EMISSIONS TRADING AND AVIATION: A CRITICAL ASSESSMENT OF THE EUROPEAN UNION EMISSION TRADING SCHEME

Professor Dr. Dr. h.c. Andreas Knorr, German University of Administrative Sciences Speyer, Freiherr-vom-Stein-Straße 2, 67346 Speyer, Germany, knorr@uni-speyer.de

Professor Dr. André W. Heinemann, University of Bremen, Wilhelm-Herbst-Straße 12, 28359 Bremen, Germany, andre.heinemann@uni-bremen.de

ABSTRACT

In order to fulfil its greenhouse gas emission reduction obligations under the Kyoto Protocol, the EU, in 2003, endeavoured to set up a regional emission trading scheme: the European Union Emissions Trading Scheme (EU ETS). The airline industry was integrated into the EU ETS as of January 1st, 2012. From a EU perspective, the legality of subjecting all non-EU airlines serving EU airports to the scheme with respect to EU and international law was confirmed by the European Court of Justice's ruling on December 21st, 2012. In reaction, a group of 26 third countries is joining forces, threatening to retaliate against what they perceive a grossly unfair and ecologically inefficient scheme. In reaction, on November 12, 2012, the EU announced a moratorium which de facto suspended the application of the ETS rules to airlines from third countries for one year, to help seek a global solution under the ICAO framework. In our paper we will argue that a regional scheme such as the EU ETS is not conducive to, nor effective in achieving substantial progress regarding the Kyoto goals.

Keywords: Aviation, emissions trading, EU ETS

I. INTRODUCTION

The change of the average earth temperature – commonly referred to as global climate change – is widely held to be the most pressing environment problem of our times. The political efforts on international level peaked in the United Nations Framework Convention on Climate Change in the year 1992, as the share of human act is directly attributed to this process – the kind and extent not scientifically doubtless definable until today. On basis of this agreement under international law a supplementary treaty, the Kyoto-protocol, was approved on December 11th 1997, which firstly committed the signing nations to the obligatory emission decrease of six global warming gases[1]. It became effective in February 2005 and is running out in 2012; an agreement about a subsequent arrangement could not be achieved despite of several climate summits in the so-called Post-Kyoto-Process. Although the Kyoto-Protocol was ratified by 191 nations up to now, it only contains binding reduction commitments for the industrial nations. From the large industrial nations, solely the United States of America – the after China worldwide biggest emitter of global warming gases in absolute quantities (not according to the per capita-emission) - did not join; the American Congress rejected the protocol's ratification, even though the US-government had taken part in the negotiations. Furthermore Canada drew back from the Kyoto-Protocol due to imminent sanctions on account of exceeding her reduction aims. Finally the emission of the global warming gases of two sectors – the international civil aviation and the maritime traffic – was left out with the demand of the reduction aims.

In general the signing nations should achieve their reduction obligations by means of national measures in line with their respective climate political focus, to which the protocol has no definite specifications. Additionally it opens up possibilities for the signing nations to fulfil their requirements via three special cross-national mechanisms[2]: the trade with emission rights ('pollution certificates'), the Joint Implementation ('collective implementation'; JI)[3] and the Clean Development Mechanism ('mechanism for environmental development'; CDM).[4]

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1 The protocol covers four greenhouse gases (CO_2, CH_4, NO_2, SF_6) as well as all hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

2 For the details see UNFCCC (2012).

3 In the context of JI emitters from industrial nations are given credit for their financial savings with officially accepted reduction programs in another industrial nation. Hence they do not have to reduce their own emissions. Exemplary would be the implementation of filter technology in a foreign power plant.

4 In the context of CDM emitters from industrial nations are given credit for their financial savings with specific officially registered and certified reduction programs in developing countries (for example the switch to energy saving water boilers, but not the planting of trees). Here also no own reduction efforts are required. Important precondition is that the project in question could not haven realized without CDM, causing an additional reduction (so called additionality criterion).

In turn, to be able to achieve their own reduction commitments the EU decided to introduce the common Emission Trading System (in the following: EU ETS)[5]. Effective from January 1st 2005 this is valid for all 27 EU-member states. The three EWR-members[6] Norway, Liechtenstein and Island joined January 1st 2008.

