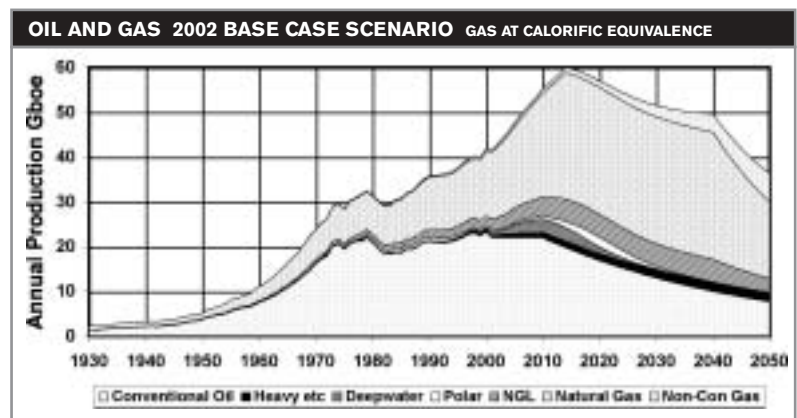


Fig 7. The total amount of energy the world will be able to get from both oil and gas will continue to rise for about another ten years. After that, there will be a slow decline for about 25 years and then a more rapid one.

Source: Association for the Study of Peak Oil.

In the absence of C&C the five big OPEC producers – Saudi Arabia, Kuwait, Iraq, Iran, and the United Arab Emirates – would take advantage of their growing share of the world's oil production and put up prices sharply. This could give them such a huge increase in their earnings that, as in 1973 and 1979, they would be unable to spend it all on additional imports. If so, they would have no option but to lend their surplus back to the countries from which it came by depositing it in western banks. The problem with this is that the money might stay in those banks rather than being lent out again because, unless countries and corporations can see some prospect of being able to repay additional loans, they will not take them on. Interest rates might be cut to encourage them to do so but, as in Japan, even zero rates might not be low enough to make extra borrowing attractive. Without the extra borrowing, however, the global money supply would contract, plunging the world to a depression while simultaneously cutting oil demand and bringing its price down to very low levels. After a few years, the depression might pass and oil demand increase again. Prices would rise, OPEC earnings would soar, and the cycle would begin again.

In other words, under a business-as-usual scenario, there is a real chance that the level of global economic activity will contract in step with the decline in oil and gas supplies. Constant contraction and depression could be the norm. Even the oil producers would not do well out of this because their output would be sold in depression conditions for a lot of the time. There might be no way that the free market could break out of this cycle once it started because the peak oil price – the level that tipped the world into depression - might not be high enough or maintained for long enough to encourage investment in renewable energy sources. Then, once the depression had begun, oil would be cheap again and the market would provide no incentive to countries to reduce dependence on the fuel, at least on a significant scale. The world could descend, cycle by cycle, into chaos and misery, unable to help itself.

C&C is the ideal way to avoid this scenario. If C&C reduced the demand for oil and gas faster than output was going to decline anyway because of depletion, it would become, in effect, a buyers' ring, the type of arrangement dishonest antique dealers set up before an auction. The dealers in a ring decide who is to bid for each item and the maximum he or she is to pay and then, afterwards, they hold a private auction among themselves to determine who actually gets what. The point of this ploy is to ensure that the extra money which would have gone to the vendor if the dealers had bid against each other in the original auction stays within the ring and does not leak away unnecessarily to a member of the public. In our case, C&C would prevent excess money going to fossil fuel producers in times of scarcity and plunging the world into an economic depression. It would go to the poor countries instead, where it would be quickly spent in the industrialised countries by people who urgently need many things that the over-fossil-energy-intensive economies can make.

So, rather than debt growing as it would in the business-as-usual scenario, demand would increase instead constrained only by the availability of energy. Suppose it was decided to cut emissions by 5% a year. This would achieve the 80% cut the IPCC urges in thirty years and is the sort of goal we need to

adopt. Cutting fossil energy supplies at this rate would mean that the ability of the world economy to supply goods and services would shrink by 5% a year minus whatever rate it became possible to save energy and to get renewable energy supplies set up. Initially, energy savings in the overconsuming countries would take the sting out of most of the cuts as a lot of the energy they use is wasted at present. Then, as savings became progressively difficult to find, the rate of renewable energy installations should have increased enough to prevent significant falls in global output.

