Involvement of Aviation Activities in the Scheme for Greenhouse Gas Emission Allowance Trading

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ABSTRACT: The European Union includes the Environment as one of the four main target areas requiring greater effort. One pillar of EU environmental policy is the Greenhouse Gas Emission Trading System. In the EU directive 2008/101 it was held that aviation will be added to the system of greenhouse gases trading. Despite the relatively low volume of aviation emissions, the danger of aviation emissions emitted in the higher atmosphere tips the scales. Aviation will be part of the ETS from year 2012, but the most important decisions and customizations of the ETS system for aviation are to be done now. The involvement of aviation in the ETS presents many difficulties and problems, which need to be solved to allow the ETS to bring benefits to both aviation and the whole of society as well.

KEY WORDS: greenhouse gas, ETS, aviation.

1 EUROPEAN UNION GREENHOUSE GAS EMISSION TRADING SYSTEM

The European Union Greenhouse Gas Emission Trading System (EU ETS) is an executive part of EU climate policy. The ETS is anchored in Directive 2003/87/EC. The main goal of the ETS is to force producers of greenhouse gases to decrease volume of greenhouse gases produced by charging a part of emissions. The EU ETS mechanism is targeted on large emitters of carbon dioxide within the EU, about 11 000 operators which covers about 45% of EU carbon dioxide production. The EU ETS works on a “cap and trade” basis – each member country of the EU has its own limit of emissions which is covered by allowances which are redistributed between involved subjects. Allowances (EUA - one allowance represents the right to produce one ton of carbon dioxide) are distributed by national governments according to a national allocation plan on the basis of their Kyoto protocol commitments. The whole cap of allowances is smaller year by year and thus the operator receives fewer allowances on emissions each year. That forces them either to reduce their emissions or to buy allowances from the other operators who produced less emission and saved their allowances for trade. The EU ETS is planned in 3 phases till the year 2020 and the main goal is a reduction in emissions of 21% compared to year 2005. Since January 2008, the 2nd Trading Period is under way which will last until December 2012. The present resemblance of the ETS is not definitive. The European Commission proposed a number of very important changes to the scheme.

The main changes are the following:

- There will be one EU-wide cap on the number of emission allowances instead of 27 national caps. The annual cap will decrease along a linear trend line, which will continue beyond the end of the third trading period (2013-2020).
- A much larger share of allowances will be auctioned instead of allocated free of charge.
- Harmonised rules governing free allocation will be introduced.
- Part of the rights to auction allowances will be redistributed from the Member States with high per capita income to those with low per capita income in order to strengthen the financial capacity of the latter to invest in climate friendly technologies
- A number of new industries (e.g. aluminium and ammonia producers) will be included in the ETS; so will two further gases (nitrous oxide and perfluorocarbons).
- Member States will be allowed to exclude small installations from the scope of the system, provided they are subject to equivalent emission reduction measures
- These changes were mentioned in Brussels, 23 January 2008 Questions and Answers on the Commission's proposal to revise the EU Emissions Trading System. They are fundamental and if adopted they will change the situation on the allowance market and thus change the prices of EUA. Changes are widely discussed and active lobbying is under process. The main effort of EU is to stabilize the price of allowances, because only a stabile price is a guarantee for the investor to realise an acquisition for the reduction of emissions. The first phase of ETS resulted in a total depreciation of EUA 2007 (allowances for first phase), which was due to the wrong estimation in the volume of emissions in first phase (2005-2007) and overmuch EUA were allocated freely. The EU does not mean to allow that situation to happen again. Figure one shows an overview of the average settlement prices of EUA contracts (curve) traded on the ECX (European climate exchange). Columns indicate the volume of traded EUA. The curve shows underflow connected with the global economic recession that reduces industrial production and thus CO2 emissions. On the other side the columns show that traded volume is higher, because of low price. Speculative buys show that at least part of the involved organisations expected a significant rise in the EUA price in the future and the depreciation of EUA 2007 had passed out of mind. The actual price of EUA on ECX from 1st June 2009 was about €13.30 and was slowly decreasing.