However, the EU ETS covers less than half of the local emissions of the relevant global warming gases. This is the reason for pushing the extension of the EU ETS politically of not registered branch of economies. But this was exclusively put into effect for the aviation sector, which was implemented into the system in January 1st 2012[7]; on the other hand the inclusion of sectors with clearly higher absolute total emissions, especially the agriculture (incl. forestry) is not intended by the commission momentarily or – as for the maritime traffic -, in case that an international sector-specific solution is unlikely to come about.[8]

The inclusion of air traffic in the EU ETS was highly controversial from the beginning and is still today. Recently Italy the first member nation expressed itself for a postponement of the deadline date (Torello 2011). This was after three American airlines and their inter trade organization filed a law claim before a British court[9], which had presented it to the EC because of the general significance for preliminary decision. On December 21st 2012 rejected the claim with the formalistic reasoning that there was no offense against international law on hand in case of the ETS.[10]

A little later members of the US Congress presented a draft bill – the European Union Emissions Trading Scheme Prohibition Act-, which, in case of legal effect, would prohibit the participation of US-airlines with threat of punishment (N.N. 2011; Flottau 2011; Laing 2012). China already passed such a prohibition in February 2011 for its airlines (Toh 2012). Also the governments of twenty third countries, amongst them the USA, China, India, Brazil, Japan, Russia and several Golf states demand insistently, partly on open threat of sanctions, the release of their airlines from the EU-emission trade during flights from and to EU-airports (Parker 2011). In April 2011 even the French premier François Fillon called for an acceptable compromise for the third countries concerned at the EU-commission (Reuters 2012).

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5 European Union Emission Trading System (EU ETS). The legal basis is directive 2003/87/EC from October 13th 2003 (Abl. L 275, October 25th 2003, p. 32 ff.)

6 European Economic Area (EEA).

7 The legal basis is directive 2008/101/EC from November 19th 2008 (Abl. L 8, January 13th 2009, p. 3 ff.)

8 In the case of maritime traffic an according agreement should be made under the lead of the International Maritime Organization (IMO), a special organization of the UN.

9 See European Court (2011), Case C-366/10).

10 The meanwhile merged Continental-United, American Airlines and the Air Transport Association of America (ATA).

II. AIR TRAFFIC AND CLIMATE CHANGE

The air traffic's share of the entire, directly related on human activities, global warming gas emissions is estimated, according to the source and calculation method to two to three per cent (IPCC 1999; IPCC 2007; Schumann 2007; ADV 2007; McCollum/Gould/Green 2009). As per the EU-commission (2006) the cumulated rate of increase lay at 87 percent between 1990 and 2005, given the absolute and relative growth of the offered traffic performance. The commission predicts an increase of up to 150 percent of cross-frontier flights until 2012 – this would consume approx. a quarter of the reduction requirement of the EU in context of the Kyoto-Protocol – as well as a duplication until 2020 (EU-commission 2005 and 2006). The climate effects of air traffic are based on the release of CO2 which develops by the burning of kerosene and especially on the carbon black particles, nitric oxides and water vapor as well.

In this context however, it is not to be overseen that air traffic, within the traffic sectors absolutely regarded (status: 2004), not only releases less global warming gases than the shipping traffic but also substantially less than road traffic. Also the traffic sector in the whole ranges with its share of 13.1 percent of total emissions not only behind agriculture (13.9 percent) and forestry (17.4 percent) – whereas both sectors are basically excluded by the EU ETS and an inclusion does not appear on the political agenda. They also lie considerably beneath the industrial emission (19.4 percent) and energy business (25.9 percent) (to the numbers IPCC 2007).

III. FUNCTIONALITY AND FUNCTIONING PROBLEMS OF THE EMISSION TRADING

The national assignment of clearly defined usage rights combined with the option of trading these after effected allocation is described as a certificate solution in the environmental economics (respectively as emission (usage) rights or also as 'Cap-and-trade'-system). Contrary to the common (schoolbook) opinion this eco-political instrument does not represent a pure market solution. In fact it is a rationing system – similar to coupons – in form of a quota arrangement, supplemented with a following secondary market. This can on the other hand, depending on a precise legal institutional definition of the emission trading, be more or less competitive and therefore economically regarded on the whole more or less effectively defined[11], more on this later.