Under C&C, investors in renewable energy projects could be sure of keen demand. The poorer parts of the world would get the resources they need to follow low-energy development paths. And the spread of purchasing power would open new markets for manufacturing companies. Even the oil and gas producing countries would benefit if they were offered a reasonable fixed price, as this could be more lucrative for them than high prices for short periods followed by lengthy slumps. And that's just the economics. Everyone would win a second time if the climate was saved.

The US would benefit too

But what about the United States? As the main beneficiary of the present system, wouldn't it lose rather badly? We don't think so. In our view, its main loss would be the massive seignorage gains that it has been able to make and many commentators have been saying recently that these gains are about to come to an end anyway.

It might happen like this. As we write, the dollar is falling against the other reserve currencies. If this continues, many institutions and private individuals holding dollar assets, Americans and foreigners alike, will feel at some point that they have lost enough and start to sell their holdings off as rapidly as they can in order to switch the proceeds to the pound or the euro before the dollar slips even lower. Panic could set in and the heavy asset selling is likely to cause US real estate, bond and stock prices to drop sharply and the dollar to fall faster still, frightening those who have so far held themselves aloof to join the headlong rush to get out of the currency, just as happened in Mexico in 1994.

The heavy fall in the value of the dollar would then make US goods highly competitive on world markets and its exports would rise. They would do so, however, against a worldwide decline in business activity caused by two factors. One would be the loss-of-wealth-effect. Roughly half of the world's savings are invested in the US and as the value of these investments (and the income from them) plummeted, those owning them would feel poorer and cut back their spending. The other would be that the rise in imports from America and the rapid decline in exports to it would cost millions of people outside the US their jobs. Many firms, desperate to stay in business, would slash prices, thus spreading the deflation that is already eroding prices in Japan, Taiwan and Singapore. Wages outside the US would fall too, increasing the real burden of debt consumers have to carry. Nobody in their right mind would wish to take out new loans in these circumstances and the money supply will contract so that, even though goods and services are cheaper, they would become less affordable because there would be less money about.

That's about as far as we can take the scenario. The world economy could go on contracting for years – in theory. The positive feedback that proved so rewarding on the way up – growth leading to greater profits that went to fund more investment and thus more growth – would prove terrifyingly destructive on the way down

Once this had happened, it would definitely be in the interests of the ex-superpower to join an international move to sign up to C&C and to issue the ebcu. True, if the US held back, it would benefit from being able to burn oil, coal and gas without having to purchase SERs first. This would keep the price of the declining amount of fossil energy it was still producing from domestic sources lower than that paid by those of its competitors that had signed up. Moreover, the US would benefit from the lower prices being charged by OPEC as a result of the C&C price ring. However, the countries in the SER club would be bound to impose import duties on products coming from non-members, whom they would despise as free riders and parasites. Also, the club would almost certainly give its members rebates calculated on the energy content of their exports to non-members so that their producers and farmers could still compete.

This would remove any advantage the US gained by staying out of the system, particularly as its products would be discriminated against and its pariah status would cost it its remaining authority in world affairs. But what would happen in the US itself? Would a planned, steady rise in fossil energy prices really be so bad, particularly as developing renewable energy sources would generate a massive range of technological and investment opportunities? If one accepts that oil and gas are getting scarce anyway, the transition to renewables has to come. Even if the US energy demand for oil and gas merely stays constant, it will need to consume the world's entire output of these fuels within 50 years.

Moreover, a switch to renewable energy would restore some of the security that the country is currently trying to buy through its military spending, as the lobby group Environmental Defense has pointed out⁹. "Affordable technology exists for a new American energy economy that can deliver real cuts in oil consumption and greenhouse gas pollution, while at the same time making the nation's power supply more secure from terrorist attacks," its senior lawyer, Jim Marston, said in 2002. "The sunlight, wind and falling water that power renewable energy cannot be eliminated, and renewable energy is not powered by explosive, flammable or radioactive fuels which are vulnerable to attack."

"The administration and Congress should work together on a clean energy package that protects America's national security, environmental security and economic security" his colleague Steve Cochran added. "As the world's largest producer of greenhouse gas pollution, it's well past time for the United States to join the broad based international coalition against global warming." A lot of Americans would say amen to that.

