

Alternatives to Kyoto: the Case for a Carbon Tax

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Axel Michaelowa's paper addresses how the world should proceed in a post Kyoto Protocol period, which begins in 2013 but must be agreed before then. It is informative, ingenious, and constructive. But its proposal for extending emissions targets and enlarging the number of countries to which they apply is deeply flawed, partly by carrying forward the flaws inherent in the Kyoto Protocol (KP hereafter). This comment will address the intellectual framework of the proposal, identify three fatal flaws (all inherent in the Kyoto Protocol), and suggest an alternative approach.

Michaelowa explicitly rejects a cost-benefit approach to public policy in dealing with global climate change in favor of an absolute (indicative) ceiling to atmospheric concentrations of greenhouse gases, mainly but not exclusively carbon dioxide. This approach implies an extreme degree of risk aversion with respect to climate change – any cost to avoiding it is worth the price – about which every economist should be skeptical. Moreover, ordinary citizens will in practice reject this approach – they will not be willing to bear any cost to reduce emissions enough to stabilize concentrations. Policy analysts should acknowledge this from the outset. The price citizens will be willing to pay will initially be modest; it may grow as hard evidence of the costs of climate change accumulate, but even then it will not become infinite, not least because those who will be expected to bear the brunt of the cost of reducing emissions may not be those who incur the greatest damage from climate change. This approach implicitly places climate change above all other social objectives, and it implies a degree of global communitarianism that does not exist today and is not likely to come into being within the next decade, when a post-KP regime must be negotiated. Calling the framework “indicative” softens this strong formulation in tone, but does not alter the substance until the possible limits are identified explicitly.

Emissions permits need to be allocated if the trading regime envisaged is to function effectively. The proposal focuses on allocation of targets among countries, but not the allocation of national targets (= emission rights) within countries. On what principle should they be allocated? Many economists no doubt would favor national auctions. But auctions are in fact rarely used when valuable resources are to be

distributed; allocation on the basis of historical emissions or some variant thereof, is usually preferred. Perhaps allocation can be undertaken honestly in Sweden or Germany or even (more doubtfully) in the United States. But they certainly cannot be undertaken honestly in many countries that under Michaelowa's proposal will be "graduated" into the class of countries assigned emission targets, and indeed they cannot be undertaken honestly in many countries in the KP's Annex I. It is an invitation to favoritism, hence for corruption, the more so the more valuable the permits, and in the framework proposed they could be valuable indeed. Do we really want environmental programs to become the handmaiden of corruption in many countries, as this need for governmental distribution of valuable emission rights surely will?

The proposal envisages international trade in emission rights, something necessary in the KP framework to minimize the economic costs of any given degree of reduction in emissions. But international trading entails potentially large transfers between law-abiding citizens in rich countries such as the USA, Canada, Europe, and Japan to corrupt officials and their favored oligarchs in countries less meticulous about the rule of law – or directly to the governments of such countries. These transfers would not be conditioned on anything beyond willingness to sell emissions rights that had been internationally agreed. The bottom line is that American and European citizens would be making unconditional transfers to Russia, Iran, eventually (although not immediately in the next round) to Burma and North Korea. I would not want to have to defend such a proposal before the US Senate, whose assent would be required for ratification, or indeed before the German Bundestag. It is indefensible. I am aware that some advocates see large transfers from rich to poor countries as a positive advantage of a KP-type trading regime, partly to draw poorer countries into the emission-control regime, partly because it involves redistribution from rich to poor. But if we have learned anything about unconditional or lightly conditioned transfers from rich to poorer countries during the past four decades, it is that they too rarely foster economic development, and they often enrich the powerful and the already rich in poorer countries.

China, India, and many other poor countries do not graduate into emission-target countries under the proposal, although their turn would eventually come with the continued growth in per capita income. But China is where the real action is with respect to climate change within the next decade or two. Despite vigorous programs to move to alternative fuels such as nuclear, hydro, natural gas, and windpower, if China continues to grow rapidly it will build more coal-fired electricity-generating plants in the next two

decades than the United States and Europe put together. Once constructed, these power plants will last for half a century. If we are to take the problem of greenhouse gas emissions seriously, and give it the urgency implied by Michaelowa's framework, we all have an interest in these Chinese power plants. As a practical matter, I offer the judgment that atmospheric concentrations cannot be limited in the next few decades without sequestration of carbon dioxide from major emitters – carbon capture and storage (CCS) as it is increasingly called. The United States is devoting substantial research to this process, which is promising but still undeveloped, both as to the best technical approaches and with respect to keeping the cost of CCS within reasonable bounds. It is much cheaper to design a new plant with CCS in mind than to retrofit an existing plant for carbon capture. Thus here is an arena for practical international cooperation, with Americans and others providing the technical know-how, China providing the experimental ground, and the rich countries together paying the incremental costs – not for power generation, but for potential sequestration. No doubt some of the experiments will fail; we are still in uncertain terrain. But we can learn more quickly which methods are more effective and/or less costly with some full scale experimentation, and in the meantime actually slow the growth in emissions that would otherwise take place. India and others could also offer similar opportunities, but quantitatively China dominates the field in the coming decades.