[11] A note on the important difference between market and competition seems appropriate in regards to the comparing analysis of efficiency of alternative climate political instruments. As already apparent from the theory of market failing, markets do not produce results that are per se economically efficient. The same may apply to in general functioning markets, meaning

In the first procedural step the government defines the maximum allowed emission rate. The basis of decision-making for their measurement in the context of rational environment policy must be well-grounded natural scientific analysis respective to the maximum absorbency of the concerned eco-systems including possible cumulative effects. In particular, there must be an obvious cause and effect connection attestable between the reduction of the emission rate (as interim goal) and the aspired environmental quality (as ultimate aim); if this does not succeed, the introduction of the emission trading only results in the waste of short resources, which could have generated a higher yield in alternative applications. Furthermore the country as emitter has to ensure (respectively all participating nations concerning cross-national certificate solutions) the emission rights, so that all originators of the relevant emissions, but certainly all main causers, will be integrated in the trading system.

An especially attractive avoidance strategy with cross-nation emission trading systems is the dislocation of the third country recorded activities, by which the reduction aims would partially be contradicted. The goods which were produced there with much less costs could then be reimported into the country of origin. But these price advantages through ‚leakage'-effects could generally be neutralized by an import tariff. Apart from the protectionist potential of misuse that generally is linked to such motivated trade restrictions and the fact that dislocations are not commonly not to be explained monocausally, their application however meet legal limits (boundaries): they simply do conform to GATT. The basic rules of the world trade order allow the charging of custom duties for the protection of domestic manufacturers under clearly defined legal conditions. These however may only be charged for imported goods that are „like products". The attribute of similarity is exclusively defined by technical-physical characteristics (so called industry concept of factual market demarcation) and not generally by the production method.

Besides, a special, though often ignored form of 'leakage' are the misallocations resulting from relocating production activities covered by the scheme to subsidiaries or contract producers in third countries which do not participate in the scheme. As a result, reduction targets may at least partly be compromised, while the goods which are produced 'off-shore' at lower costs may nevertheless be reimported into their previous country of origin. Therefore another welfare-decreasing effect of an insufficient coverage of the emission trading will be hereby due to the resulting inter- and not least intrasectoral misallocations; Would for example only one of two global warming gases emitting common carriers be integrated in the emission trading system, its competiveness in price would fall in the intermodal competition. This would result in environmental unwanted and economically inefficient modal split-relocations.

Once the political responsible people have defined the maximum allowed emission rate, this in the second process step will be proportionally distributed in form of emission rights

markets that fulfill their coordinating function regarding supply and demand plans. If however the abuse of market power on the supply or demand side distorts the competition process and therefore the market results, these are not efficient either. The criteria for market conformity are not realized by the existence of a market solution but only with functioning competitive market processes.

('certificates') to those companies which need these for the production processes. Dealing with these certificates is generally possible. Should extra certificates be needed, the companies can hence buy them or sell the surplus of certificates on the secondary market – the exchange market. The state can raise or – which is the usual case – gradually decrease the number of available certificates anytime.

In terms of ecological accuracy and economic efficiency the certificate solution – provided that it is reasonably applicable in environmental practice[12] – is regarded as superior compared to alternative environmental instruments such as eco-taxes, especially regulatory interventions like technical standards (Feess 2007; Hartwig 2007). One reason is that through this solution – like with limits, but in comparison to a contribution solution, which allows the price per emission unit, but not the absolute emission quantity[13], - precise quantity control could succeed, meaning total accuracy concerning the ecological (emission) aim be fulfilled. The specific economic efficiency of this instrument lies especially in its technical openness and the accompanied immanent attraction for innovation: Certificates saved by process innovations can be sold by the owner increasing profit.

If the trade of emissions really represents the best solution compared to other environmental and instruments, as mostly claimed in economics literature this fact is not by no means mandatory; an early and at least under economists mostly observed principal criticism about the emission trade from an economical point of view plus an approval for emission taxes is to be found for example in Nordhaus (2006).

Such are the functionality requirements for an economic efficient and at the same time environmental effective trade of emissions, in particular on international or even global level, quite unambitious; the requirements were surprisingly seldom made an issue about in the environmental and climate change policy.

Basic requirement is a functioning legal infrastructure in all participating countries. (for many Pies 2002). This concerns in particular the modality of certificate assignment und last but not least the monitoring of the emitters' compliance of the assigned emission rate. Especially in many developing nations, but not only these basic requirements, do not sufficiently meet demands. Like always when countries create an artificial scarcity and therefore new asset values are created in considerable amounts, strong incentives arise at the same time for all parties involved (in politics, businesses and public administration). Therefore those third parties might possibly try to acquire these scarcity rents not only legally but also through fraud, corruption or in the extreme case even through violence (Nordhaus 2007).