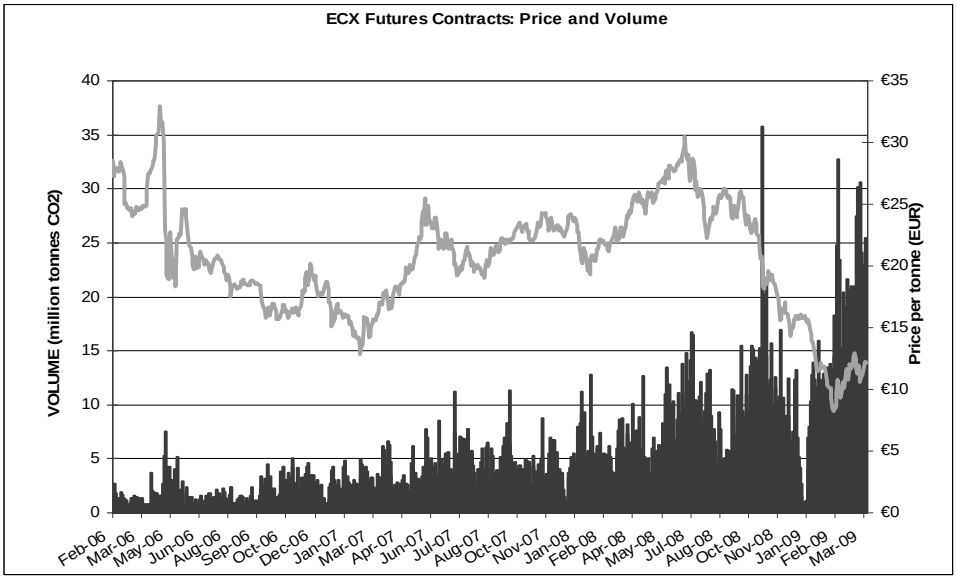

Figure 1: EUA prices at the European Climate Exchange

2 INVOVLVEMENT OF AVIATION ACTIVITIES IN THE SCHEME FOR GREENHOUSE GAS EMISSION ALLOWANCE TRADING

Aviation emissions represent only about 5% of all greenhouse gases emissions. That is quite a small percentage, but the main reason to include aviation in the ETS was the rapid growth of air transport in the late 90´s and at the beginning of the 21st century. But as shown in Figure 2, the global economic depression hit aviation seriously. Air transport is in its deepest depression ever and is the worst depression of all means of transport.

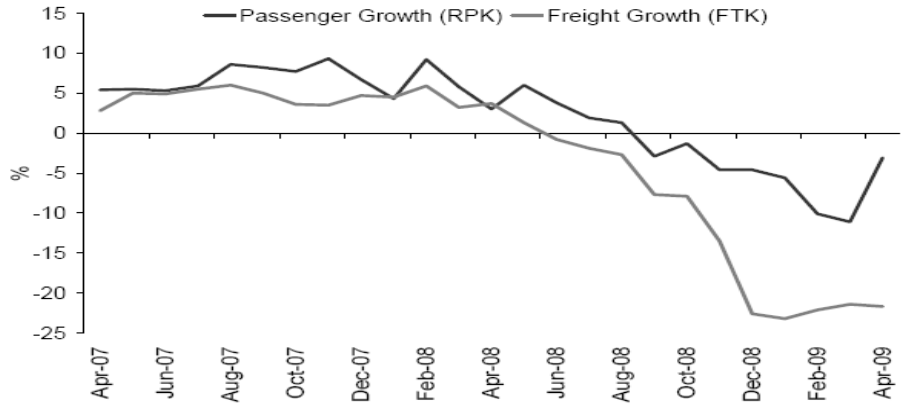

Figure2: International air transport passenger and cargo growth

With the decrease in air transport the main reason to involve air transport in the ETS disappeared, or, at least for next few years, is less important, but a new reason appeared. The new reason why to involve air transport in ETS are contrails. Contrails have been considered possible modifiers of regional climate. Contrails may increase total cloud and cirrus cloud amounts, and consequently change the Earth's radiation balance. As a result, surface and upper tropospheric temperatures may change. According to IPCC (Intergovernmental Panel on Climate Change) Aviation Special Report in the future, contrail cloudiness and radiative forcing are expected to increase more strongly than global aviation fuel consumption because air traffic is expected to increase mainly in the upper troposphere, where contrails form preferentially, and because aircraft will be equipped with more fuel-efficient engines. More efficient engines will cause contrails to occur more frequently and over a larger altitude range for the same amount of air traffic. The contrail cover would increase even more strongly if the number of cruising aircraft increases more than their fuel consumption. Higher cruise altitudes will increase contrail cover in the subtropics; lower cruise altitudes will increase contrail cover in Polar Regions. Future climate changes may cause further changes in expected aircraft-induced cirrus cover. But the LOSU (level of scientific understanding), in the area of aviation produced aerosols and cloudiness, is still low. Further research in this area is essential for a correct assessment of the exposure. Uncertainties about the impact of aircraft emissions in higher atmosphere, and fear from possibly more serious consequences, are now the main reasons why aviation shall prevail in ETS. For example, maritime transport inclusion in the ETS has been prepared for a longer period than the inclusion of aviation, but with a consideration for the economic depression, the inclusion of maritime transport in ETS has been recessed without date.

