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# Hot Air Trading under the Kyoto Protocol: An Environmental Problem or Not? \*

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***Summary: The EU is expected to be one of the buyers of emission rights on the international carbon market. However, various policymakers, also in the EU, fear that ‘hot air’ will be sold under the Kyoto Protocol, for instance by the Russian Federation. Based on an institutional law and economics framework, we have tried to find out whether hot air trading should be seen as an environmental problem or not. Two distinctions are crucial: one between a formal and informal interpretation of environmental effectiveness and one between an ex ante and an ex post perspective of hot air trading. We conclude that hot air trading only disturbs effectiveness in an informal (or ethical) interpretation. Moreover, the view that hot air trading is undesirable appears to assume an ex post perspective on the negotiated emission targets. Finally, there is evidence that an increasing number of policymakers now perceives hot air trading as de facto unavoidable. We find that these perceptions of hot air trading have shifted, as a result of external and internal pressures, from an ethical and ex post oriented outlook to a more formal and ex ante oriented one.***

## I. Introduction

The Kyoto Protocol entered into force on 16 February 2005, after the Russian Federation had ratified it, bringing the percentage of greenhouse gas (GHG) emissions and number of countries over the required threshold as defined in Art. 25. Although Kyoto does ‘too little, too fast’, according to some economists (e.g. Aldy *et al.*, 2003), it ‘is and will stay a milestone’ in promoting internationally coordinated action (Faure *et al.*, 2003: 4).

The Kyoto Protocol allows industrialised countries, the

so-called Annex B Parties, to meet their commitments partly by achieving emission reductions abroad. According to Art. 3.1, they shall individually, or jointly, reduce their overall GHG emission level by at least five per cent below 1990 levels in the commitment period 2008 to 2012. To reach this level, these Parties have adopted differentiated targets, such as an eight per cent reduction for the European Union (EU), a six per cent reduction for Japan and stabilisation for the Russian Federation. Trading emissions should improve cost-effectiveness, because reducing pollution at an emission source in another country can be cheaper than doing so domestically (e.g. Woerdman, 2005). Annex B Parties are allowed, for instance, to purchase Assigned Amount Units (AAUs) on the basis of International Emissions Trading (IET) under Art. 17. These and other market-based instruments, referred to as the Kyoto Mechanisms, “... have the potential to become the most important cornerstones of the emerging climate regime ...” (Oberthur and Ott, 1999: 275).

Which (legal entities in the) Annex B countries will trade depends on their marginal abatement costs: those with relatively high marginal abatement costs will buy and those with relatively low marginal abatement costs will sell emission rights. The EU is expected to be a net buyer, although some Member States will purchase emission rights (like the Netherlands, Belgium and Italy), whereas others will sell them (like Germany, France and Spain) (Ybema *et al.*, 1999). AAUs will mainly become available from the countries with economies in transition, such as the Russian Federation and the Ukraine (e.g. Zhang, 2000).

However, it is well-known that ‘hot air’ will be traded under the Kyoto Protocol, which is considered to be one of the most important effectiveness problems of emissions trading systems. If the official emission ceiling in a country is higher than its business-as-usual emissions, it can sell pollution rights without having to reduce emissions. The trading of this hot air not only was, but still is seen as an environmental problem by various scientists, policymakers and NGOs. Already in the second half of the nineties, hot air trading was thought to be ‘a serious problem on the practical level’ (Oberthür and Ott, 1999: 189), posing a political barrier to acceptance of emissions trading in the international climate

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negotiations. Hot air was also the most frequently mentioned reason in official EU documents (between 1997 and 2000) for the European proposal of 1999 to quantitatively restrict the use of the Kyoto Mechanisms (Woerdman, 2002). Even almost ten years after the Kyoto deal was struck, some still criticise this aspect of the emerging trading scheme. Professor Jepma (2004: 1), for instance, recently wrote that "... the system even generates a rather odd bonus (see Russian hot air), which effectively inflates the collective cap".

Building upon a distinction between two interpretations of effectiveness made by Woerdman (2004), we try to find out in this article whether hot air trading should be seen as an environmental problem or not. Our approach is that of institutional law and economics (e.g. Medema *et al.*, 2000). Such an approach recognizes, among other things, the existence of formal and informal institutions and moves the economic analysis of law beyond costs and efficiency to elements of equity and perceptions of moral behaviour, for instance. The result is that we will not only consider the formal aspects related to hot air trading under the Kyoto Protocol, such as its emission targets and the efficiency of emissions trading, but also its informal aspects, including ethical views of the emissions trading scheme's basic elements. In the second section, to start with, the differences and relations between emissions trading and hot air trading are highlighted. In the third section, a distinction is made between a formal and an informal interpretation of environmental effectiveness. In the fourth section, a distinction is made between an *ex ante* and an *ex post* perspective of hot air trading. In the fifth section, policymakers' changing perceptions of hot air trading are considered. In the sixth section, conclusions are drawn.