Better distributed political power

More generally, oil and gas depletion will change the basis and distribution of political power. At present, financial power rests

in the hands of the countries which create the money we use and the banks that authorise its creation. Since newly-created money can be used to buy energy and without energy, nothing can happen, the creation of money delivers to those who receive it a great deal of physical and political power.

While oil and gas production can still be raised, increasing the money supply can bring about an increase in the supply of energy. Once production has peaked, however, that will no longer be true and, rather than the availability of money being the limiting factor, as it is now, the availability of energy, and who gets it, will determine what gets done, by whom, and where. In other words, rather than money buying energy, energy will buy money. In future, the possessors of energy will have the physical and political power.

This will lead to a massive power shift to the Middle East unless something is done to prevent it. One option is for the nations whose power is based on money to use force to take over the nations whose power will be based on energy while they still have the ability to do so. Events in Iraq have demonstrated, however, that this is not a workable solution. A far better course would be for countries to develop their own sources of power. And this power would have to be from renewable resources as coal and nuclear energy are non-runners for reasons explained in the panel. The key feature about renewable energy sources is that they vary widely. Many are so small and scattered that they are much more efficiently developed by local organisations than by giant multinationals. This means that, rather than money power being generated by big banks and countries far away, communities will be able to produce energy power – the new money - for themselves. A mosaic of much more diverse, self-reliant local economies and cultures should spring up. And that, in itself, would be a major step towards global sustainability.

Frequently asked questions

Q. An equal per capita allocation of emissions permits seems a bit rough and ready since some countries are a lot colder than others and therefore need more energy for space heating. Other countries have much better renewable energy potentials. Wouldn't it be better to devise a more elaborate formula for distributing the permits that took these circumstances into account?

A. Any way of allocating emissions rights is going to be unfair to a greater or lesser degree. Every country in the world has special circumstances of some sort or other and a rough-and-ready climate agreement is infinitely better than no agreement at all. An international conference at which each country attempted to argue that it was a special case and its citizens should have an above-average allocation would quickly break down in acrimony. The Global Commons Institute has, in fact, suggested that countries which trade a lot with each other or have other strong ties should group themselves in 'bubbles' in the way the fifteen member states of the EU have done under the Kyoto Protocol, and redistribute their equal-per-capita allocations amongst themselves to allow for special circumstances. More generally, if a distribution formula could be found that was universally accepted as being superior to equal per capita, there would be no problems with using it. The key factor is acceptability. We need to find a system that everyone can accept as reasonably fair.

Q. Shouldn't each country's overall emissions entitlement be adjusted to take account of its historic responsibility for the climate crisis? In other words, instead of receiving grandfathered emissions rights under C&C by being granted a period of grace before the equal per capita allocation begins, the inhabitants of industrialised countries would have their allocations cut because of the environmental debt their fathers and grandfathers ran up when they released carbon dioxide into the atmosphere in the past.

A. We dislike this approach because it departs from the basic C&C principle that all men are created equal and are therefore entitled to equal emissions rights. Once you begin to demand exceptions to that principle it loses its moral force. True, the overconsuming countries might be given an extra emissions allowance for ten or twenty years under C&C to allow them to get their houses in order but this is a temporary concession generously granted them by the rest of the world rather than a departure from the equal per capita principle.

In fact, of course, the knowledge that the wealthy countries' consumption patterns have caused the climate crisis will undoubtedly be at the back of everyone's minds at any international conference to negotiate a C&C-based climate treaty. But that's where the information should stay since, if the poorer nations try to drive too hard a bargain, the danger is that the richer ones will refuse to deal and walk away.

Poor country negotiators will have to remember two things if any sort of treaty is to be agreed. First, they need to get as many wealthy countries as possible to ratify the treaty if there is to be a good market for their countries' emissions permits. Second, the rich countries are going to have to make far more drastic changes to their economic systems and ways of life than are the poorer countries. The rich have therefore to be allowed to retain enough resources to do so. It has to be remembered that, in addition to carrying out a massive replacement of their capital stock to allow them to survive using much less fossil energy, the overconsumers are going to need to export a lot more goods and services to underconsumers just to earn enough euros to buy emissions permits. They will therefore be stretched two ways.