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12 For example a ban of especially toxic substances – i.e. limit value = 0 – on the grounds of ecological effectiveness and economic efficiency.

13 This is dependent on how strongly the consumers react to the tax-induced price increase by consumer restrictions. In the extreme case of price rigidity the sales of volume and ceteris paribus the amount of emission while the good's production would remain constant; only the good's retail price would rise.

That this is by no means a purely theoretical risk is documented in today's known and in the international press reported on offences of acquirement of emission credits in the context of the Clean Development Mechanism (for examples see Carrington 2010; Kron 2011; Neslen 2011). Even in the EU itself it came to purchase tax cases of fraud in a dimension according to Interpol of about 5 billion € in form of so called carousel frauds[14], also to theft of electronically saved certificates worth of several million Euro.[15]

Yet even if criminal acts are completely counted out, there are tremendous legal appeals for consumers of certificates to ensure a most possibly large portion in course of the initial national distribution of the artificial created scarcity rents. This can especially be accomplished by most low acquisition prices – ideally by a cost free allocation – in the initial process of certificate distribution; these can then be sold on the secondary market with high 'Windfall profits'. The same result is achieved when alternatively the certificates, which were bought for prices lower than the current market value, will go into the buyers' cost account in height of their opportunity costs, meaning to market values (respectively replacement costs) and the shifting to the end consumer succeeds. This will be even more the case; the more inelastic the demand function of the end consumer takes course.[16]

The certificate trade's efficiency is therefore crucially dependent on the mode by which the basic equipment of the emission rights is carried out. As introduction into this specific economical problem it should initially be referred to the according insights of other parts of economic policy in which comparable quantitative restrictions exist – and which also predominately are artificially caused by national interventions and are only exceptionally due to technical shortage and therefor objective lacks.

- Practical examples for artificial shortages are the assignment of working concessions – like in the postal service or in the taxi business -, such as import- or export rates in the cross-national trade of goods (because of the always[17] connected always market closing and competition restrictive and therefore efficiency diminishing effects this external instrument is in fact forbidden according to EU rights and in context of GATT as well).[18]

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14 For details see N.N. (2010). The statements mentioned there by Europol "in several states…up to 90% of the total CO_2 trade are only made to get access to taxpayers' money."

15 For details see Kremers (2011) and Wetzel (2011).

16 This legally unobjectionable and economically justifiable procedure was practiced by the German energy providers.

17 Under the realistic assumption that the supply of available licences/quotes is smaller than demand. Otherwise the certificate approach would be economically senseless.

18 The GATT generally allows the collection of customs duties under defined conditions, meaning a taxation of imports, as these can be partially bypassed by the concerning foreign providers through cost and price reductions. Custom duties offer the concerning foreign companies incentives for increasing efficiency. Furthermore the market closing and therefore competition restrictive effect is always less compared to the quantitative restrictions.

- As example for the second category of objective bottlenecks are the allocations of slots for the usage of defined way of traffic infrastructure (air traffic, railway system), whose capacity is exhausted to the maximum, or the allotment of radio frequencies.

In practice two methods of initial distribution of emission rights are common: auctions or the assignment by periods of reference. Furthermore there exist hybrids in such a way that a high percentage of certificates are assigned without charge, but the concerned companies have to buy the needed amount of certificates at the secondary market (or have to throttle their emission rate accordingly). The EU decided for exactly this procedure for the inclusion of air traffic in the EU ETS planned on December 1st 2012; more on this later.

Provided that a competitive form of the auctioning rules is set up, the complete auction presents the most effective way of assigning the provided certificates in the initial distribution. The purchasing price conforms to the marginal willingness to pay and the impulsion to strategically stockpile the not necessary certificates to impede the market launch of competing providers is thus also effectively prevented. In conclusion, other than with the cost-free initial equipment the already named ‚windfall profits' emerging from the reselling of certificates on the secondary market can be avoided as much as possible.