The Directive 2008/101/EC of the European Parliament includes some aviation activities in ETS. ETS will apply on flights to and from EU airports from 1.1.2012. Year 2012 should be a test phase for this project. The progress in the reduction of greenhouse gas production should be stronger than in the older ETS phases now because aviation will be involved

directly from the test phase into the stricter phase 3 of ETS. There will be differences for aviation ETS to secure a smooth changeover into phase 3. For year 2012 the amount of EUA to be located is equal to 97% of historical aviation emissions and the total quantity of allowances to be allocated to aircraft operators shall be equivalent to 95 % of the historical aviation emissions multiplied by the number of years in the period. This percentage may (and is expected to) be reviewed as part of the general review of this Directive. Historical aviation emissions means the average of the annual emissions in the calendar years 2004, 2005 and 2006, but by 2 August 2009, the Commission shall decide on a change of the historical aviation emissions, based on the best available data, including estimates based on actual traffic information. 85 percent of EUA shall be given for free, 15% shall be auctioned. This percentage may be increased as part of the general review of this Directive. There shall be a 3% reserve from all EUA to be allocated for operators:

(a) who start performing in aviation after the monitoring year for which tonne-kilometre data was submitted, or

(b) whose tonne-kilometre data increases by an average of more than 18 % annually between the monitoring year for which tonne-kilometre data was submitted

This 3% reserve is important especially for EU newcomers because their air transport market is not fully established yet, and is expected to grow rapidly. If there were not any reserve ETS a strong market disadvantage for the operators from these countries would be created. As ETS is primary targeted on large operators, there are some borders for aviation operators to be involved in ETS.

The ETS shall not include flights performed by aircraft with a certified maximum take-off mass of less than 5700 kg, flights performed by a commercial air transport operator operating either: fewer than 243 flights per period for three consecutive four-month periods; or flights with total annual emissions lower than 10000 tonnes per year. There are other flights excluded from ETS, such as flights performed exclusively for the transport on official missions of a reigning Monarch, Heads of State, Heads of Government , all military activities, SAR (search and rescue), all VFR flights, training flights, flights which take off and landed on the same airport and flights for scientific purposes, etc..

Air transport emissions shall be monitored by calculation. Emissions shall be calculated using the formula: Fuel consumption × emission factor. Fuel consumption shall include fuel consumed by the APU (auxiliary power unit). Emission factor should be taken from 2006 IPCC Inventory Guideline, unless emission factors identified by accredited laboratories are more accurate. Each kind of fuel has its own emission factor. The emission factor used for most aircraft fuel is 3.15. This means for the purposes of ETS for each 1 tonne of fuel burned 3.15 tonnes of greenhouse gases are produced. The emission factor shall take into consideration the danger of contrails and if the danger of contrails will be proven, it is expected that the emission factor will rise. The allocation of allowances is solved on the principle of aviation activity. The amount of aviation activity shall be calculated in tonne-kilometres using the following formula: tonne-kilometres = distance × payload. Where: "distance" means the great circle distance between the aerodrome of departure and the aerodrome of arrival plus an additional fixed factor of 95 km; and "payload" means the total mass of freight, mail and passengers carried. For a rough conception, emission cost sample scenarios for Lufthansa are given in figure 3. All benchmarks are made to work with the high level of uncertainties on some key factors and calculations for many different scenarios are to be taken in consideration. Scenarios for Lufthansa are positively influenced by the fact that Lufthansa operates mostly modern aircrafts with good fuel consumption rate, scenarios for airlines with an older fleet would be worse.

