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BODY:

It had to come of course, and here it is with a solid sounding thump: the Proceedings of the Opec Seminar on the Environment, held in Vienna in mid-April, for favour of a review, etc. Proponents of carbon taxation should read it. It is exceedingly thought-provoking and will indeed provoke a great many people. Opec is perfectly within its rights to have a good blast at global warming theory and the many effects of taking action against it. With the Climate Change Convention now running after Rio (FTEE 128/19), the issue is not going to go away. That being true, it is worth looking at what Opec's collection of experts had to say. There are a great many issues here, that have nothing to do with growing trees.

So it is nice to find that the Proceedings of Opec's First Seminar on the Environment in Vienna, last April begins neither with a cough nor a speech of welcome. (The latter comes later on page 8.) It begins with a remarkably down to earth paper by Juan Carlos Sanchez, Environmental Affairs Adviser to Venezuela's PDVSA. This points out that PDVSA's compliance to the US Clean Air Act will cost roughly \$ 2.9 billion by 1997, in addition to the \$ 500 million needed for Venezuela's own environmental regulations. You can then: add in the odd half billion for doubled hull tankers, membership of the Marine Preservation Association and the liabilities under the Oil Pollution Act of 1990; take a further \$ 300 million for compliance with the EC Large Combustion Plant Directive and note the expenditure in relation to sulphur content in diesel; stir in the fact that taxation on oil products in the EC is over 50 per cent of the final price already; and finally take note that PDVSA has just shaved \$ 1 billion off its 1992 operating and investment budget. (Sanchez did not actually mention this one.)

To enjoy this cocktail of expenditure to the full, all it needs is a good shake and a pinch of carbon tax at \$ 10 a barrel. Under the circumstances, Sanchez is rrlly restrained. He merely points out that the carbon tax idea will make it "very difficult" to fund all the other commitments and they will have "to be reviewed". As a first shot, this is not a bad one and every multinational, busy reducing the number of its employees, would undoubtedly agree.

Subroto, Opec's Secretary General, gives the traditional welcoming speech, but he is saving himself for later. The question of money then reappears in a talk by Seyyid Abduai, Director General of the Opec Fund for International Development. His estimate - "clearly on the low side" - of the requirements for "concessional finance" needed to meet the Rio Agenda 21 programme is \$ 125 billion per annum to 2000, excluding Russia and Eastern Europe. Since the average Official Development Assistance (ODA) in the 1980s was \$ 55 billion per annum, he drily suggests that "an increase in ODA of this magnitude may be too much to expect". But the real point about this is that the net outflow from developing countries to the developed countries in 1990 was \$ 40 billion in debt- servicing alone. Given this, the ODA is obviously rather smaller than might be expected. Indeed "the South is at present unable to adequately address the worst form of environmental degradation - that is, human poverty and misery - and should, therefore, not be expected to be in a position to attach high priority to combating global warming, the pollution of international waters, the destruction of biological diversity and the depletion of the stratospheric ozone layer."

In short, the debt problem, the problem of developed world farm protection and a general redistribution of global financial liquidity is necessary before the people of the third world will be able to afford to pay anything but peanuts to combat global warming. And as Sanchez had already noted, it is Venezuelan pockets that are already paying for US clean air and pristine waters. Environmental regulation can be seen as a restraint on trade. In the context of the current state of the world economy, this is a very important issue, which will be examined later. But now for the environmental nitty-gritty.

Ragnar Gerholm

First into the lists comes Professor Tor Ragnar Gerholm, Emeritus Professor of Physics at the University of Stockholm in Sweden. Gerholm is a familiar figure in the ranks of the sceptical about global warming, but his approach to the subject is not the familiar one of meteorology. Instead, he chooses to attack the assumptions underlying projections for energy demand. This is a genuinely new approach. His target is the Intergovernmental Panel on Climate Change's (IPCC) Scientific Assessment, produced by the World Meteorological Organisation (WMO) and the UN Environmental Programme (UNEP) and his attack is ari underhand. He simply points out that the assumed emissions scenarios are chosen on the basis of an energy demand and supply forecast that is grossly in error. Not for Gerholm the complex questions of whether output of sulphur will reverse the carbon dioxide effect, or whether the ocean carbon sink is big enough. On the contrary his point is that that "business as usual" scenario (BAU) that has so frightened the "greenies", is a load of old rubbish.