On the grounds of political acceptance the distribution per reference periods respectively basic years is clearly preferred (so called 'grandfathering'). Thereby incumbents are more or less politically appointed. They receive a governmental defined minimum amount of certificates, which in the extreme case fits exactly their realized emission rate in the basic year. For newcomers however, this method turns out to be a considerable barrier for accessing the market, unless they do not also have a regulated admission to the available free certificates at their disposal. If on the other hand only the later acquirement on the secondary market remains an option, this raises their entrance and production costs compared to the incumbents in any case. In other words, the incumbents' grandfather rights are an economic subsidy (de Sepibus 2007).

This procedure can lead to problems moreover also because there is no existing objective method to define the 'correct' basic year. To this effect the climate policy illustrates an especially informative example. The climate effect of global warming gases less depends on the new emissions ('flows') per year, rather than on the reduction of stocks which have built up in the atmosphere (CO_2 is estimated to remain in the atmosphere for over 100 years). A not inessential part of the global warming gas / greenhouse gas concentration is therefore – provided that is has man-made / anthropogenic origin – to be traced back to emissions of the industrial nations today during more early phases of their economic development.

Therefore it is not surprising that many developing and threshold countries are demanding on grounds of equal chances - keyword: equality at the start – an intertemporal adjustment from the industrial nations in form of initial equipment well above the current need. Elsewise they fear for considerable negative impacts on their economic growth which in turn would lower their chances to close the gap to the Western prosperity level.

But also the transformation countries of the former Eastern bloc were anxious to maximize their share of the created certificates in context of the Kyoto-Protocol by a favorable basic year – precisely by the definition of a period of reference before the breakdown of their earlier command economies, through which consequently their economic performance also involving their greenhouse gas emissions were substantially diminished at first.

Finally, the perhaps most grave because most principal objection against the present climate change policies goes back to German Economist Hans-Werner Sinn (2008a and 2008b). He argues, economically absolutely correct, that no permanent reduction successes will be achieved with a climate policy only focused on demand for carbons (and other sources of greenhouse gases). This is necessarily to be led back to the operation mode of the emission trading itself, in which the maximum amount of emission of all participating states are capped; savings in a country lead automatically to other countries buying the no longer needed certificates instead. This is the case if the total supply is smaller than the total demand. There is no change in the whole emission amount of the emission trading system – whose reduction is only possible by mutual agreement of all participating nations. The same applies also then, in case other environmental measures additional to the emission trading – such as the exploitation of alternative energies or the expanding of nuclear energy – have reduced the need for certificates in a country, which participates in the emission trading, absolutely.

If in contrast not all countries are member of the emission trading, the difficulty tightens even more as in this case, the exporters of natural resources (oil in particular, gas, coal) which releases global warming gases by burning, have strong economic enticement to increase specifically the extraction rate of these resources; the aim to be delivering maybe with long-term delivery contracts with especially favorable prices in those countries, which are not member of the certificate trading system. The consequences lie at hand: in this unlikely scenario against the background of the Kyoto-process results any emission trading system with limited members can even account for a rise of the global greenhouse gases. Not only environmentally the certificate solution affects contra productive in this case. In addition, other things being equal the companies‘ competitiveness in price suffers whose countries have joined the emission trading because of the lawful inflicted obligation to acquire emission rights.

IV. MODE OF OPERATION AND FUNCTIONING PROBLEMS OF THE EU ETS

As mentioned in the beginning, the ETS emission trading system of the EU was introduced on January 1st 2005 based on a common resolution of the European Council and the EU-

parliament.[19] It represents the worldwide largest and at the same time the first transnational established certificate solution until today and currently counts 30 European member states, amongst them all EU-countries.

The EU ETS is a classic, 'cap & trade' system planning a reduction of the allowed total emission rate in regular intervals. The introduction happens gradually in three phases which accord to a trading period; the system is supposed to be completely implemented with closing of the third phase in the year 2020. The first phase started in 2005 and already ended in 2007. The EU commission also called it „pilot phase of learning". In this period of time the initial allocation of the ‚European Union Allowance', short EUA named certificates of the included emission sources – in total approx. 11.000 so called installations, the energy producing and production facilities from five lines of industry (precisely mining, coke works and refineries, cement- or lime production, ceramics, glass, brick industry as well as paper and cellulose industry). Each EUA owner is allowed to emit one ton of CO2 (in other words 0.27 tons of carbon) or any other relating to the climatic effect amount of different greenhouse gases.

