Internationale Politikanalyse
International Policy Analysis

Hans-Jochen Luhmann and Wolfgang Sterk

Climate targets – should they be met at home or where it is cheapest?

The "clean development mechanism" as generator of investment from inside the climate regime

■ The Kyoto Protocol's emissions trade mechanisms permit individual industrialized countries to purchase reductions in other countries and count them towards their own Kyoto emissions targets. Originally conceived as a limited safety valve for overburdened industrialized countries the emissions trade has come to be regarded by many as the central mechanism for North-South financial transfers, and one which should be extended.

■ However, the idea that support should be provided primarily by means of the emissions trade conflicts with environmental requirements: It undermines the framework conditions necessary for the requisite environmental innovations and the stemming of climate change requires, not only in the North, but also in the South, considerable emissions reductions by 2050, not merely restrictions. The question arises, how it can be achieved, in the longer term, that the South, alongside its own reductions, continues to satisfy the North's considerable demand for emissions rights.

■ Emissions trade must be tailored in such a way that there is still sufficient pressure for innovation. Only then will there be any prospect that the concept of "environmental industrial policy" will achieve what it is capable of. That is, if support for Southern states is to be organized by means of the emissions trade market it must, in contrast to previous measures, take place in addition to domestic reductions in order to maintain the pressure for innovation.

JULY 2008

FRIEDRICH EBERT STIFTUNG

Content

Summary

The Kyoto Protocol's emissions trade mechanisms permit individual industrialized countries, instead of reducing emissions on their own territory, at least partly to purchase reductions in other countries and count them towards their own Kyoto emissions targets. Originally conceived as a limited safety valve for overburdened industrialized countries emissions trading has in the meantime come to be regarded by many as the central mechanism for North–South financial transfers, and one which should be extended. The developing countries, that is, have to be integrated in the environmental protection obligations that are to be met worldwide. Given their clearly smaller historic responsibility for climate change and their clearly weaker economic and technological capacities it is unreasonable to expect them to achieve the requisite environmental protection results by themselves. The idea that support should be provided primarily by means of emissions trading, however, is questionable on a number of points. In terms of its implementation hitherto, substituting domestic reductions as far as possible with purchases from abroad, the emissions trade option conflicts with environmental requirements in two ways. First, it undermines the framework conditions necessary for the requisite environmental innovations. The argument underlying emissions trading – the greatest possible cost efficiency – reflects a static understanding of efficiency that does not go far enough.

Only the (predominantly) domestic fulfillment of emissions reduction obligations by the industrialized countries can form the basis for technical advances that can then be distributed in the developing countries, and promises, in an interaction of forerunners and successors, to generate the rapid transformation needed to limit anthropogenic climate change to a tolerable level.

Second, the stemming of climate change requires, not only in the North, but also in the South, considerable emissions *reductions* by 2050, not merely restrictions. The question therefore arises, to what extent it can be justified, in the longer term, that the South, alongside its own reductions, continues to satisfy the North's considerable demand for emissions rights. In essence, the conclusion follows that emissions trading must be tailored in such a way that there is still sufficient pressure for innovation. Only then will there be any prospect that the concept of an "ecological industrial policy" will achieve what it is capable of.

That is, if support for Southern states is to be organized by means of the emissions trade market it must, in contrast to previous measures, take place *in addition to* domestic reductions in order to maintain the pressure for innovation. Even if one allows for the fact that the South should make a contribution in accordance with its economic capacities the North still has to meet emissions targets far beyond what is currently on the political agenda.

Overview

It is reported that at the UN conference on climate change in Nairobi in November 2006 an assessment was presented that sheds light upon the nature of the climate regime of the future. This vision is rather special, on two grounds: on the one hand because, unusually, it is not based on quantities, but rather on financial considerations; and on the other hand on account of the identity of the "prophet" who presented it. The person in question is the new leader of the UNFCCC Secretariat. "In one scenario, UNFCCC[1] Executive Secretary Yvo De Boer calculated based on three 'ifs'," reports the *Earth Negotiations Bulletin*:[2] "If industrialized countries reduce emissions by 60–80 percent by the middle of the century; if they buy carbon credits from developing countries for half that amount; and if carbon prices sit at around US$ 10/tonne, a carbon finance flow worth some US$ 100 billion a year could be generated."

De Boer's assertion refers to the emissions trade mechanisms that were introduced into international climate policy by the Kyoto Protocol. Under the Kyoto Protocol the industrialized countries are obliged to reduce their greenhouse gas emissions by 5.2 percent, on average. Emissions trading permits individual states to substitute emissions reductions on their own territory with the purchase of reductions in other states and to count them towards their own national targets. This is to allow states with high national emissions reduction costs to utilize more economical emissions reduction possibilities in other countries. As far as the effect on the environment is concerned, it is immaterial whether a tonne of carbon dioxide (CO_2) is emitted – or not emitted – in Germany, Russia, or South Africa. According to the quotation cited above, therefore, the Executive Secretary of the UNFCCC assumes that the industrialized countries will willingly commit themselves to far-reaching reductions by 2050 – but that more than half of their obligations will be met not at home, but rather through the purchase of emissions reductions from abroad.