In fact the argument is a remarkably strong one, which deserves more space

than is possible here. In essence it is that most BAU forecasts conveniently ignore structural changes in energy demand. Equally, anyone looking back at the BAU forecasts of two decades ago quickly realises that, drunk or sober, the forecasters of the 1970s were out by almost a half. They anticipated primary energy consumption by 1990 within the OECD alone of between 6,000 to 7,000 million tonnes of oil equivalent (Mtoe), yet in practice it reached only just over 4,000 mtoe. Yet as Gerholm points out, the IPCC make the assumption that energy demand will continue on the BAU to put out carbon at an exponential 2 per cent a year. This means that it will rise from 350 ppmv to 827 ppmv by 2100. As Gerholm puts it: "This simple, not to say naive, conception seems to be the sole foundation for the BAU scenario and consequently for the scientific conclusions and policy recommendations inferred".

Gerholm then traces back the fossil fuel implications of putting this much carbon into the atmosphere. First he points out that the BAU scenario requires 22.4 giga tonnes of coal equivalent (Gtce) by 2100. This assumes a per capita consumption of fossil fuel roughly equivalent to the amount used in Western Europe, for everybody on the planet. It also assumes that the industrialised countries will in practice be using more fossil fuels, even with their non-fossil sources, than they do now. And then comes a really smart shot: Current estimates of remaining fossil fuels - according to Shell - are in the region of 1430 Gtce. Yet the BAU scenario suggests that we will have burnt 1639 Gtce in the next 110 years in order to reach the doom-laden assumption of a 827 ppmv carbon atmosphere. In short, to reach the great global warming debacle anticipated by the IPCC, we will have managed to burn more fossil fuel that appears to be on the planet!

This thought is than backed up with a whole series of ludicrous assumptions about oil and coal production. He quotes a US oil expert: "Why should we believe that the Gulf states, after more than 20 years of constant production level of approximately 22 mbpd, suddenly after the year 2000 will be able to add 10 mbpd of new production capacity every five years until they reach the maximum? The oil market as we know it will experience a serious crisis probably before the year 2015." The situation in coal is somewhat similar. To reach the BAU target, coal output world-wide would have to increase fivefold! Faced with these nonsensical assumptions, Gerholm concludes that the BAU is total unsustainable. The price impact of the move must of necessity reduce energy consumption through energy saving, even at a very low long-term price elasticity. (At -0.3 price elasticity, the savings in energy demand must be in the region of 40 per cent by 2100 on the predicted scenario.) Equally, the BAU scenario takes no notice of an assumed levelling off of population growth in the next century. Gerholm goes on to make his own projections of energy demand in the next century, using the Fisher-Pry model of technology change. He concludes that far from hitting the BAU target of over 800 ppmv, by 2100 the rate of fossil fuel substitution will be such that only around 560 ppmv will be present on the worst scenario compared

with around 360 ppmv currently. More important, it is in the developing world from which all the additional carbon will come. "A ceiling on carbon dioxide emissions is therefore primarily a concern of developing nations of which most have hardly any other means of meeting their rising energy demands. But if the developing countries are exempted, the global effect of international carbon dioxide conventions become virtually nil".

The evidence of the declining carbon dioxide output in the US, France and Switzerland is at least partial confirmation of the developed and developing world distinction. And if one can undoubtedly quarrel with Gerholm's idea that non-fossil fuel will hit over 70 per cent of primary energy demand by 2100, any quarreling at this time range is likely to be rather futile. Nobody knows. Perhaps mankind will finally have cracked the solar-hydrogen energy economy. Yet this fine paper does at least bring the notion of energy prices back into the IPCC deliberations. If we really are proposing to spend billions on limiting carbon output, we had better just be aware that the global energy economy is in a very curious state just now. Oil prices are at an historic low in real terms and the western world is in slump. It may well be the case that energy pricing has a far bigger impact on carbon output than any legal regulations. This leads straight back into the carbon tax debate and who gets the economic rent from using it, but for now, it is on with the show..