The member nations which had been assigned a fix amount of certificates in line with national allocation plans which they had supplied according to their climate political priorities and considering the EU-aid rules autonomically were merely committed to provide at least 95 percent of the certificates for free in order to countervail transition problems. Almost all countries opted for total initial equipment free of charge.

Currently the system records approx. 40 percent of the total greenhouse gas emissions and about 50 percent of the CO_2 emissions of the participating nations – this corresponds to about eight percent of the worldwide CO_2 output anthropogenic origin – but not the sectors such as forestry and agriculture and the whole transport economics and private households.

Due to the generous grandfathering which in result even led to an overprovision, the price per certificate fell to the reached the bottom level in September 2007 to only 0,1 € (ten cents) on the secondary market; the highest level so far in history, amounted to almost 30,- € per ton, while the certificates currently are dealt with at 12,- € to 13,- €. The fine in case of exceeding the covered amount by certificates came to 40,- € per ton in the first phase; with the beginning of the second phase this was raised to 100,- €, whereupon the emitter has to additionally hand in a certificate per ton of deficiency.

In the current until the end of 2012 on-going second phase of trading the number of available emission rights ran short of 6,5 percent compared to the initial amount in 2005. At the same time the factual field of application was extended to the catalytic cracker regenerators mainly used in the chemical industry. Besides the member states were now allowed to sell

[19] The following presentation of the EU ETS is mainly based on the information of the EU-Commission (2009 and 2010).

up to 10 percent of their certificates; at the same time the instrument of national allocation plans were simplified and made more transparent. Finally the participation in the Joint Implementation- and Clean Development-Mechanism of the Kyoto-Protocol was firstly permitted. To what extent the 'credits' are taken into account is decided by the participating governments in the EU ETS.

In the third final phase of the trading (2013-2020), whose main features were regulated end of April 2009, the previous national allocation plans will be replaced by a single, EU-wide effective emission cap. Simultaneously this upper limit will be linearly lowered year by year in unlimited duration by 1.74 percent as from 2012. This corresponds to a reduction of the number of available certificates of 21 percent compared to 2005. Already in 2013 half of the certificates should be auctioned; 100 percent should be reached in 2027. However many complicated sector- and country-specific special and exception rules find application.

Besides the already mentioned inclusion of air traffic beginning of 2012 the area of application of the EU ETS should be extended starting 2013 with special technical plants and greenhouse gases from a series of various industrial production processes (EU Commission 2009). [20]From that moment on, according to the EU commission still only 43 percent of all manmade greenhouse gas emissions would be recorded, whereas unaltered quite a few of very significant emitters such as agriculture, forestry and shipping would still be exempted. The commission still owes a factual reason for the mentioned sector specific exemptions; these are not even referred to in their publications.

According to an agreement of the member states 20 percent of the earnings from the certificate auctions should be invested in the „fight against the climate change in Europe and the developing nations"(EU Commission 2009, 18). In other words about 80 percent of the auction revenues flow directly respectively indirectly into the national budgets via special financial transfers between poorer and richer member countries for random use.

V. UNSOLVED PROBLEMS OF THE INCLUSION OF AIR TRAFFIC IN THE EU ETS

On December 20th 2007 the EU Council of ministers for Environment met the decision of also including the air traffic in the EU ETS effective January 1st 2012. The branch takes up the second position after the energy business with an energy allotment of 213 million tons (Sterns and Krukowska 2011). Concerned are all airlines – also those from third countries – which land in airports within the 30 EU ETS-member countries. Merely straight over flights

[20] In particular these are "equipment for the capture, transport and subterranean storage of greenhouse gases; CO_2-emissions from petrochemical, Ammonia and Aluminum plants; nitrogen oxides through the production of sodium nitrate, adipin and glyoxalin acid; emissions of per fluorinated hydrocarbons from the aluminum production" (EU-Commission 2009, 12).

are excluded from the emission trading. Several specifics count for air traffic in the EU ETS. On the one hand the concerning airlines only become 82 percent of their emissions in the initial distribution without charge for the basic year 2010 which is rather disadvantageous for the branch; it was characterized by many and partially longer interruptions in the European air transport due to the closure of air space that lasted several days because of the Icelandic volcanic eruption, harsh onset of winter and many labor disputes. Another 15 percent will be auctioned and the remaining three percent were firstly packed to a reserve funds, out of which special needs of over average expanding airlines and of newcomers should be discretionary met. There is no comprehensible factual reason for this obvious placing of the branch's disadvantage in terms of initial distribution of certificates in comparison to the already included sectors.