One can well ask, why try to extend the period of the Kyoto Protocol? The obvious answer is that it exists, and has been accepted by most of the rich countries. But it does not include the United States or China, two countries whose cooperation is absolutely essential if greenhouse gas emissions are to be seriously limited. The proposed framework does not include China in the near future, and it is not much more likely to appeal to the United States than the KP did. While President George W. Bush definitively killed the prospect of US adherence to the Kyoto Protocol (in an admittedly an unnecessarily clumsy, indeed offensive, way), I conjecture that had Albert Gore – whose personal concern about climate change cannot be doubted – been elected US president in 2000, the United States still would not have adhered to the KP. He could not have persuaded the required two-thirds of the US Senate that it is a good agreement, acceptable to the United States, and indeed President Clinton never submitted it to the Senate, although he could have done.

The other reason, I suspect, that some continue to push the Kyoto Protocol is that Europeans got a very good deal under the KP, as is implicit in Michaelowa's new targets, which demand relatively more of Europe. Why, in late 1997, was 1990 chosen as a base year (and earlier years for two central European countries)? In part because it built highly inefficient East German industrial emissions into the European base, and British coal consumption, while on the way down, was known to have a considerable distance to go. Similarly for Russia and Ukraine, who had to be induced into the Kyoto Protocol with generous targets, even though by 1997 it was clear that the energy-intensive heavy industry of the Soviet era had collapsed and was likely to recover only partially even under optimistic scenarios. European growth was also slow throughout most of the 1990s, making it easier for Europe to meet a target based on 1990. In strict negotiating terms, the United States was simply out-negotiated (and carried a surprised and embarrassed host country, Japan, with it). Table 1 reports the 1990 emissions, the targeted reduction for Annex I countries in the Kyoto Protocol, an estimate of emissions in 2010 made by the US Department of Energy in 2004 (excluding any new measures to meet the KP targets), and the percentage reductions required by the Kyoto Protocol from projected 2010 emissions. It can be seen there that the largest reductions are required by Canada, Australia, USA, and Japan, in that order, all 25 percent or more, while required reductions in Western Europe are only 12 percent, while Eastern Europe, Russia, and Ukraine have targets well above their projected emissions. We knew more about growth during the past decade in early 2004 than we did in late 1997, but the main patterns were already known during the Kyoto negotiations. It is not surprising Australia and the USA withdrew; Japan would have "lost face" not to ratify an agreement that bore the name Kyoto, but Japanese officials felt let down by their US negotiating partners, whom they had counted on to protect their position. And Canada had a vigorous debate over ratification, and the then Liberal government imposed a cap on the price of emission rights in order to get the treaty through Parliament, even though such a cap was outside the KP framework and might lead to non-attainment of Canada's Kyoto target.

One way or another, the energy-consuming public is going to have to pay higher prices – under the proposal, significantly higher prices – to cut demand for fossil fuels and to induce emission-reducing technical changes in the energy system. Barring some technical breakthroughs in energy production or consumption that are not now foreseen, higher prices are unavoidable. Advocates of significant action in

the near future to reduce emissions have been reluctant to acknowledge this ineluctable fact. (If instead they expect fast-acting technical progress sufficient to keep the cost low, they should be explicit about that assumption, and think of hedging strategies if it turns out to be incorrect.) This strategy of concealing or seriously downplaying an important consequence of proposed actions will not work in open societies where skepticism of government claims has grown significantly.

A strategy more likely to be successful is to acknowledge that carboniferous energy needs to become more expensive, and to accomplish the required increase in prices with an internationally agreed tax, revenues to accrue to each tax-levying country, to avoid the issue of large unconditional transfers among countries. Many countries would welcome the additional revenue; countries where this is not the case could use the revenues to lower other taxes. This proposal – an alternative to Michaelowa's -- is discussed in more detail in the following section. It is not assured of success. But in my judgement it has a better chance of actually reducing greenhouse gas emissions than does the proposal in Michaelowa's paper.