Essam Eldrin Galal

In a curious way, the next paper, by Essam Eldrin Galal of the National Society for Technological and Economical Development, Egypt, rather confirms Gerholm's arguments, although probably unintentionally. We are back with a vengeance in the land of comparative statistics. Did you know that the average per capita energy use of developing country nationals is 124kg of oil equivalent and that of the developed world is 4,867kg? Of course, energy demand is rising in the high-income countries at 1.2 per cent a year - 1980-89 average - while it is growing at 4 per cent a year in low income countries. This is explained by the fact that Los Angeles has three times as many cars as India, but that the bulk of the additional cars likely to be added by 2025 are going to be in developing countries. There are 500 million now worldwide, but the figure will reach 2 billion in thirty odd years. As confirmation of this disparity of energy demand, let us not forget that the inhabitants of Los Angeles send as much carbon dioxide into the atmosphere from their barbecues alone as 250,000 cars; a figure which conveniently adds up to the entire transport infrastructure of a medium-sized developing country. (Reading papers of this kind, it is easy to slip into the feeling that LA really must be some kind of latter-day Sodom and Gomorrah, at least in energy terms. It gets citations everywhere. What tends to be forgotten in these examples is that LA has its own disparities of consumption, otherwise why would a large proportion of its population want to burn part of it down?)

The simple point here backing Gerholm is that any rise in developing country energy demand will inevitably have pricing effects. But Galal follows Abdulai in pointing out that stabilising developing country energy demand needs access to western technology, which the developing world cannot afford. OECD development assistance has been consistently lower as a proportion of GNP than that from both OAPEC and Opec, the figures in 1983 for example being 0.09 per cent, 1.7 per cent and 0.82 per cent respectively. Galal too points out that energy demand has largely stabilised in the OECD, while it is often growing in the developing world faster than GNP. Yet "any form of restrictions on the growth of their already low per capita energy consumption would amount to a perpetuation of their underdeveloped status."

Mohammed Al-Sabban

If Galal points a finger at the OECD for being miserly, Mohammed Al-Sabban, Economic Adviser to the Ministry of Petroleum and Mineral Resources, Saudi Arabia criticises it for not giving plans adequate thought. This too is a fine paper and his target is the carbon tax and he shoots from the hip. To paraphrase his points: (1) No consideration has been given to other greenhouse gases that might be cheaper to control. (2) Not enough attention has been paid to deforestation. (3) Carbon taxes are seen as the only policy option. (4) Nobody seems to have bothered about the decreased impact of carbon taxes on emissions if the tax is recycled. (5) Nobody seems to have bothered to assess the high level of price support, subsidies and tax incentives on various industrial sectors that also contribute to emissions. (6) What about the trade impacts of carbon taxes? (7) The level of economic benefit is totally uncertain. (8) Nobody seems to have noticed the carbon output created by the production of fossil fuels themselves and this is an important issue.

This is almost a parody of Al-Sabban's points. To illustrate the material he uses the DRI forecast of carbon stabilisation at 1988 levels and points to the complexity. According to this, it will need a \$ 58 per tonne of carbon tax in Sweden and \$ 401.4 per tonne tax in Japan. If this is true, then it does not require a genius to suggest that this will give the GATT a near terminal headache. Furthermore, citing DRI, he suggests that the net result will be a cumulative reduction in OECD GDP of between 1 and 3 per cent, depending on the country, between 1995 and 2020. This in turn will have a negative GDP effect on the rest of the world of at least -0.7 per cent.

The argument here is complex, but thorough and beautifully illustrated by a flow chart reproduced here. Suffice it to say that an internally imposed OECD carbon tax would reduce growth in the OECD and be inflationary simultaneously. This in turn would demand higher OECD interest rates, further increasing non-OECD debt burden terms. (In Nigeria, external borrowing is already as high as 39.1 per cent of GDP.) Yet the impact of lower OECD energy demand

because of the tax, would depress world energy prices outside the tax ring fence. The net result would be an increase in non-OECD energy demand. Yet it is precisely in non-OECD energy demand where the main threat from energy demand growth to the environment lies. In short, an OECD carbon tax would actually be counterproductive in terms of global warming. As Al- Sabban puts it himself: "High energy prices and lower economic growth rates in industrialised countries could result...in deteriorating developing countries' balance of trade which is the main wheel of their economic growth, and they could end up paying most of the cost of controlling greenhouse gas emissions."