## II. Emissions trading and hot air trading

In the early literature on emissions trading, effectiveness was considered to be guaranteed, because emission sources operate under an emission ceiling (e.g. Baumol and Oates, 1988; Tietenberg, 1992). This ceiling was assumed to be lower than business-as-usual emissions (e.g. Anderson *et al.*, 1999: 118). However, it soon became clear in the literature that this

assumption might not hold in the real world. In (inter)national environmental agreements, emission sources (firms or states) may receive generous emission budgets due to different kinds of institutional factors, including incomplete information (leading to incorrect emission projections), the exertion of negotiating power, or considerations of equity and political acceptability.

Under the Kyoto Protocol, for instance, if the emission budgets of some countries exceed their expected business-as-usual emission figures, they may end up with unused assigned amount units (AAUs) that can either be banked or transferred, without having to take mitigation efforts. Without trading, assuming that the other countries use their assigned amounts completely, total GHG emissions in 2008-12 would be lower than agreed upon in the Kyoto Protocol. However, when emissions trading is allowed, the hot air countries will be able to sell this surplus to other countries that will use it to cover emissions that would not have been allowed without the transfer of this surplus. This is legally allowed, because hot air trading occurs under the emission ceiling of the Kyoto Protocol. However, it might be considered an environmental problem as it would make overall emissions higher than without such trading. Some blame the instrument of emissions trading for this, because only with emissions trading the hot air can be sold.

With respect to the Kyoto Protocol, most analysts expect that hot air will be available in particular from the Russian Federation and the Ukraine. These countries have managed to negotiate stabilization targets (for the commitment period 2008-12 based on 1990 levels) and have faced strong economic decline due to problems of transition and economic restructuring. The result is that they will probably not reach this emission level in a business-as-usual scenario. This would allow them to sell parts of their assigned amounts to other Annex B Parties without having to reduce emissions. Although hot air trading could be seen as undesirable (because the result is that emissions can be covered that would otherwise not have been covered), Bashmakov (1999) holds the opposite view and considers the tradable hot air in Eastern Europe as a legitimate compensation for the emission reductions induced by the economic decline which resulted

from the disintegration of the centrally planned economic system.

It is always difficult to calculate the precise amount of hot air trading in advance due to the inherent uncertainty of emission estimates. Therefore, the projections of hot air under the Kyoto Protocol differ considerably. Michaelowa and Koch (1999) emphasise that there is a 'range of forecasts' which originates from several studies using divergent assumptions and different data. In a model survey by Zhang (2000), for instance, the hot air projections under the Kyoto Protocol vary between 92 and 374 MtC-eq, roughly somewhere between zero and 50% of the required Kyoto reduction efforts, depending on the estimated level of business-as-usual emissions. In a more recent literature overview, Berk and Den Elzen (2004) come up with hot air figures that vary between nine per cent and 44%.

To illustrate the level of uncertainty that policymakers faced just after the Kyoto Protocol had been concluded, Haites (1998) calculated that 165 million tons of carbon could be sold as hot air (compared with an annual reduction from business-as-usual emissions of 1,000 million tons of carbon), while Victor *et al.* (1998) expected that the carbon 'bubble', as they called it, could be as much as 1,000 million tons of carbon (in the central scenario). Still, the possibility was not ruled out that the Russian Federation and the Ukraine would experience higher economic growth rates than anticipated. In that case the hot air might not become available at all, which is also stressed in later studies (e.g. Laroui *et al.*, 2004). Our 'guesstimate' based on the aforementioned figures would be that the expected magnitude of hot air under the Kyoto Protocol lies between 10 and 30% of the reduction efforts necessary to meet the aggregate emission target.