Moreover, the 'historic debt' argument finds little sympathy amongst people living in wealthy countries as they feel no personal responsibility for creating the climate problem. This means that the over-consuming nations' negotiators will not be able to pay the argument much attention if it is put forward in an attempt to work out better terms. The best the under-consuming nations can hope for is that, spoken or unspoken, the carbon debt idea will help them shorten the time the rich countries agree to take to adjust to getting the same number of SERs as the rest of the world.

Q. Some people are saying that it's already too late to prevent a climate catastrophe.

A. They might be right. No-one knows. But fearing that we might have left corrective action too late doesn't mean that we shouldn't take it. We are certainly in for a catastrophe if we don't try to prevent it. And look at all the other benefits that would be brought by the package of proposals we've just discussed. Even if we were 100% sure that, say, a runaway warming was about to start, the actions suggested would still be worth taking because, amongst other things, they would help build the sort of low-energy, de-centralised local economies more likely to survive the crisis. In addition, the measures would mean that we installed money systems capable of continuing to function during the economic contraction a climate crisis would inevitably bring.

Summary

1. C&C seems the only proposal for curtailing greenhouse gas emissions capable of gaining the necessary level of international support to be put into effect.
2. Any arrangement to control greenhouse gas emissions is likely to break down unless it is coupled with the introduction of a non-debt-based global currency that links the overall size of the world economy with the ability of the planet to cope with that economy's waste. Without such a link, a conflict would develop between the world economy's need to use energy to grow and the need to control fossil energy use.
3. The new global currency would be given into use. This feature, together with the earnings from emissions-permit sales, would make the combined C&C/ebcu arrangement very attractive in the poorer parts of the world, particularly as the issue of the currency would solve the Third World debt crisis. The new currency would also remove the unfair advantage that wealthy nations get from operating 'reserve' currencies.
4. The value of the global currency would be a fixed number of SERs, just as at one time, a dollar's value was fixed at one-thirtyfifth of an ounce of gold. As every country's currency would have floating exchange rates with the ebcu, all money would have an energy value. Instead of banks approving the creation of money as now, money would be created wherever energy was extracted or captured. This would decentralise both political and actual power systems as renewable energy can be captured almost anywhere in the world.
5. The industrialised countries need to be able to stop growing without their economies crashing if they are to cut fossil energy use and release resources for the poorer parts of the world. Their national currencies should therefore cease to be debt-based to remove the growth compulsion. Instead, their national currencies should be spent into use by governments and the quantity of money in circulation adjusted by changes in the levels of taxation and state spending.
6. The distribution of emissions permits to individuals is necessary to provide them with a source of income to cushion them against the effects of higher energy prices.
7. The purchase of emissions permits from under-consuming nations by overconsuming ones would not just provide an income stream for the poorer parts of the world. It would also be a means by which the rich countries would pay off their ecological debts.

THE GAINS AND THE LOSSES

Here's a score sheet to prove our point that, in this massively non-zero-sum game, everyone is a winner.

<p>Rich countries</p> <p>Gains</p> <ul style="list-style-type: none"> • An end to forced, damaging uneconomic growth required to satisfy the growth compulsion inherent in the current monetary system • A stable economic and financial system • Excellent overseas markets for advanced products • Reduced reliance on uncertain supplies of imported energy • Fewer potential causes for international conflict and terrorism. • And, above all, a good chance of avoiding a climate catastrophe 	<p>Losses</p> <ul style="list-style-type: none"> • The ability to exploit poorer countries through debt restructuring programmes. • The seignorage gains arising from the use of national currencies as if they were international ones.
<p>Poor countries</p> <p>Gains</p> <ul style="list-style-type: none"> • Freedom from debt. • A new source of income for the whole population • A stable global economic and financial system • Good internal markets for a wide range of domestically-produced goods. • Less pressure to export • Reduced reliance on imported energy • Fewer potential causes for international conflict and terrorism. • And, above all, a good chance of avoiding a climate catastrophe 	<p>Losses</p> <ul style="list-style-type: none"> • Cheap dumped food from the US and the EU. Supplies of this will cease because more costly energy will make it uneconomic to produce.
<p>Fossil fuel producing countries</p> <p>Gains</p> <ul style="list-style-type: none"> • A fair, stable price for fuel exports • A new source of income for the whole population • A stable global economic and financial system • Good internal markets for a wide range of products • Fewer potential causes for international conflict and terrorism. • And, above all, a good chance of avoiding a climate catastrophe 	<p>Losses</p> <ul style="list-style-type: none"> • Cheap dumped food from the US and the EU