The advisory board has a number of basic and further air traffic specific arguments against the inclusion of air traffic in the EU ETS. At first to the basic objections against the emission trading with greenhouse gases:

- Global environmental problems can only be solved ex definitione on a global level. This obligatorily requires the involvement of all relevant producers – the nations and private economic entities. Neither the Kyoto-Protocol nor the EU ETS achieves this elementary condition. The latter constitutes a moderate isolated application in terms of sectorial coverage and especially geographically, measured to the demands made to a real global system.
- For this reason the EU ETS is ineffective regarding the targeted climate protection aims as also economically inefficient; the same applies to the Kyoto-Protocol. As far as the necessary scientific foundation of the emission trading with greenhouse gases is concerned, there still remain unexplained cause-effect-links to today's knowledge. In particular no obvious causal relationship could be verified between changes of the emission rates and changes of the average earth temperature. [21]Besides the existing computer forecast models are not suited for a long-term prognosis of climate changes: *„In sum, a strategy must recognize what is possible. In climate research and modeling, we should recognize that we are dealing with a coupled non-linear chaotic system, and therefore that the long-term prediction of future climate states is not possible"* (IPCC 2001, 774). In view of this statement it is not amazing that the economic estimation of possible costs and benefits of the climate change and whose distribution is not marked with a chance of agreement by biggest imponderability up to now. Up to sums of several billions were calculated depending on the scenario and model assumptions. The whole band width – and at the same time the extent of lack of knowledge also in this field – is conveyed exemplarily by the difference in method and deviating model calcu-

[21] Rather the evidence that the greenhouse gas emission will result in the raise of the average earth temperature with a delay of about 800 years is growing (compare für viele Sinn 2008b, 42, and the recorded literature there).

lations by Nordhaus and Boyer (1999) on one hand and by Stern et al. (2006) on the other hand.

- Against this background the avoidance strategies of climate policy including the emission trading currently being favored, but potentially very cost intensive, seem generally to be reflected on. Instead of extending and tightening these, it would from our present point of view make sense to develop suitable adaption strategies for the most affected regions and their inhabitants, which could be realized with much less financial effort.[22] In this context it needs to be mentioned that to today's knowledge merely three percent of the yearly CO2 emissions are of human origin, while 97 percent come from natural sources.[23]

The just mentioned basic arguments against the certificate solutions as instruments for climate protection are strengthened by the following air traffic specific points of criticism about the EU approach:

- Emission trading solutions raise the economic risk of the concerning companies, in particular regarding the long-term investment decisions, as the prices per certificate underlie considerable changes over the time – comparable to the volatility of flexible exchange rates and many commodity prices. It is obvious that international operating airlines are much more exposed to the fore mentioned risks than almost all other industrial sectors. An insurance against such exchange rate fluctuations is generally possible by hedging transactions. But these cause additional costs which would not occur with emission taxes or binding emission limits and the competing traffic carriers would be thus spared.

- A much better forum than the EU for the conception and implementation of global environment protection measures in air traffic is the International Civil Aviation Organization, short ICAO). As special EU-organization not the entire EU belongs to her, but all of the EU-member states and in total 190 countries are contract parties. An agreement in line with the ICAO in the past would have had the advantage of finding more acceptances to the inclusion of air traffic in the regional EU ETS, especially in the third countries and the situated airlines there. However the unification process would have probably been more tedious. But in the past, nevertheless the ICAO contract parties succeeded in decreasing local environmental pollution through air traffic – in particular in noise prevention (Knorr and Arndt 2003/2004). Therefore the EU would have been well-advised, ideally in cooperation with the USA, China and other important aviation countries, the set an appropriate limit to the IACO for working out a sector specific climate protection regime and only in case of a final failure of negotiations to

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22 According to model calculations for the USA the costs for coastal protection measures (including the damage by land losses) for the complete coast line as a result from rising sea-level of one meter by the end of the century are about to amount to 7.5 bn US-$ (Neumann and Livesay 2001).

23 Compare Sinn (2008b) and the extensively quoted primary literature.

carry out the inclusion of air traffic in its emission trading regime – and to credibly threaten this option beforehand.