If anybody needs reminding that the OECD is in any case suffering a downturn, then the man to do it is John Shiller, Emissions Planning Associate of the Ford Motor Company. Just hear this: " The US Clean Air Act...establishes about 50 new requirements for cars and trucks alone. Implementing these requirements will eventually cost \$ 8 billion to \$ 10 billion annually, about the same as the combined industry earnings in its best years. However, the current economic downturn is the worst in a decade and limits how fast industry can respond to the regulatory demands and the competitive challenges of the nt...Ford's worldwide consolidated operations lost \$ 2.3 billion in 1991 (a loss of \$ 3.2 billion on automotive operations) compared with a profit of \$ 99 million in 1990. Chrysler Corporation has reported a loss of \$ 795 million in 1991. General Motors recorded a consolidated 1991 calendar year loss of \$ 4.5 billion. Together, these losses amount to more than \$ 8 billion on automotive operations alone."

Shiller goes on to point out that Toyota is expected to reduce its profits by 73 per cent this year and Japan's automakers are thought to have lost \$ 3 billion on US operations last year. In short, any increase in the general burden of environmental charges on the automotive industry is coming at an extremely difficult time. As always, it is not enough to legislate for pollution control, without some marginal notice of what is happening in the economy as a whole. This is a similar dilemma to that noticed before. The rate at which the pollution from vehicles could be reduced relates to the rate of change in the "parc". In times of economic boom, it is possible to switch the number of vehicles on the road towards environmental best practice, relatively rapidly. In times of harsh recession, when few buy new cars, the rate of emission improvement slows. According to Shiller, since 1978, the average fuel consumption of European vehicles has improved by more than 20 per cent. Those of the US improved by 50 per cent between 1973-1988. Now however, improvement is slow for economic, rather than technical, reasons.

Oil Companies

Much the same point is raised by John Mitchell, Special Advisor to the Board of BP. He too points to the Clean Air Act and costs it at \$ 15 to \$ 23 billion

to the US oil companies by the late nineties. He drily adds: "without quibbling over the last cents, the numbers are very large in relation to the profits of the oil industry". There is therefore no possibility that these costs can be met by oil industry shareholders. Returns on equity of the US petroleum companies since 1983 have been significantly lower than returns on the Standard and Poors Index and have been quite variable. The competitive situation means it will be difficult to pass these costs on until some refineries have been driven to close and thus must take a year or two. But in the long run the costs must be passed on or the shareholders will vote their money elsewhere. How economic growth responds to price increase is another story.

Mitchell goes to attack the whole notion of percentage carbon reduction targets, for failing to notice that Europe in particular has substantial energy taxes already. He wants EC energy taxes to be rationalised, but believes this to be politically difficult because the politicians want to avoid rationalising the European coal industry and would prefer a large cash infusion from a new tax, to making sense of the old ones. US attitudes to the environment are damaging the US oil industry, so the global warming business is not purely a conspiracy against Opec. Nonetheless, the carbon tax concept is likely to seriously damage the interests of all consumers and unhinge the market at a time when the oil majors at least can ill afford the cost.

Mitchell's views may be coloured by the problems of BP, but few operational managers in the oil industry would not agree with his forthright views. Once again the investment cost in tackling global warming has to be seen in the context of the current state of industry. Ajay Mathur, of the Tata Energy Research Institute, India, reflects on the same problem. To put it his way: "The low energy consumption levels in developing countries also constrain their ability to limit Greenhouse Gas emissions as a large fraction of emissions are from subsistence activities. This, in turn, (accompanied by the low per capita creation), makes it economically painful for them to shift investment limitation strategies. At the same time, however, since the costs of emission limitation are much cheaper in developing countries than in the industrialised countries, global economic efficiency demands greater limitation in the developing countries. The only way out of this dilemma is the establishment of an international economic regime that taxes carbon use in all countries, but also simultaneously facilitates the transfer of resources from the high limitation cost countries to the low limitation cost countries."