Hans-Jochen Luhmann, Wolfgang Sterk, both Wuppertal Institute for Climate, Environment and Energy.

1 United Nations Framework Convention on Climate Change.

2 *Earth Negotiations Bulletin* (ENB), vol. 12, nos. 318, 20 (November 2006): 19.

The introduction of emissions trading was long disputed – and to some extent this remains the case. In particular, in the negotiations on the Kyoto Protocol the EU held out against it for a long time because it feared that states would in this way be given the possibility to "buy themselves free" of the need to change their unsustainable lifestyles, modes of production, and infrastructure. In the meantime, however, emissions trading has to a large extent become accepted, and indeed on account of their burgeoning national emissions many EU states depend upon it if they are to meet their Kyoto obligations. In Yvo de Boer's vision emissions trading functions no longer as an emergency outlet for overburdened industrialized countries, but as the royal road to extensive financial transfers from the North to the South.

In what follows we shall first examine the genesis of international emissions trading and work out how in the course of the Kyoto negotiations the original aim of obtaining commitments to reduce domestic emissions in the industrialized countries has successively been watered down. We shall then contrast the notion of economic efficiency achieved as much as possible by trading emissions with the concept of an ecological industrial policy announced as a program by the German government, which aims at tackling the problem of climate change by means of large-scale innovations to be developed at home. We shall also discuss how far these two approaches are compatible. Finally, we shall critically examine the quantitative implications of de Boer's vision.

This vision is questionable in a number of respects because the EU's fear that the possibility of purchasing more emissions rights from abroad will diminish the pressure for innovation at home has not been dispelled. And since considerable emissions reductions are required by 2050 not only in the North but also in the South the question arises, how the South, alongside its own reductions, will also be able to keep up with the demand for emissions rights from the North in the amount of 50 percent of the North's reduction commitments.

How upper limits are made permeable – evaluation of the period up to 2012

The chameleon-like notion of "their emissions"

The background to the "vision shift" expressed by de Boer's words is a conceptual distinction within the Kyoto Protocol agreed under the UN umbrella. The industrialized countries made a commitment before the UN environmental conference in Rio in 1992 that was a constitutive condition for the developing countries, namely that they "should take the lead" in emissions reductions. This is the form of words used in Article 3(1) of the United Nations Framework Convention on Climate Change (FCCC), which was universally understood to mean that "the industrialized countries wish to (and shall) be pioneers in the reduction of greenhouse gas emissions *from their territory*."

In the implementation and concretization of this the aim of the Kyoto Protocol reads "Parties included in Annex 1 [that is, the industrialized countries] shall … reduce their overall emissions … by at least 5 percent below 1990 levels in the commitment period 2008 to 2012".[3] Both the press and the general public usually overlook the flexibility of the concept of "their overall emissions" that the negotiating partners created in Kyoto.

Significance of the phrase "their overall emissions"

During the preparatory stage the Protocol was conceived as a treaty that would include emissions typical of the industrialized countries – only they were to be subject to reduction obligations. Contrary to this the result of the all-night sessions was that with the expression "overall emissions" the notion of net emissions was transformed into a complex notion of gross emissions. The possibility had been created to offset emissions of fossil fuel CO_2 with the (net) absorption of recent CO_2 by the so-called green mantle of the earth (by so-called "sinks"). The negotiation process that went on for several years after Kyoto, and which came to an end with the Marrakech Accords in 2001, was essentially for the purpose of interpreting this concept of gross emissions.

Up until Kyoto the meaning of "their emissions" was clear. According to the usual UN interpretation up to that point "their" denoted the territorial origin of the emissions. Since, under pressure from the USA, the whole system of quantitative control and target attainment in the Kyoto Protocol rests upon emissions rights, however, and the whole Kyoto Protocol is therefore only a system for trading emissions, the possessive pronoun "their" could from now on also be understood in a second sense – in the direct possessive, that is, in the proprietary rights sense with the meaning of "attributable to them". This supplementary meaning was henceforth taken as the legally binding one; "their emissions" overnight became a

3 Kyoto Protocol to the United Nations Framework Convention on Climate Change (KP), Art. 3, para 1.

balance sheet concept. What the Kyoto Protocol in fact commits the industrialized countries to do is not to reduce their own emissions in accordance with their emissions targets, but at the end of the commitment period to be able to produce emissions rights in the amount of the emissions coming out of their territory. For this purpose they are free either to restrict emissions from their own territory or to balance increased emissions at home with emissions rights purchased from abroad. The Protocol's emissions targets merely lay down the initial quota of emissions rights.