Some believe that '[hot air] is a temporary phenomenon because it is unlikely to happen again in a future budget period' (Metz *et al.*, 2001: 175). This view is probably naïve. Emissions trading not only lowers compliance costs, providing an incentive to accept a more stringent target than without trading, but it also provides an incentive to negotiate a generous emission ceiling in order to maximize the economic gains from trading (O'Connor *et al.*, 1997: 28). Furthermore,

according to Baumert *et al.* (1999), it is likely that excess emissions for new participants would be welcomed by some industrialized countries, since it would make compliance less expensive for them. Given these incentives, the hot air problem probably also applies to those developing countries that, somewhere in the future, wish to take up commitments and want to engage in emissions trading (Michaelowa and Koch, 1999).<sup>1</sup>

Although the magnitude of hot air trading is uncertain, it is clear that policymakers were harassed with different figures and studies according to which there was likely to be a hot air problem, big or small, if they would choose to implement emissions trading. Environmental problem or not, this put doubt on the effectiveness advantages of tradable emission rights systems in general and made emissions trading under the Kyoto Protocol look environmentally 'suspicious' instead of environmentally 'superior'. Emissions trading is not equal to hot air trading, but hot air can only be traded with emissions trading.

### III. Formal and informal interpretations of environmental effectiveness

In the context of the Kyoto Protocol, it is possible to distinguish two interpretations of the concept of environmental effectiveness (Woerdman, 2004). In a formal interpretation, environmental effectiveness is achieved if the official aggregate emission target is attained, such as the five per cent emission reduction by industrialised countries, as required by Article 3.1 of the Kyoto Protocol. In an informal interpretation, which can be characterised more specifically as an ethical interpretation, environmental effectiveness is achieved if aggregate emissions are reduced below the official target by refraining from those economically attractive actions that are legally possible but that would result in higher emissions or less emission reductions than without those actions. Although this distinction may seem unconventional at first sight, it will prove to be useful to understand the arguments used in discussions on the environmental

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<sup>1</sup> This is sometimes referred to as 'tropical air' (by analogy with the trading of 'hot air').

performance of emissions trading.

An emission baseline (or simply: baseline) is defined as an estimate of future emissions at one or more points in time under ‘business-as-usual’ conditions. A macro-baseline is constructed at the national level and estimates future emissions of (the total of emission sources in) a country at one or more points in time in the absence of an emission ceiling. Such a baseline is constructed on the basis of aggregated national projections of economic growth, energy use and technological development, among other things.<sup>2</sup>

If there is a gap between the official emission ceiling and business-as-usual emissions of a country, referred to as ‘hot air’, assigned amounts may be traded and used to cover emissions that might have remained unused without emissions trading. If the hot air is traded under the emission ceiling, effectiveness is still achieved in its formal interpretation, but not in its ethical interpretation. This means that only in the latter interpretation, hot air is seen as a macro-baseline problem, according to the definitions provided above. Trading hot air is economically attractive and legally possible, but without such trading it could be that actual emissions of all emission sources together are lower than the overall target. Hot air trading does not disturb effectiveness in its formal interpretation, but only in an ethical (or informal) one.

#### IV. *Ex ante* and *ex post* perspectives of hot air trading

Environmental effectiveness can be described in a ‘static’ sense as the achievement of a pre-defined policy target, such as a certain emission level, but also in a ‘dynamic’ sense as the extent to which this policy target is attained. This (simple and plausible) conceptual refinement is needed to acknowledge that environmental effectiveness can be improved, achieved or reduced.

The view that hot air is problematic, because it can

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<sup>2</sup> A micro-baseline, on the other hand, is used in emission reduction projects, like JI or CDM projects under the Kyoto Protocol, and estimates future emissions at the project location at one or more points in time in the absence of the project. Such a baseline incorporates project-specific data, for instance the average (projected) emission level of comparable emission sources in the sector in which the project will be implemented.

be sold and used to cover emissions elsewhere that might not have been covered without trading, assumes an *ex post* perspective on the negotiated emission targets by taking those targets as given. However, hot air trading is not problematic from an *ex ante* perspective on the negotiations in which the level of the negotiated emission targets depends on the level of flexibility created. In this dynamic institutional setting, the higher the level of flexibility created, the higher the level of the accepted emission targets. Without the hot air, the emission targets under the Kyoto Protocol could have been less stringent, to an extent that might even exceed the volume of hot air.

Some authors consider the allocation of hot air as a side-payment (or ‘bribe’, if you will) for the acceptance of the cap-and-trade provisions under the Kyoto Protocol (e.g. Shogren and Toman, 2000: 32). Although the United States (US) initially signalled only to be willing to accept a stabilisation target, it adopted a reduction target in 1997 because emissions trading was included in the Protocol with the prospect of buying cheap hot air from the Russian Federation and the Ukraine (e.g. Oberthür and Ott, 1999). These former Soviet countries were finally persuaded to adopt a target as well, because they had the prospect of selling (some) emission space, that they will not use anyway, to the industrialised West. It could be argued, therefore, that the allocation of hot air was necessary for some countries to make their emission limits politically acceptable. Taking away this hot air might have prevented them to accept the negotiated emission targets (e.g. Baumert *et al.*, 1999; Moe, 2000) and, as some predicted, may prevent them to ratify the Kyoto Protocol (e.g. Bohm, 1999).