A Global Carbon Tax

There are negative and positive arguments for introducing a tax on emissions of greenhouse gases (GHGs). The negative argument is that the leading alternative, quantitative goals with a trading regime in emission rights, is almost certainly politically unsustainable on a global basis. Key developing countries must be seriously involved in any effective effort to reduce GHG emissions. On US Department of Energy projections, for instance, China's CO₂ emissions will reach those of Europe before 2010 and those of the United States by 2035. Emissions from India, Brazil, and others are also significant and growing rapidly. Yet it is difficult to imagine a set of effective national quantitative targets that China and the USA could both agree on, to take only the leading emitters among rich and poor countries. Kyoto excludes developing countries. Kyoto's advocates acknowledge that, but aver it is only the first step. What does the next step look like? Michaelowa's proposal is a constructive effort to specify the next step, but contains the weaknesses noted above.

Furthermore, "cap and trade" will involve the allocation of valuable rights. The prospect of such allocation might be attractive to domestic businessmen, who are always looking for government handouts (witness any tax bill), but it will necessarily be a highly political process, unless the rights are auctioned, which will be resisted strongly by the business community. While the domestic process is merely

unattractive, and in a sense deeply corrupting, the international allocation with trading will be politically impossible. What Senator, once s/he understands the full implications of a trading regime, can vote for a procedure which could result in the unconditional transfer of billions of dollars, even tens of billions, to the government of communist China, or to Castro's Cuba, or even to Putin's Russia? Not only is it politically impossible, at least in the United States, but I would argue that large unconditional transfers to governments are in general highly undesirable, shifting attention in receiving countries away from the need for fiscal discipline and thoughtful cost/benefit analysis of the balance to be struck between taxation and government expenditure.

The key alternative, if action to reduce GHG emissions is to be taken, is to focus on level of effort rather than on quantitative targets: concretely, on the introduction, within an internationally agreed framework, of a domestic tax on GHG emissions, revenues to accrue to the government of each country where the emissions occur. The focus initially would be on fossil fuels, cement, and other industrial processes that result in emissions of carbon dioxide. Methane is more difficult under any regime, and can be added later after experience is garnered with CO₂.

The proposal involves international agreement on a regime for a common tax to be levied on the major sources of emissions of carbon dioxide, and on the selection of the common tax rate, both initially and subsequently. The tax would be incremental to existing taxes (and subsidies) , including those on fossil fuels, on the grounds that whatever taxes exist were introduced for reasons unrelated to global climate change, that global climate change is a newly recognized problem for purposes of collective action, and that all parties should add new incentives for the reduction of emissions. (Allowance could be made for taxes that have been introduced in a few European countries following agreement on the Kyoto Protocol whose explicit rationale was to reduce CO₂ emissions.)

A uniform incremental CO₂ tax would introduce an incentive, worldwide, to reduce carbon emissions. The response to the tax would of course differ from country to country. Where emissions can be reduced at a cost lower than the tax, such reductions can in time be expected to take place. Where the cost of reducing emissions exceeds the tax, the tax will be paid. In either case the cost of fossil fuels will be raised everywhere, in proportion to their carbon content. A uniform tax thus is economically efficient, in that reductions will be greatest where the cost of such reductions is least, worldwide. The universal

presence of the tax will also avoid geographic relocation of industries to avoid the tax – a potential problem under the KP and its extensions -- except where such relocation is in fact economically efficient.

Introduction of such a tax raises a number of issues, which will be taken up in turn: the level of the tax, and procedures for changing it; compliance; enforcement; macroeconomic effects; possible differential treatment; use of revenues; and how to treat sequestration -- activities that deliberately withdraw atmospheric CO₂.

One objection sometimes raised to a tax is that we will not know initially what the quantitative impact will be. Entirely true. But the KP targets also bear little direct relationship to the underlying problem, viz. the growing concentration of GHGs in the atmosphere. It is, as its advocates insist, only a first step. The tax would similarly be a first step, with a much clearer path to what the second and subsequent steps would look like.

The initially agreed tax should be at a level sufficient to attract serious attention to tax-avoiding emission reduction, say \$50 a ton of carbon. (This would amount to nearly \$14 per ton of CO₂ the unit of measurement used in the Kyoto Protocol, and would amount to roughly a 100 percent tax on coal, with lower tax rates per useful btu for oil and still lower for natural gas.)

The world would gain experience over time with the impact of this tax on emissions, while it is also learning more about the climate system and refining its estimates and its preferences concerning the prospects for climate change. Provision would be made for a review of the rate of tax after, say, the first ten years, and quinquennially thereafter, taking into account both greater knowledge about the impact of the tax and about the evolution of climate in response to continuing GHG emissions.

Compliance would be easy to assess. Every country has a known mechanism for promulgating new tax rates and regulations. We would know whether a country had responded to the international agreement by changing its tax regulations in accordance with it. Administratively, the tax would best be levied at the choke points for fossil fuels: main gas and oil pipelines, or refineries, and main coal shipments by rail or barge, plus allowance for pit-head power production. But this practical detail could be left to each country.