Central to the whole process is the Clean Development Mechanism (CDM) that allows the industrialized countries to finance emissions reductions in developing countries and to count them towards their Kyoto targets. While transfers between industrialized countries are ultimately a matter of cutting up a cake whose size is determined by Kyoto, the CDM makes the cake of emissions rights available to the industrialized countries bigger.

An unambiguous formulation of the old meaning of "their" in qualifying emissions that emanate from a particular nation state, in the meantime, would be "domestic". At the insistence of the EU the Protocol contains a provision that emissions trading should be merely "supplementary" to "domestic action". This provision was never defined quantitatively, however, and so can be interpreted by individual states as they will.

How a strict reduction target is watered down

(a) The industrialized-countries level within the meaning of climate law

After the negotiating rounds in Bonn (2001) and Marrakech (2001) on the operationalization of emissions reductions the extent to which the industrialized countries' reduction commitments were diminished by the addition of greenhouse gas absorbing "sinks" was quantifiable, namely from –5.2 percent to –2.5 percent, and at any rate to a number that always has a minus sign.[4]

This calculation works out only if the industrialized countries all join in, however. The USA is officially not participating; in practical terms Canada has also opted out. Japan recently carried out a retrospective revision of its energy balance for 1990. The climate policy side effect of this "correction" of the base year figures for Japanese reduction commitments – which amounts to 6 percentage points – was a reduction of 2 percentage points. This approach is "elegant" because it cannot be checked from a climate law standpoint: the climate regime bodies may check only the *conversion* of energy statistics into emissions figures.

From 1990 to 2005 the industrialized countries' emissions were reduced by a mere 3 percent. That is the temporary effect of two contrary developments: on the one hand, there was a continuous increase in the emissions of Western industrialized countries and of Japan, amounting to 12 percent (1.5 Gt/a);[5] on the other hand, this increase was overcompensated by a development in the (much smaller) group of former socialist countries whose emissions from 1990 to 2000 fell (by 2.1 Gt/a or –40 percent), although since 2000 they have increased continuously.

(b) The European level

The EU-15's Kyoto reduction commitment stands at –8 percentage points, corresponding to 340 Mt/a. It is envisaged that 2.5 percentage points (110 Mt/a) of that will be achieved extraterritorially and 1 percentage point (33 Mt/a) by taking into consideration carbon sinks – if a forest in Europe is a carbon sink it is an indication of an imbalance, and that as a rule goes back to the planting of a forest several decades previously. Reforestations release carbon, however. The EU, going by this announcement, will simply not achieve a further percentage point, which may be presumed to constitute a mortgage on the future. What remains is a volume of 2.5 percentage points (110 Mt/a) that is to be achieved "domestically" by means of climate policy measures aimed at meeting the targets.[6] That amounts to no more than one third of the original reduction commitment. What the EU advocated up to Marrakech (2001), but was unable to implement, was that at least 50 percent of the required reductions be achieved domestically. Nevertheless, the EU hopes that its actions will be regarded as setting a credible example by the developing countries.

4 Bernd Brouns and Tilmann Santarius, "Die Kyoto-Reduktionsziele nach den Bonner Beschlüssen", in *Energiewirtschaftliche Tagesfragen,* 51 (2001): H.9, 590 f.

5 According to FCCC/SBI/2007/30, p. 7, Fig. 2.

6 The implausible and, especially in relation to the USA, unsustainable balancing principles as regards the emissions of the EU's internal air traffic is not taken into consideration.

(c) The level of Germany, the pioneer

In Germany the same applies as at the level of the European Union, only on a different scale. Within the framework of the internal EU-15 allocation of the Kyoto commitments Germany promised reductions in the amount of 262 million t/a that would make up the greater part of the EU-15's reduction commitment of 340 million t/a. In 2005 there was still a shortfall of the magnitude of 50–70 Mt/a. In Germany, due to the imbalance attributable to the Second World War or their balancing out after 1945, the forests find themselves in a late phase of net growth, which affects its sink capacity. It stands (compared with 1990) at around 4.5 Mt/a and at this level Germany may also (at most) take it into account. The Federal government has decided to exercise this option.

What is quantitatively decisive is the extent to which German industry (insofar as it is subject to the EU emissions trade) is granted the option of emissions reductions from "Joint Implementation" and "Clean Development Mechanism" projects (JI/CDM). This involves a massive increase as compensation for emissions reductions that the decision of the European Commission of 29 November 2006 asked of this sector. Originally, industry was promised a JI/CDM fulfillment quota of 12 percent. But subsequent to the above mentioned decision, which prompted industry to urge the Federal government to take action against it, the quota was raised to 20 percent. The basis of calculation as regards the quota is the emissions volume granted to the sector up to 2010 (understood as an average for 2008–2012) – for German industry 453 Mt/a. Industry may therefore purchase JI/CDM certificates in the amount of 90 Mt/a (originally 50 Mt/a). In the first half of the 2000s this sector's emissions stood at around 500 Mt/a, and so it needs to make a reduction of almost 50 Mt/a. In theory, the affected companies do not themselves have to save a single tonne, but can even buy more than what they are obliged to reduce.