End Notes

- 1 *'Preventing dangerous climate change'*, CAN position paper released at COP-8, New Delhi, India.
Available at http://www.climatenetwork.org/docs/CAN-DP_Framework.pdf
- 2 Taken from the essay *'First the bad news'* at http://www.ecoequity.org/ceo/ceo_7_2.htm
- 3 http://cires.colorado.edu/people/tolbert.group/data/Chem5151/natlogar_files/frame.htm
- 4 Economic Update, 12/02/2002
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- 5 *'Foreign and Underground Demand for Euro Notes: Blessing or Curse?'*
Economic Policy 26, April 1998, pp263-303.
- 6 The International Monetary System in the 21st Century: Could Gold Make a Comeback?,
lecture delivered by Robert Mundell at St. Vincent College, Letrobe, Pennsylvania, March 12, 1997.
Available at <http://www.columbia.edu/~ram15/LBE.htm>
- 7 *Kingpins of Carbon: How Fossil Fuel Producers Contribute to Global Warming*,
Natural Resources Defense Council and others, New York, July 1999.
- 8 See *'Alternative Energy Could Enhance National Security'*
at <http://www.ecomall.com/greenshopping/edenergy.htm>
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- 9 C.A.S. Hall, C.J. Cleveland and R. Kaufmann.
Energy and Resource Quality: The Ecology of the Economic Process.
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- 10 *'Preventing dangerous climate change'*,
CAN position paper released at COP-8, New Delhi, India.
Available at http://www.climatenetwork.org/docs/CAN-DP_Framework.pdf

The Effects of Allowing the World to Warm

The Climate Action Network believes¹⁰ that even if atmospheric concentrations of greenhouse gases were held at present day levels, a warming of at least 1° C may not be avoidable. CAN writes: "This committed warming is likely to cause irreversible damage to some unique ecosystems and the extinction of endemic species contained in them. Significant damages to agricultural production in some developing country regions, growing water shortages and increasing exposure to health risks will also occur. This is not 'acceptable' under any definition of the word." The organisation then sets out the consequences of allowing warming to proceed beyond the 1 degree level:

1-2° C global mean warming

Developing Countries

- Many developing countries will suffer from net market losses in important sectors.
- Globally some regions may have net market benefits and others principally developing countries have net market losses.
- Majority of people adversely affected by climate change and livelihoods of the most vulnerable populations dependent on natural ecosystems increasingly adversely affected.

Food security

- There is the likelihood of significant damages to crop production in tropical and subtropical countries sufficient, among other things to reverse agricultural self-sufficiency progress in many developing nations. Heat waves will damage crops (rice unable to form grains, fruit unable to set) and livestock will suffer from heat stress (reductions of milk production and conception difficulties in dairy cows).

Water shortage

- Decreased water supply and quality will occur in regions already suffering from water scarcity and drought such as the Mediterranean, southern Africa, and arid parts of central and south Asia affecting half a billion people.

Floods

- More flood damage will result from intense storms, especially in areas affected by deforestation, wildfires, insect infestations, and ecosystem degradation.

Extreme events

- Increasing frequency and intensity of extreme weather events will result in increased insurance costs and decreased insurance availability (coastal areas, floodplains).

Health effects

- Direct – Increased heat related deaths and illness, affecting particularly the elderly, sick, and those without access to air conditioning;
- Indirect – more illness and death resulting from increased frequency and intensity of extreme weather events.
- Increased risks to human life, risk of infectious disease epidemics, and many other health risks where floods, droughts or storms increase in frequency and/or intensity.

Ecosystems

- Wildfires and insect infestations will disrupt relationships in complex ecosystems already undergoing stress from direct effects of heat. Increased disturbances of ecosystems by fire and insect pests.
- Coral bleaching events will increase in frequency and duration, leading to destruction of brain corals and loss of related reef ecosystems.
- Loss of up to 10% of coastal wetlands globally from sea level rise will eliminate habitat of major migratory bird populations.
- 30–40% of nature reserves adversely affected

Ice Sheets and Sea Level Rise

- Meltdown of the Greenland ice sheet is likely with global mean warming above 1–3° C, and would lead to several meters sea level rise over several centuries with disastrous consequences for millions.



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