Lindzen's attack

At this point, with a further 50 pages of detailed analysis to go, FTEE must plead poverty of space. Suffice it to say that John Lichtblau of the Petroleum Industry Research Foundation diverts the argument by laying all the blame on coal and pointing out that US gas is a much underrated resource. But then comes a

real delight. Richard Lindzen is Sloan Professor of Meteorology at MIT and can pen a mean phrase when he wants to, and, boy, does he want to! Only a few nuggets need be printed here. Indeed to try to paraphrase this tour de force of irritation would insult the Professor's polemical skills and his venom. To give some of the flavour all that is needed is a shell-burst of quotes: "Current models all predict that warmer climates will be accompanied by increasing humidity at all levels. As already noted, this behaviour is an artifact of the models since they have neither the physics nor the numerical accuracy to deal with water vapour. Recent studies of the physics of how deep cloud moisturize the atmosphere strongly suggest that this largest of positive feedbacks is not only negative but very large. Or to put it another way, increased atmospheric moisture will have a cooling effect.

"...There is nothing in the record that can be distinguished from the natural variation of the climate. If one considers thtcs the situation is even more disturbing. There is ample evidence that the average equatorial sea surface has remained at + or - 1 oC of its present temperature for billions of years, yet current climate models predict average warming of from 2-4 oC even at the equator. It should be noted that for much of the Earth's history, the atmosphere had much more CO2 than is currently anticipated for centuries to come..." "In the meantime, the global warming circus was inlwing. Meetings were going on non-stop. One of the more striking of these meetings was hosted in Summer 1989 by Robert Redford at his ranch in Sundance, Utah. Redford proclaimed that it was time to stop research and begin acting. I suppose that this was a reasonable suggestion for an actor to make, but it is also indicative of the overall attitude to science. Barbara Streisland personally undertook to support the research of Michael Oppenheimer at the Environmental Defense Fund - even though he is a full-time advocate, and not a climatologist. Meryl Streep made a public appeal to stop warming on Public Television. A bill was even prepared to guarantee Americans a stable climate."

"The petition was eventually signed by 700 scientists including a great many members of the National Academy of Sciences and Nobel Laureates. Only about 3 or 4 of the signers however had any involvement in climatology."

A particular target for Lindzen's wonderful spleen is the Democratic Vice Presidential candidate, Senator Gore, known locally as Gore the Bore. Lindzen has nothing but pure scorn for Gore's contention that the true believers in global warming are the heirs of Galileo and that summer of 1988 was the "Kristallnacht" before the warming holocaust. His contribution alone is worth the money for the proceedings. It is a polemic of outstanding sarcasm and wit and must have rocked the delegates into applause. After all, this is a US Professor at one of the most prestigious US universities, before an Opec audience, lambasting the environmental movement for absurd overkill. One more quote will suffice:

"...the major losers will onary people. Wealth will be squandered that could have been used to raise living standards in much of the world. Living standards in the developed world will decrease. Regulatory apparatuses will restrict individual freedom on an unprecedented scale. Here too however, one cannot expect much resistance to proposed actions - at least not initially. Public perceptions, under the influence of extensive, deceptive, and one-sided publicity, can become disconnected from reality. For example, the state of Alabama has had a pronounced cooling trend since 1935, Nevertheless, a poll among professionals in Alabama found that about 95 per cent of the participants believed that it had been warming over the past 50 years, and that the warming was due to the greenhouse effect. Public misperceptions coupled with a sincere desire to 'save the planet' can force political action even when politicians are aware of the reality."

Giant Soya beans

After this, the contribution of Bert Drake, a plant physiologist of the Smithsonian Environmental Research Centre falls a trifle flat, but is useful for all that. Drake's particularly business is soybeans and numerous other bits of flora and the impact of increased CO₂ on photosynthesis. Unlike Lindzen, Drake is anything if not cautious, but his essential message is that increased atmospheric CO₂ speeds up photosynthesis. As such he challenges the old ecological assumption that the carbon cycle of plants exists in a global equilibrium. The research here is, to say the least, inconclusive. Nonetheless, there are pointers to the notion that as CO₂ ppm in atmosphere grows, the plants grow too. One study suggests that since the industrial revolution atmospheric CO₂ has grown by 25 per cent and the yield of soybeans has grown by 15 per cent. Trunk diameter in "sour orange trees" has apparently increased by 179 per cent in an Aoexperiment. In short, plant life, according to one Puerto Rican workshop could absorb between 3.5 to 8.2 Giga tonnes of carbon per year as an additional carbon sink, while the gross carbon output from anthropogenic sources is in the region of 3.4 GtC/yr.