(d) Conclusion

Overall, a uniform tendency emerges: when the term of redemption of commitments is still a long way off, reduction promises are made in accordance with the "domestically" principle; as the deadline approaches, however, and domestic policy measures are required to achieve what was promised, the more the "domestically" principle is watered down. The transformation is particularly striking in the case of the EU, which originally was very skeptical of emissions trading and the use of sinks and insisted on the primacy of "domestic action" but in the meantime has itself become a bulk purchaser.

Reconsideration of the central aim of multilateral climate policy

Given the political tendency to abrogate promises the closer the time comes to having to keep them it was foreseeable that the seemingly endless negotiations that would be set going again in order to reach agreement on the future of the Kyoto Protocol would once more generate unsatisfactory results unless something fundamentally different – something surprising or unusual – was fed into the established play of forces.

At Germany's instigation the EU decided to do something unusual. It was clear that the negotiations on concrete reductions targets by 2020, 2030 or 2050 would degenerate into a direction-less "power poker" unless the question of where the danger threshold lies, to which Article 2 of the UNFCCC refers, was first settled. According to Article 2 "the ultimate objective of this Convention and any related legal instruments [such as the Kyoto Protocol] … [is the] stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." A reconsideration of the aim of all climate policy was due.

In terms of climate law anthropogenic climate change is to be understood as an increase in the concentration of long-lasting greenhouse gases. In addition, there is a maximum acceptable level beyond which lies the "danger" zone. At this threshold the zone of collective illegality begins. The atmosphere is here represented as a kind of reservoir or pool. The legal concept of "dangerous climate change" denotes the size of the pool's rim, the maximum capacity. Beyond this limit things continue, expressed mathematically, in a non-linear fashion. In relation to a bath one describes the consequences if this tipping point is exceeded as overflow or flooding.

There is full consensus in the international community concerning the following: (a) climate change should be stopped; (b) this should be achieved before the tipping point is reached. Climate change will be stopped when the level of greenhouse gas emissions is reduced to the capacity of the pool's drain – the rise in the water depth gauge, that is, is the result of the difference between the two. Drainage capacity stands at a value below 10 Gt/a, probably much lower. At present we are experiencing an afflux of 50 Gt/a. In 1990 it was almost 40 Gt/a.

At UN level the international community has so far dragged its heels in laying down limits. But according to the text of the FCCC it is committed to clarifying the issue within the framework of checking the "adequacy of commitments",[7] although every year since 1998 it has postponed the corresponding agenda item to next year's meeting.

Central decisions on the maximum available carbon/greenhouse budget

When the European Council declared on 23 March 2005 that in its opinion the danger threshold within the meaning of the UNFCCC comprises "an increase in the global annual mean surface temperature of 2 °C in comparison with the pre-industrial level" the effect was like a lightning bolt. This task of subsumption has also occasionally been revised by climate science, with a result of 1.5 °C to 2 °C.

The numerical value of 2 °C refers to the (maximum permissible) increase in temperature caused by mankind by altering the earth's energy balance, even if it only fully manifests itself decades later. If one wishes to avoid going beyond the danger threshold it is not possible, on account of this delay, to "shut off" when the limit temperature is reached, because then it would already be much too late. At the time of the EU decision the manifest increase in the global annual mean surface temperature stood at 0.7 °C, while what had already been caused stood (according to the semiofficial scientific estimate at the time) at around 1.8 °C.

In marking policy objectives by setting a maximum *temperature* the political world has not formulated its guidelines in terms of a category that can directly influence action. That can be achieved by instructions concerning permissible future greenhouse gas emissions and so also their complement, namely emissions reduction objectives within a certain time period. The political formulation, however, is in the category of "temperature", therefore in the form of a measure of the *effect* of climate change. With this categorical decision policy makes itself dependent upon climate science and its models that physically describe the long-term connection between cause and effect. With the help of these models the maximum permissible emissions budgets can be determined, calculating backwards, from the temperature upper limit. The central parameter of climate models, which reduce this causal connection to a simple relation, bears the name "climate sensitivity". It indicates the temperature increase (in °C) at which the climate system reacts to a doubling of the carbon dioxide concentration in the earth's atmosphere.