Economic models support these conjectures. In a rational choice framework, Boom (2000) demonstrates that the US has only been willing to accept a relatively stringent cap on its emissions in the expectation that the emission reduction could be implemented in Central and Eastern Europe by way of emissions trading that includes hot air (which is, of course, also in the interest of the Russian Federation and the Ukraine as potential sellers). The analysis also indicates that if the EU had blocked the allocation of hot air to Central and Eastern Europe, the US would have committed itself to a much less

stringent emission ceiling. No hot air might even have prevented an agreement in 1997 in Kyoto in the first place. Importantly, from an environmental perspective, when hot air would not have been allocated, this model points at the possibility of a less stringent US emission cap that exceeds the volume of hot air in the Kyoto Protocol.

This *ex ante* perspective on the negotiations (in which the targets are not seen as given) would seem to suggest that hot air trading is more an opportunity than a problem in establishing emission ceilings. This is true for the (agenda-building and) decision-making stage of emissions trading, but once trading and hot air are established to ensure that countries accept certain emission targets, some actors may still try to block hot air trading in the implementation stage of emissions trading. This actually happened, not only in the form of opposition from green NGO's, but also in the form of the EU proposal to limit hot air by placing a quantitative restriction on the use of the Kyoto Mechanisms (EU Council, 1999).

We have seen that the *ex post* perspective has a static view of the emission caps under emissions trading, whereas the *ex ante* perspective approaches them from a dynamic perspective. Another dynamic aspect is that banking 'institutionalises' the initially negotiated hot air permanently into the emissions trading system, since banking allows for the transfer of unused hot air to future commitment periods. Under the Kyoto Protocol, for instance, the carry-over of hot air is possible on the basis of Protocol, Art. 3.13 stating that the emissions of an Annex B Party which are less than its assigned amount in a commitment period can be added to its assigned amount for subsequent commitment periods. Banking to the next commitment period is unrestricted for any AAUs held by an Annex B Party in its national registry which have not been retired or cancelled (CP, 2001: 61).

Various economic analyses either neglect institutional features such as hot air (e.g. Montgomery, 1972), or recognise such features but see hot air as an allocation aspect that neither affects efficiency nor formal effectiveness (e.g. Tietenberg *et al.*, 1999). From that perspective, it can be defended that emissions trading, and thus also hot air trading, would generate a price per tonne of CO<sub>2</sub>, which provides the

Russian Federation and the Ukraine an incentive to reduce emissions if the associated costs are below the market price. However, some policymakers, also in Europe, associated emissions trading (that makes effectiveness cheaper and easier to achieve) with hot air trading (that undermines effectiveness, not from a formal and *ex ante* perspective, but from an ethical and *ex post* perspective by making emissions higher than without trading). If such a perception takes hold, the credibility of emissions trading can be undermined (e.g. Butzengeiger *et al.*, 2001).

## V. Policymakers' changing perceptions of hot air trading

Initially, the perception did, in fact, take hold among various groups of policymakers that hot air trading undermines environmental effectiveness. In an empirical analysis of the opinions of key officials in the EU, the vast majority mentioned equity as the primary motivation behind the EU proposal to quantitatively restrict the use of the Kyoto Mechanisms (Woerdman, 2002). This should prevent, as they said, that industrialised countries 'buy their way out'. Hot air was mentioned as the second major reason for the EU to propose a cap on trade. Hot air trading was apparently seen as an environmental problem that should be reduced or diminished by means of additional regulation. This points to the empirical relevance of both the ethical interpretation of environmental effectiveness and the *ex post* perspective of hot air trading. However, there are also indications that the *ex ante* perspective of hot air trading was not entirely strange to European officials. Although these policymakers believed that hot air would constitute a major part (more than 20%) of emissions trading, they agreed at the same time that hot air was necessary for the US to initially accept (and subsequently ratify) an emission reduction commitment under the Kyoto Protocol.

Nevertheless, perceptions of hot air trading changed when the EU faced internal and external pressures. First, 40% of the interviewed officials from different Member States did not personally agree with the official EU proposal, decided upon by their Ministers, to quantitatively restrict emissions

trading (Woerdman, 2002). Second, although in particular the Americans, but also countries like Canada and Japan, had bargained hard, and with success, to introduce emissions trading in the Kyoto Protocol, in March 2001 the US, rather unexpectedly, withdrew from the Protocol. This meant that the EU was left with an agreement full of flexibility instruments that initially were a pre-condition for the Americans to accept the emission reduction target which they now rejected. This *fait accompli* was exogenous to the extent that the earlier EU proposal to quantitatively restrict emissions trading had no influence on the US withdrawal that followed shortly after this proposal was made. To prevent countries like Canada and Japan following the US example, which they could now make a credible threat to do, the EU had to give up its resistance against full trading that would also include the trading of hot air.