- Furthermore only certificates for flights to and from EU-airports have to be bought in context with the EU ETS – however for the complete distance, even if this runs mostly outside of the EU sovereign territory, as in the case of a flight to the USA or Far East. [24]Hence, within the EU this requirement does not lead to an intermodal distortion of competition (but to intermodal distortions of existing substitutes, that do not underlie the EU ETS). A completely different picture occurs with air routes between the EU and third countries. Due to the emission trading the additional costs per flight ticket amount to low one- or two-digit sums by the EU according to the distance. The experiences with ecologic motivated special charges for air trips in the Netherlands and currently with the German air transportation tax (cumulative to the rise of the aviation fuel price during the survey period) doubtless show that even pretty low additional costs induce a noticeable traffic shift to the neighbor countries in the price elastic demand groups.[25] It can be assumed that in result to the emission trading this will especially affect the EU-airlines with quantitatively not insignificant traffic shifts. This leads to a large benefit of the rapidly expanding airlines from the Golf region (Emirates, Qatar Airways, Etihad amongst others) such as from Turkey (Turkish Airlines), from the over average growing relations between Europe and Asia, Australia/New Zealand and Africa such as from South America and the American East coast to Asia (especially India) due to price-sensitive customers – the ethnical and VFR-traffic (VFR=Visiting Friends and Relatives) - at the expense of European carriers.

- The nonetheless strong political and legal resistance of third countries to the inclusion of their airlines in the EU ETS may against that background be led back to the considerable extraterrestrial impact of this emission trading. As already mentioned further above even providers from third countries have to buy their certificates for the complete distance, even if it mainly doesn't go through the sovereign territory of the EU.[26] According to the legal opinion of the EU-commission, to which the Advocate General Mrs. Kokott followed unrestrictedly in her final application dated October 6th 2011 in the claim of American side against the EU before the European Court of Justice

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[24] According to a calculation of the Air Transport Association of America (ATA) only 9 per cent of emissions emerge on a flight from London to San Francisco above the sovereign territory of the EU, however 29 or 37 per cent above the US-American respective Canadian airspace and the remaining 25 per cent over the Atlantic Ocean (Clark 2011).

[25] This shift was the reason why the Dutch government cancelled the national air traffic tax already after one year. Stephan Gemkow, the companies' Financial Officer gives examples not only Lufthansa related for a similar development in Germany in a recently published interview in the Börsen-Zeitung. See Börsen-Zeitung, No. 190, October 4th 2011, p. 11. – Although the Federal government of Germany announced while introducing the air traffic tax the abolishment of fit with the inclusion of air traffic in the EU ETs. Concrete related plans were not presented to the public yet.

[26] In full text form to be found at http://www.mcgill.ca/files/iasl/chicago1944a.pdf.

and the court itself (European Court of Justice 2011) in its judgment the rules for the convention lacking EU-membership in the IACO, do not apply under international law (although, as already mentioned, all EU-member states have joined the ICAO). Therefore the retaliatory measures of several concerned third countries such as especially the USA, Russia, China and India, grow more and more likely. The consequence would be a trade war, which not least would damage the European airlines as well as the related branches like the aircraft maker Airbus Industry.

VI. CONCLUSION AND OUTLOOK

The integration of aviation into the EU ETS in its present form was not only ineffective form an environmental policy point of view, as well as a foreign policy disaster for the EU; The inclusion of air traffic in the EU ETS in its current form was not environmental-economic suboptimal and with regard to foreign affairs failed. In particular the apparent small environmental political benefit does not appear factually justified with the associated considerable financial strain for the European airlines. Moreover in case the EU-commission is not willing to compromise, there will be imminent measures from the third countries, amongst them significant economic powers such as the USA, China, India, the Gulf States, Brazil and Russia, against the EU. The aim instead should be a sector specified global arrangement, under the aegis of the International Civil Aviation Organization, being designed and administrated by her. This approach would not only strengthen the credibility of international regimes. An agreement on this level seems likely with a realistic point of view given the past controversies around the EU ETS, but also given the factual commitment of the most EU-ETS enemies from third countries including the USA and China, alternatively to an ICAO-solution to support the environmental protection in air traffic.

A second-best-solution could consist of removing the especially problematic extraterritorial elements of the EU ETS. Precisely, in the calculation of the certificate based emissions for both European and third country carriers only the distance should be taken as the calculation basis of emissions, which their aircraft traversed over the sovereign territories of any of the 30 EU member states.

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