Frankly, FTEE is simply not qualified to say whether this is hocus pocus or not, but the idea has its charms. The giant soyabean will certainly have its attractions to Heinz - bean means Hein etc. Equally, the question - how would you like your giant pea cooked this evening, darling? - has a certain ring to it. However it is time to get back to the depressing state of the economy in the company of Robert Mabro and Subroto.

Robert Mabro

It does not take Mabro much time to get to the heart of the matter. He maintains that the argument that the immediate difficulty for oil and particularly Opec, from the global warming business has been exaggerated. The

plain fact is that higher fuel specifications require more oil not less and that Opec is likely to benefit from increased gas consumption. Not least of the problems is that the Europeans in particular are using the environmental bean feast to pursue policies that are really related to security. After all, what could be more absurd than discriminating in favour of local coal production through subsidy, while taxing imported oil? (This reflects the laughable idea being put around in Governmental circles that any new carbon tax should be directly related to subsidising the German coal industry.) As for further taxes on gasoline, the price elasticity of demand is so low anyway that additional taxes on it are going to make not a halfpence worth of difference to the CO2 output. The Europeans should come clean and call any new tax an excise revenue earner and leave it at that. Mabro's advice to Opec is simplicity itself:

"The countermove is to impose an import tariff on the import of goods and services from the countries which discriminate against oil through a fiscal regime that does not correspond to the carbon rankings of fuels. Spelling out the modalities of retaliation clearly and credibly before the event is the best way to avoid it. A firm approach, aimed at preventing the damage of discrimination rather than curing it after it has occurred would concentrate wonderfully the minds of those who contemplate discrimination." Rather ominously he later adds:..."The restriction of Opec's institutional brief to oil is far too narrow now that we are entering an era where natural gas is called upon to play an important role. It is also too narrow in economic terms because development is the ultimate objective and oil is just the means."

Sobruto too follows on in a similar theme. Having pointed out that the average weighted selling price of oil in the EC is \$ 83 a barrel in 1991, he notes that 54 per cent of that selling price is already taxation. He re-enforces various of the arguments about aid flows, but he finishes with an equally veiled threat: And last but by no means least of the possible, "undesirable consequences of the energy/carbon tax is the attitude of Opec member countries might be forced to take in the light of consumer-government policies we consider harmful to our interests. If the tax is implemented in the OECD ct with the objective of standardising their CO2 emissions at 1990 levels by 2000, and subsequently to reduce them by 20 per cent by the year 2010, OECD potential energy demand will also decline substantially, making deep inroads into Opec's oil revenues and cutting its real GDP. I ask you, what kind of incentive does such a tax offer our member countries to commit scarce financial resources to increasing and maintaining oil production capacity in order to meet the future increases projected in world oil demand?" In short, if anybody is going to take any more economic rent from oil, then it may as well be Opec and there is not too much the OECD can do about it.

Warning shot

While the proceedings are full of genuflections in the direction of the "problem", there can be little doubt as to the overall direction of the presentation. Opec rightly sees any fiscal changes to combat global warming as a serious threat. And the EC in particular should take this feeling seriously. Yet there is another big theme hiding here, which really has nothing to do with energy at all. Put at its bluntest, if the OECD wants anything from the developing world on this front, then it had better start changing the rules of international liquidity. The unrelenting fact is that the OECD is willing the end but failing to provide the means. And within the OECD it is the Europeans who are really the source of the problem. By insisting on a tight monetary policy in line with Germany and refusing to reflate, they are tightening the noose of developing country debt. At the same time, those industrial actors, who are necessary to promote both growth and energy efficiency are laying off their workforces.

With the world being run on a policy of sound money, harsh conditions for hard currency loans - such as those imposed on Russia by the IMF - are the order of the day. But the developed world community should watch out. When economic growth restarts, as it inevitably must, there may well be a new community of interest abroad in the world; that between Opec and the states of the former Soviet Union. Any market shifted towards gas would be an excellent target for this community of interest, while the western oil companies will still be too enfeebled to react quickly, using domestic resources.

* The Proceedings of the Opec Seminar on the Environment is available from Multi-Science Publishing Company, 107 High St., Brentwood, Essex CM14 4RX, priced at US\$ 78.00.