The Russian Federation, however, became the next stumbling block for the EU: in 2003 it threatened not to ratify the Kyoto Protocol. This Russian hazard was at least partly linked to the US withdrawal. The American abandonment had implied less demand for emission rights causing lower prices and thus less revenues for the hot air countries such as the Russian Federation (e.g. Missfeldt and Villavicenco, 2002), although more recent research also highlights Russian domestic forces, including the lobbying by pressure groups, that have contributed to its reluctance to ratify (Buchner and Dall'Olio, 2004). Various Members of the European Parliament stated that the external threat of a possible Russian withdrawal accelerated the internal co-decision procedure on EU-wide emissions trading (e.g. Houlder, 2003). An early agreement should stimulate Russia to ratify by signalling that the EU takes climate policy and market instruments seriously and that the Russians, although the Americans had left, can still gain from trading emissions with partners from abroad, including the Europeans.

This has shaped the perception among an increasing number of policymakers, for instance in the EU, that hot air trading was *de facto* unavoidable. External and internal pressures triggered an attitude change in the EU which, in its turn, caused cultural values to slowly change towards, what Bernstein (2002) calls, 'liberal environmentalism'. The

withdrawal of the US from the Kyoto Protocol changed the game and seems to have increased the acceptance of hot air by the EU and the green NGO community as a 'necessary evil' to keep Annex B Parties such as Japan and the Russian Federation on board of this international environmental agreement.

## VI. Conclusion

Emissions trading is not the same as hot air trading, but hot air can only be traded with emissions trading. A country has hot air if its business-as-usual emissions remain below its official emission ceiling. Emission rights can then be traded and used to cover emissions that might have remained unused without emissions trading. Many emissions trading 'blueprints' assume that the emission ceilings are set lower than business-as-usual emissions, but various studies suggest that this assumption may not be met under the Kyoto Protocol, for instance regarding the Russian Federation.

In this article, we have tried to find out whether hot air trading should be seen as an environmental problem or not. We have basically argued that the answer to this question depends on the perspective taken. An institutional law and economics framework points to the relevance of two distinctions: one between a formal and informal interpretation of environmental effectiveness and one between an *ex ante* and an *ex post* perspective of hot air trading.

Regarding the first distinction, the emission ceilings are still respected when hot air is traded. This means that effectiveness is achieved in its formal interpretation. However, hot air trading does disturb effectiveness in its ethical (or informal) interpretation, because it can make overall emissions higher with than without emissions trading. Without hot air trading, the actual emissions of all emission sources together could have been lower than the overall target. It means that hot air trading is only an environmental problem from an ethical point of view. This finding is not sufficiently recognized in the existing literature.

Regarding the second distinction, the view that hot air is undesirable, because it can be sold and used to cover emissions elsewhere that might not have been covered without

trading, assumes an *ex post* perspective on the negotiated emission targets by taking those targets as given. However, hot air trading is not problematic from an *ex ante* perspective on the negotiations in which the level of the negotiated emission targets depends on the level of flexibility created. In this dynamic institutional setting, the higher the level of flexibility created, the higher the level of the accepted emission targets. Without the hot air the emission targets for countries under the Kyoto Protocol could have been less stringent, to an extent that might even exceed the volume of hot air. This view is also underrated in the existing literature.

Environmental problem or not, there is some evidence that an increasing number of policymakers now perceives hot air trading as *de facto* unavoidable. After the EU had proposed to limit hot air by quantitatively restricting the use of the Kyoto Mechanisms, the US withdrew from the Kyoto Protocol. This proposal, that was also criticised by various European policymakers, was soon abandoned when other countries, including the Russian Federation, threatened to withdraw as well. As a consequence, EU officials have more or less accepted that hot air will be traded as a 'bribe' for ratification by hot air countries such as the Russian Federation.

This particular attitude change indicates that perceptions have shifted, as a result of external and internal pressures, from an ethical interpretation of environmental effectiveness and an *ex post* perspective of hot air trading to a more formal and *ex ante* oriented outlook. Nevertheless, there are still policymakers, and scientists, that perceive hot air trading as an environmental problem. The analytical distinctions made above should help to reveal the assumptions behind their views.

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