Against this background the significance of the IPCC Report of spring 2007 becomes clear. It contains two new insights that constituted a sensation in relation to the estimation of the budget available up to the danger limit. In January Working Group 1 announced that the reaction of the temperature in the earth system should be estimated at a higher level since climate sensitivity no longer stands at 2.5°C (the EU had calculated on this basis) but at 3°C, that is, 20 percent higher. Working Group 3 followed this in May with the assertion that global emissions currently stood (and had done so for some time) at around 5 Gt/a – that is, 10 percent – higher than in previous projections, made in the mid-1990s. That means that a not inconsiderable part of the future emissions budget, hitherto considered compatible with the two-degree target, has already been taken up.

The IPCC Report undermines the basis of the EU's March 2005 decision to establish a global reduction target for 2050. The EU's formulation was "in the order of at least 15 percent and perhaps by as much as 50 percent". The EU has not responded explicitly and officially to the new situation resulting from the IPCC Report. There has not been enough time for that because of the deadline pressure due to the G8 Summit in Heiligendamm in June 2007. The G8 and EU Council chair Angela Merkel had the two-degree upper target written in to the February draft of the Summit communiqué, as well as, at the level of action and regarding reductions by 2050, the formula "around 50 percent" – significantly more than the EU policy position of 2005.[8] This double formulation was considered by "Goliath" – President Bush – as a menacing "stone": "The treatment of climate change runs counter to our overall position and crosses multiple 'red lines' in terms of what we simply cannot agree to."

As a result, a compromise was reached. Every reference to limits, whether it be concentration or

7 According to Art. 4.2 (d) a second "Review" process was due by the end of 1998, and then at regular intervals. The international community has observed none of these measures. The first review took place (at leaast formally), under which the Berlin Mandate (1995) was agreed upon, on the basis of which the Kyoto Protocol was introduced.

8 On 8–9 March 2007 the European Council had dropped continuing numbers for 2050, in a vague formulation according to which each country could accept these numbers as the self-defined target of the industrialised countries, but not as a global target: "Their [the industrialized countries] attention should be … directed towards the target of reducing their joint emissions by 2050 by 60 to 80 percent compared with 1990."

temperature values, was deleted, and nothing was mentioned that could even remotely be perceived as legally relevant to Article 2 FCCC, which deals with the protection of natural resources. A single sentence remained referring to action, namely the formula "a reduction of at least half by 2050." The US found this acceptable only because the reference to 1990 was deleted and the formula was quantitatively indeterminate, that is, empty. For the EU this formula went beyond the position it had taken hitherto. With Heiligendamm and thanks to the Federal Chancellor's strategy of dealing only indirectly with the hesitant or even resistant partners within the EU,[9] it was increased from "perhaps as much as 50 percent" to "at least 50 percent". As a self-imposed commitment concerning a global target the outcome of Heiligendamm can be considered an important achievement for the EU.

In September 2007 an attempt was made to ensure that the equivalent of the two-degree target, the protection of natural resources, was appropriately formulated in terms of practical instructions. Behind the initiative lies a group of former heads of state and persons of similar status, who are not bound by the urge to compromise characteristic of negotiations, including the President of the Commission who had initiated the Rio Agreement of 1992, Gro Harlem Brundtland, today the UN General Secretary's Special Envoy on Climate Change. Also belonging to this circle is Klaus Töpfer, former UNEP chief, as well as the USA's former chief climate negotiator under Clinton and Gore, Timothy Wirth. The group was formed by the UN Foundation and is known as "Global Leadership for Climate Action" or GLCA. On 10 September 2007 it published its proposal "Framework for a Post-2012-Agreement". The reduction target by 2050 presented in the document is "at least 60 percent", that is, "more than 60 percent". This represents a prime supportive argument from outside for a small group of colleagues who struggled to reach a compromise during all-night sessions, and it will prevent the negotiations beginning with cut-back targets: this is the purpose of the GLCA position.

The more-than-50-percent formula, that is, led to the tendency to reduce it to 50 percent, to the Toronto formula of 1988, and this tendency is to be observed not only in government circles, but also in environmental NGOs. But in this way one overlooks science's spring 2007 decision to increase climate sensitivity. The only thing compatible with the current resolution situation is to raise the more-than-50-percent formula precisely to "more than 60 percent".

The ambivalence of the central themes of economics as regards climate policy

This tendency to renounce the "domestically" principle is simply astonishing. That is, one must relate this phenomenon to the frequently announced program of implementing the ambitious climate policy targets by means of far-reaching innovations on the part of the economies of the industrialized countries. In fact, what we are talking about is a second industrial revolution – and in Germany, another historical parallel has been officially taken up: the need for another New Deal has been announced as a program.[10] An "ecological industrial policy" is also frequently discussed. It has also been attempted to make practical guidelines of these aims and objectives: the agreement of the "grand coalition" of 11 November 2005 is supported by this "cantus firmus".