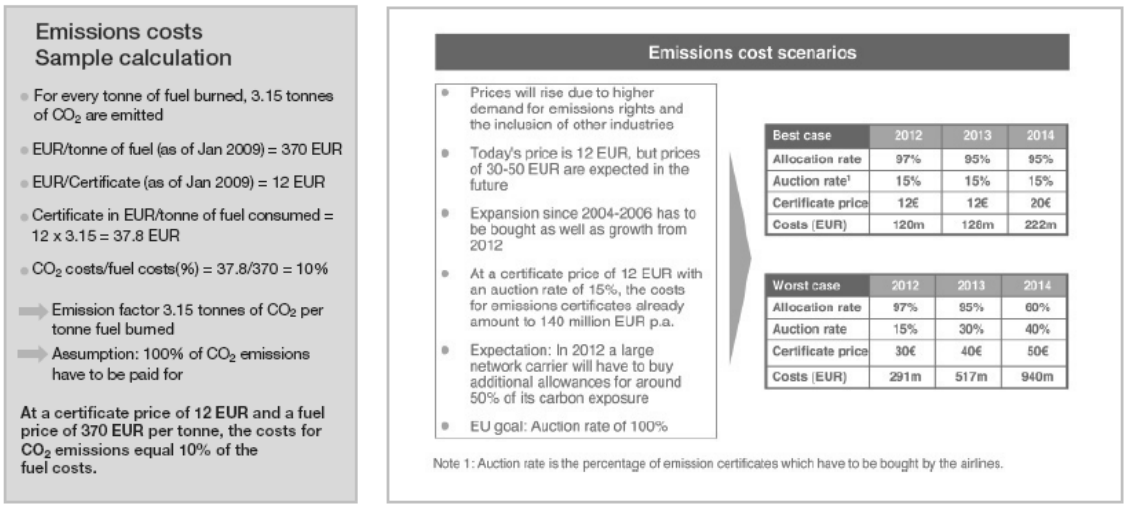

Figure3: Emission cost scenarios for Lufthansa

As the sample calculation shows nowadays EUA costs are about 10% of fuel costs, and with only 15 % of EUA needing to be bought, but a rise in the price of EUA is expected in the future. The worst of all scenarios counts with a price of 90 EUR (100EUR is fine for emissions without allowance) per EUA and 100% EUA auctioned – the outcome approximately adds an additional 60% to fuel cost. That would be devastating especially for low cost airlines. It should be mentioned that the EU is supporting ecologically less dangerous fuel, these fuels have significantly smaller emission factors, some have a factor = 0, that means no EUA needed and all allocated can be purchased. But there is still no real alternative fuel for a minimum of the next 5 years. ETS should be the reason why airliners should support research into the area of “green” jet fuel.

3 PROBLEMS CONNECTED WITH INVOVLMENT OF AVIATION IN ETS

The main problem with the inclusion of aviation in ETS, already mentioned above, is the uncertainty about future development. The percentage of EUA allocated freely or auctioned, as well as the rate of decrease of the whole cap, is absolutely necessary for the reasonable planning of emission reduction. The EU has to give definitive and mandatory information about the future of the ETS. The difference between 15% and 100% of EUA auctioned is enormous and makes long term investments in emission reduction highly risky. This high level of risk is understandably weakening efforts on emission reduction and devaluing the whole idea of ETS. Combining the contending concerns of the environmental lobby on one side and airliners on the other side is challenging, but compromises have to be accepted as quickly as possible.

Other problems are connected with the expected additional costs of ETS. The cost of allowances will be same for all operators, but there will be additional costs depending on the business model or geographical location of operator, which will create uneven conditions on the part of the airlines. In “Analysis of the EC Proposal to include Aviation Activities in the Emission Trading Scheme”, which was prepared by Ernst & Young and York Aviation in 2007, is a warning that the ETS will hit especially low cost airliners seriously because their product is much more price sensitive than the product of airliners oriented on business clients. Because of the price sensitivity, low costs can not afford to raise their prices and will have to compensate the ETS costs by decreasing their profit. Another problem can arise from the administrative requirements connected with the ETS. As each subject involved in the ETS has to have an authorized monitoring plan for emissions,

another monitoring plan for tonne-kilometre output and yet another agenda connected with trading on EUA exchange, it is obvious that there will be administrative costs. According to the E&Y analysis these costs are estimated to be about 150 000 EUR per year. That is another burden, especially for small airlines. Another threat is so called "carbon leakage". Because of the competitive disadvantage of EU operators, who are involved in the ETS, against non EU operators, there is a high risk that passengers who use some EU airports only as a transition hub will rather use a non EU hub (and non EU airliners too) to avoid additional costs from ETS. Airports and airlines operating from airports near EU borders will also be challenged by operators from near non EU airports, and airlines involved in ETS will oppose the market disadvantages against operators which are not involved in ETS, due to not meeting the requirements. All these market disadvantages are serious problems and the EU is aware of this situation and is working on some solutions. As mentioned above, air transport is now facing its worst depression ever and this depression will negatively influence the implementation of ETS in aviation. In a time of financial instability for airlines it is complicated to implement an ETS supporting strategy in their own business plans. The best way to profit from ETS is to buy modern aircraft with a better fuel consumption rate. For most airlines the ETS will only be another burden in a time of crisis. For some of them it could be the last strike for their tight budgets. On other hand there should be some positive effects too. Apart from the reduction in greenhouse gas emissions, there should be some competitive advantage for the airlines involved if ETS or a similar scheme will be adopted in other parts of the world. The same situation is with competition from other means of transport. What is today a disadvantage, could become advantageous, if another means of transport will adopt a similar scheme of emission trading and face the same problems as aviation today. ETS could also be an advantage for some business models of airlines that will benefit from a reduction in emissions and trading with EUA. No less important will be the investments in alternative jet fuel research, which may bring new power sources and make aviation less dependant upon crude oil.

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