Promulgating new taxes and actually collecting them are two different things, for any tax. Enforcement of tax collection raises complicated questions, as indeed would enforcement of emission

ceilings. Almost all countries (Cuba, North Korea, Taiwan, and Hong Kong, along with a number of mini-states, are the exceptions) are now members of the International Monetary Fund (IMF), and as such their economic policies, including fiscal policies, are subject to detailed annual surveillance by the IMF staff. Under a carbon tax agreement, the IMF could be asked to pay special attention during these reviews to sources of revenue, and in particular to carbon tax revenues. Each country's revenue books would be open to inspection, and its tax officials available for questioning. Countries' tax systems would also be monitored to assure that the carbon tax was not nullified by changes in other taxes which indirectly favored CO₂-emitting activities, a concern that has been expressed by Wiener and others. Of course any country that desired to cheat could do so, but that is a problem with any regime to limit emissions, and many officials would have to be brought into the conspiracy. Furthermore, physical readings of the largest sources of emissions, such as power plants, could be taken (e.g. by satellite and by on site inspection) as part of the compliance regime.

What about the erosion of impact of the carbon taxes through other tax relief or subsidies to the emitters? Again, the IMF could be asked to scrutinize any major tax change for consistency with the carbon tax regime. The process would be a consultative one, initially bilateral between each country and the IMF. Presumptive cases of violation could be referred to special panels, WTO-style, for further investigation and scrutiny. Publicity would be given to significant violations. Exports from countries with egregious and quantitatively significant violations could, by panel finding, be made subject to countervailing duties by importing countries, even under existing legislation, once the tax on CO₂ emissions was judged internationally to be a cost of business, subsidization of which would be treated as a conventional export subsidy.

Any significant change in taxation can have disruptive macro- and micro-economic effects. Provision should be made in all countries for phasing in the tax, starting low and gradually rising to the full agreed and pre-announced rate. Macroeconomic effects could be minimized by making the tax fiscally neutral (which would involve making a guess in each country what its initial impact on emissions would be), either by increasing expenditures or by reducing other taxes. Many governments would need the additional revenue, and for this reason ministers of finance everywhere would welcome such a tax. Where

the revenue is not needed, or where an increase in the total tax burden is politically insupportable, the new revenues could be used to reduce other taxes.

The revenues are likely to be substantial, but not overwhelming. The Clinton administration calculated in 1998 that if the Kyoto Protocol were to be extended to China, India, Mexico, and South Korea (each of which was given a notional target equal to its business as usual trajectory) , the trading price that would achieve the Kyoto targets would be \$23 a ton of carbon, equivalent to a tax of that rate, about half the rate suggested above. With estimated worldwide emissions in 2010 under effective Kyoto targets of 7 billion tons of carbon, the tax would yield worldwide revenues of \$160 billion, about 0.4 percent of gross world product in that year.

Developing countries, as noted above, must be fully embraced by the carbon tax regime if there is any hope of limiting atmospheric GHG concentrations. However, developing countries could be granted a longer period of time to introduce the tax, so long as the period was not so long as to induce uneconomic relocation of economic activity to countries that had not yet introduced the tax. Five years might be an appropriate delay, to be followed by the phase-in period.

Even though the carbon tax would increase the price of fossil fuels, growth need not be seriously affected, since the revenues could be used for expenditures or tax-reductions that contribute to growth. Decisions about use of the carbon tax revenues would be left entirely to each country, so long as they were not used to undermine the purpose of the tax, which is to reduce CO₂ emissions.

Reduction of emissions may not always be the most efficient way to limit growing atmospheric GHG concentrations. Sequestration of CO₂ from the atmosphere should be included in the menu of permissible actions. Subsidies (at the agreed CO₂ tax rate) could be given for sequestration, or tax rebates where the sequester is also the emitter. Again, this process would be up to each country to implement, subject to international surveillance.

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CARBON DIOXIDE EMISSIONS
(mmt)

	1990	2010 ^P	KP Required Cut (percent)	KP Required Cut (mmt)	Cut as % of 2010
USA	4989	6559	7	1919	29
Canada	473	686	6	241	35
Japan	987	1239	6	311	25
Australia/NZ	294	455	(8)	137	30
Western Europe ^a	3412	3567	~8	428	12
Eastern Europe	1104	797	8	(219)	(27)
Russia	2405	1792	0	(613)	(34)
Other FSU ^b	1393	808	0	(585)	(72)
Total (excluding USA & Australia)	9774	8889		(437)	(5)

^P Projection in EIA, International Energy Outlook, 2004

^a EU, Iceland, Norway, and Switzerland

^b Only Ukraine covered by Annex I