One of the architects of this policy approach, Matthias Machnig, now undersecretary at the Environment Ministry, formulates the idea thus: "such an accelerated environmental reorganization will not take place through environmental ministers alone … we need heads of state and government". Machnig has also expounded the three central pillars of this policy's architecture with enviable clarity.[11] According to him, "we need ambitious limits … we will need market introduction programs … we need an increase in research funding." The New Deal being striven for is therefore conceived by its architects as (first of all and in essence) a repeated transformation taking place on one's own territory. Domestic industry should transform itself in the form of products realized by means of technological change achieved by research and development, but which are first of all demanded on the territory of the region making the running (market introduction programs), which on the home market as a pioneer market will lead to a changed product reality and at the same time to different consumption patterns.

Only in this way will a forerunner zone be created. This must go through a "second industrial transfor-

9 The main indication of the lack of unity is the postponement of the announced "burden sharing" – or, as it is known in accordance with a recent language policy decision, "commitment sharing" – decision until the period after Bali.

10 Federal Ministry for the Environment, Nature Conservation and Nuclear Safety: "Ökologische Industriepolitik. Memorandum für einen 'New Deal' von Wirtschaft, Umwelt und Beschäftigung", Berlin (2006).

11 Matthias Machnig (2007), "Schlusswort", in Federal Environment Ministry (ed.), *Klimawandel und Konsequenzen – Bedeutung von Wirtschaft, Wissenschaft und Regionen in Europa,* Berlin: 49–52.

mation" before technical progress is able to radiate from there to other regions of the global economy. Machnig's vision is not that of a stratified economic single zone, towards which development is currently tending under pressure from liberalization.

All this corresponds to the textbook accounts of economic innovation and their basis, the economic theory of technical advance, allowing us to conclude that the more the "domestically" portion is watered down, the lower is the innovation pressure in the industrialized countries. As a consequence, their role as technological forerunners diminishes. But if there is little innovation, there can be little emulation.

With the stampede to purchase emissions rights the aim of maximizing cost efficiency determines the aim of innovation. The maximization of cost efficiency implies constant, static production functions; it is therefore not only contrary to the concept of ecological industrial policy, but also not economically cutting edge. It attempts to achieve a minimum cost merely with the given state of technology; that is, it fails to include the conditions of production of (here eco-efficient) technological advance in its optimization target. But whether it is astonishing or not, the flight from the commitment to achieve reduction targets at home is general and must therefore be taken into account in policy terms.

Current calculations and projections

In the vision of the UNFCCC Executive Secretary de Boer emissions trading, previously regarded with some skepticism as a safety valve for overburdened industrialized countries, becomes the central generator of investment resources for the South. In 2007 the UNFCCC secretariat presented a report commissioned by the treaty states on the investment and financial flows needed to combat climate change.[12] In the Report, on the basis of figures from the International Energy Agency (IEA) and the US Environmental Protection Authority (EPA), two scenarios are juxtaposed. The substance of the Reference scenario is essentially "carry on as you are" until 2030; in the Climate protection scenario global emissions are reduced by 2030 to what they were in 2004.

A comparison of the investment and financial flows involved in the two scenarios comes to the result that in the case of climate protection additional investments in the amount of USD 200–210 billion a year will be necessary. That is a considerable sum in itself, but it is only a little over 1 percent of total projected global investments for 2030 and represents less than 0.5 percent of projected global GDP. Of the additional necessary investments 46 percent would have to be made in developing countries; in this way, however, on the basis of the South's poorer energy efficiency and the cost effective options in the forest zone 68 percent of projected emissions reductions could be achieved. The proceeds from emissions rights from CDM projects are estimated at 10 to 125 billion USD/a year. The revenue from CDM could therefore at first sight constitute a good part, if not all the additional investment required in the South.

The Secretariat's figures show, however, possibly without intending it, that the CDM compensation mechanism is here coming up against its *ecological* limits. Its basic principle is that reductions in the South serve to allow the same quantity of higher emissions in the North. In order to avert dangerous climate change, however, not only are significant emissions reductions required in the North, but also considerable net reductions in the South; that is, reductions that keep greenhouse gases out of the atmosphere instead of merely, as hitherto, compensating higher emissions in the North.

The difference between the Reference scenario and the Climate protection scenario in the Secretariat's Report amounts to 21.7 Gt CO_2 eq for the Southern countries by 2030. The emissions of the industrialized countries stood at 18.7 Gt CO_2 eq in the Kyoto basis year of 1990. Financing all the reductions required in the South solely by means of funds mobilized on the emissions trade market, however, would mean that the industrialized countries would have to commit themselves to reducing their emissions by 2030 by significantly more than 100 percent in comparison with 1990: in order to do no more than create sufficient demand for the 21.7 Gt reductions in the South on the emissions trade market the industrialized countries would have to commit themselves to a reduction of 116 percent compared to 1990. In addition to this, according to the Secretariat's figures, 10 Gt of domestic reductions would be required, corresponding to a reduction of 53.5 percent compared to 1990. The total reduction required of the industrialized countries would therefore come to around 170 percent. That is logically not impossible if "their" is correctly understood as a possessive pronoun. It would be impossible to achieve this target only if "their" is understood in a territorial sense. In the world of *realpolitik,* however, in which all the industrialized countries outside the EU have so far not been willing to commit themselves to reducing their emissions by 2020 by 25–40 percent, which the IPCC has calculated as necessary, such figures appear at best utopian.

12 See UNFCCC (2007), *Investment and Financial Flows to Address Climate Change,* Bonn.

From the standpoint of fairness, however, one might come to the conclusion that such targets are only right and proper for the North. The growing inflows from the South are only making the reservoir overflow because the North has already filled it up. In economic terms, however, it is scarcely conceivable that countries such as China or India, whose per capita GDP despite dynamic growth is still only a fraction of that of the industrialized countries, will be willing or in a position to produce the required emissions reductions by their own efforts. The North therefore has a responsibility both to drastically reduce its own emissions and to do what it can to achieve the necessary reductions in the South. The principle must be "both … and", not "either … or", as has characterized emissions trading so far. From a climate policy perspective, that is, the whole period of imperialism and North–South exploitation after the Second World War must be reversed in economic terms – the long-term memory of the earth's atmosphere furnishes a precise measure for the claims of the South.

What has been roughly calculated here was more rigorously worked out by De Baer, Athanasiou and Kartha last year.[13] In their "Greenhouse Development Rights Framework" they calculate for each country a specific responsibility for fighting climate change in accordance with its historical emissions since 1990 and its prosperity. For this purpose they first lay down USD 9000 as the annual income on the basis of which a reasonably decent life is possible. This value serves, as it were, as a "tax free allowance". Emissions from lower income population groups count as emissions necessary for survival, and these population groups should not be financially penalized. Correspondingly, only the income of population groups earning above this figure should be included in the calculation of a country's economic power. The "Responsibility and Capacity Indicator" worked out on this basis allocates to each country what it should contribute to combating climate change.

The outcome is not surprising given the observation made above: the industrialized countries would have to reduce significantly more than they give rise to in terms of emissions. For example, in a Reference scenario for 2025 Germany would start out from emissions of around 0.8 Gt CO_2 eq/a, but would have to achieve reductions of around 1.25 Gt/a. In contrast, China may increase its current emissions from today's 5.5 Gt to around 9.7 Gt/a, although in comparison with the reference case it would have to reduce emissions by around 3.7 Gt/a. If China undertook further emissions it could sell them to the industrialized countries.

One would have thought that such strict targets would resolve the dilemma of emissions trading versus maintaining innovation pressure. Under these circumstances even extensive utilization of emissions trading would build up considerable innovation pressure. And a government would certainly first try to exhaust all domestic emissions reduction options before spending billions on more emissions rights from the South. In this way emissions trading reverts to its original intention; it is no longer an escape door for avoiding domestic efforts, but rather a means of objectively translating the North's responsibility into political and economic action.

In light of previous experiences governments could easily feel tempted, even under these framework conditions, to try to avoid unpleasant measures at home by purchasing emissions rights from abroad, even if this led to higher costs economically. Since the reorganization of the domestic economy would require a change of course decades in advance, however, such a policy of postponement would probably end up with a country eventually being faced with a choice between immediately taking extreme measures or breaking out of the system. In order to prevent that, De Baer, Athanasiou and Kartha propose that purchaser states should be obliged to apply to their domestic emissions at least the rate of emissions reductions required for global emissions.

Conclusion

We have shown that the (largely) domestic fulfillment of mitigation measures on the part of the industrialized countries may provide the basis for a technological advance that could then be diffused among the developing countries. The interaction of forerunners and rearguard promises to generate a rapid change in technological advance with whose help the more demanding interpretations of Article 2 UNFCCC can (still) be achieved globally. We have also shown, however, that in reality there is a widespread tendency to use CDM as a generator of investment funds internal to the climate regime, and that this is in conflict with ambitious climate policy targets. If domestic reductions are substituted with purchases from abroad to the greatest possible extent this could conflict in two places with environmental requirements: on the one hand, with the sheer quantity of emissions reductions to be achieved both North and South, and on the other hand, with the framework conditions that are

13 Paul De Baer, Torn Athanasiou and Sivan Kartha (2007), *The Right to Development in a Climate Constrained World. The Greenhouse Development Rights Framework*.

necessary for producing the requisite environmental innovations.

But the developing countries must by all means be integrated into global mitigation efforts. And the industrialized countries must assist them. From the perspective of their lesser historical responsibility for climate change and their weaker economic and technological capacities they cannot be expected to bring about all the reductions required of them by themselves.

The investment resources that would therefore have to be transferred from North to South may range from tens of billions to hundreds of billions. Provisionally, there are two ways of raising this. The first possibility is direct payments from the industrialized countries' regular budgets. Previous experience with the existing climate regime funds, as well as the decades-old debate on increasing development aid to 0.7 percent of GDP raise doubts that significant additional funds can be expected from this source.

As an alternative one can fall back on emissions trading. It is politically easier to sell this at home because ultimately one receives a service for one's money in the form of emissions rights. In order to generate the requisite innovation pressure, however, there must be a commitment to significant domestic emissions reductions. Only if the CDM outlet is set up in such a way that a pressure difference remains may an ecological industrial policy offer the prospect of achieving its potential. That is, if support for the Southern states is to be organized by means of the emissions trade market this must – on account of the maintenance of innovation pressure – take place in addition to domestic reductions. Even if one allows for the fact that the South should make its own contribution in accordance with its economic capacities, this entails emissions targets for the North that go far beyond those currently on the table. Reductions targets of the magnitude discussed here may appear as utopian as to try to mobilize tens or even hundreds of billions in additional support for developing countries from the regular budget. Ultimately, this merely expresses the fact that the size of the challenge has not yet been recognized by either politicians or the general public. The North–South blockade in multilateral climate policy is not only a matter of insufficient action, but also the expression of a blockade in terms of thinking.

Zuerst auf Deutsch veröffentlicht in der Zeitschrift *Internationale Politik und Gesellschaft* (IPG) 2/2008: S. 107–125: Klimaziele zu Hause erreichen oder wo es am billigsten ist? Der »Clean Development Mechanism« als klimaregime-interner Investitionsmittelgenerator von Hans-Jochen Luhmann und Wolfgang Sterk http://library.fes.de/pdf-files/ipg/ipg-2008-2/08_a_luhmannsterk_d.pdf

A selection of publications by the "International Policy Analysis"

Thomas von der Vring:
Droht eine europäische Lohnsenkungsspirale?
July 2008

Klaus-W. West:
Fortschritt nachhaltig gestalten – Perspektiven einer Politik medizinischer Innovationen in Deutschland, Frankreich und Großbritannien
July 2008

Werner A. Perger:
Sanfter Konservatismus und der Verlust der Mitte
June 2008

Barbara Lippert
European Neighbourhood Policy: Many reservations – some progress – uncertain prospects
June 2008

Jürgen Kahl:
Länderanalyse Japan: Zwischen Reformverdrossenheit und Veränderungsdruck
May 2008

Rolf Mützenich:
Ten Theses on the Undiminished Relevance of Disarmament and Arms Control
May 2008

Christos Katsioulis, Christoph Pilger:
Nuclear Weapons in NATO's New Strategic Concept. A Chance to Take Non-Proliferation Seriously
May 2008

Philipp Fink:
Länderanalyse Irland: Ein Erfolgsmodell auf dem Prüfstand
April 2008

Arbeitskreis Europa:
Europäische Finanzmärkte – Tanker oder Nussschale?
April 2008

Stefan Dehnert
Demokratieförderung in Post-Konflikt-Gesellschaften. Konkordanzdemokratie als Konfliktlösungsmodell?
April 2008

Stefan Collignon
Vorwärts mit Europa. Für eine demokratische und progressive Reform der Lissabon-Strategie
April 2008

Jörn Griesse, Christian Kellermann
What comes after the Dollar?
April 2008

Jo Leinen
Die Gewinner des neuen Europa-Vertrages
March 2008

Christos Katsioulis
Everybody's got a second chance – Die EU nach der Wahl in Zypern (only online-version)
March 2008

Arbeitsgruppe Europäische Integration
Wissenschaft und Technologie: Europas Beitrag zur solidarischen Zukunftsentwicklung
March 2008

Peter R. Neumann
Innere Sicherheit in Großbritannien
February 2008

Human Security Study Group
Ein europäisches Sicherheitskonzept
February 2008

Mary Kaldor, Mary Martin, Sabine Selchow
Human Security: A European Strategic Narrative
February 2008

Find these and further publications online:
http://www.fes.de/ipa

---

orders to:
Friedrich-Ebert-Stiftung
Internationale Politikanalyse
Ursula Müller
D–53170 Bonn

E-Mail: info.ipa@fes.de
Fax: +49 (228) 883-625

Imprint
Friedrich-Ebert-Stiftung
International Policy Analysis
Division for International Dialogue
D-10785 Berlin

www.fes.de/ipa
E-Mail: info.ipa@fes.de

ISBN 978-3-89892-910-3

Orders
Friedrich-Ebert-Stiftung
International Policy Analysis
z. Hd. Ursula Müller
D-53170 Bonn

E-Mail: info.ipa@fes.de
Fax: +49 (228) 883-625

All texts are available online:
www.fes.de/ipa