



COMMISSION OF THE EUROPEAN COMMUNITIES

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SEC(2006) 1685

**COMMISSION STAFF WORKING DOCUMENT**

**Summary of the Impact Assessment:**

**Inclusion of Aviation in the EU Greenhouse Gas Emissions Trading Scheme (EU ETS)**

{COM(2006) 818 final}  
{SEC(2006) 1684}

## 1. PROCEDURE AND CONSULTATION

In 2005 the Commission adopted a Communication entitled "*Reducing the Climate Change Impact of Aviation*"<sup>1</sup>, which evaluated the policy options available to this end and was accompanied by an impact assessment. It concluded that, in view of the likely future growth in air traffic emissions, further measures are needed. Therefore, the Commission decided to pursue a new market-based instrument at Community level in preference to other financial measures such as tax and charges and concluded that "*...the best way forward... lies in including the climate impact of the aviation sector in the EU emissions trading scheme*" (EU ETS). The present proposal aims at implementing this key pillar of the strategy without affecting its other means of addressing climate change through a comprehensive approach based on improved technology and utilisation of aircraft (including improvements in air traffic management, research etc.)<sup>2</sup>.

In response, the **Council of Environment Ministers**, the **European Council** and the **European Parliament** welcomed the Communication and recognised that emissions trading seems to be the best way forward and has the potential to play a role as part of a comprehensive package of measures.

At international level, the limitation and reduction targets adopted under the Kyoto Protocol include emissions from domestic aviation but not emissions from international flights. Instead the Kyoto Protocol places an obligation on the parties to "*pursue limitation or reduction of emissions of greenhouse gases...from aviation...bunker fuels, working through the International Civil Aviation Organization...*". At the sixth meeting of the ICAO Committee on Aviation Environmental Protection in 2004, it was agreed that an aviation-specific emissions trading system based on a new legal instrument under ICAO auspices "*...seemed sufficiently unattractive that it should not be pursued further*". However, Resolution 35-5 of the ICAO Assembly instead endorsed open emissions trading and requested the development of non-binding guidance for use by states, as appropriate, to incorporate emissions from international aviation into their emissions trading schemes. The Commission and Member States are supporting this work which is scheduled for finalisation by ICAO in 2007. The ICAO Assembly in September 2007 will discuss this issue. In any case, this proposal is not expected to enter into force before that date. The final ICAO guidance will be taken into account, as appropriate, during the co-decision procedure. The objective of the proposal is to provide a model for aviation emissions trading that can be a point of reference for the EU's contacts with key international partners and be extended or replicated worldwide. The Commission also supports the objective of a global agreement aimed at effectively tackling aviation emissions at global level.

The proposal is based on extensive stakeholder consultation including an **internet consultation** and an **Aviation Working Group of experts** set up as part of the European Climate Change Programme.

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<sup>1</sup> COM(2005) 459, 27.9.2005. For all references:  
[http://ec.europa.eu/environment/climat/aviation\\_en.htm](http://ec.europa.eu/environment/climat/aviation_en.htm).

<sup>2</sup> See in particular section 5 of COM(2005) 459.

## 2. PROBLEM DEFINITION

Air transport is an integral part of society in the 21st century, contributing to European and global integration. Unfortunately, it also contributes to climate change. **While air transport accounts for about 0.6% of the EU's value-added<sup>3</sup>, it also accounts for about 3% of EU greenhouse gas (GHG) emissions**, the majority coming from international flights which are not subject to targets under the Kyoto Protocol. **To date, policies to mitigate climate change have not required any substantial contribution from aviation.**

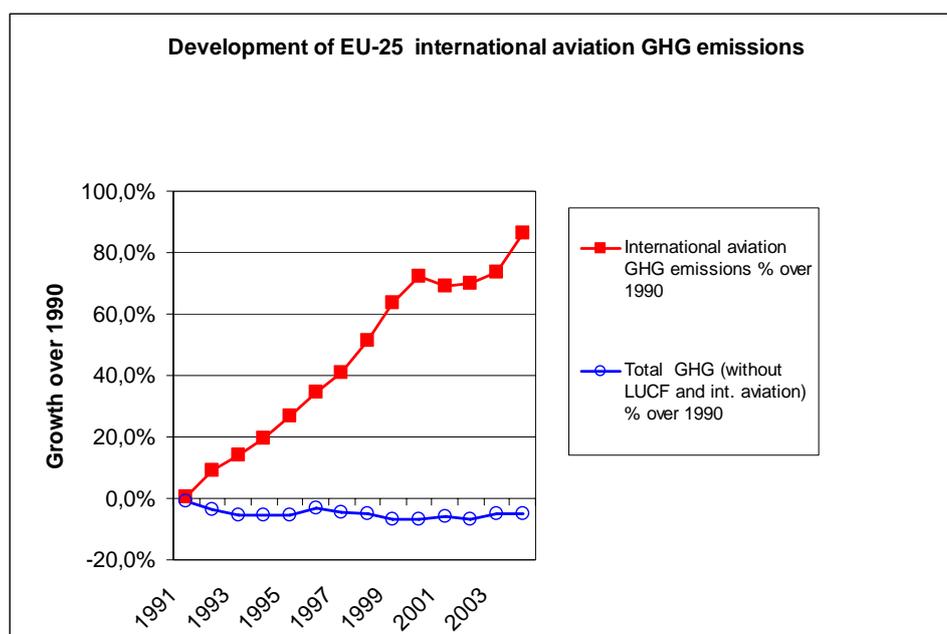


Figure 1: Development in EU-25 GHG emissions from international aviation (Source: EEA).

As Figure 1 shows, **EU GHG emissions from international aviation grew by 87% between 1990 and 2004**. At the same time policy action has led to a reduction in overall emissions from other sectors. **Air traffic is forecasted to more than double between 2005 and 2020**. Without new policies, growth in emissions will continue to undermine efforts made in other sectors.

## 3. OBJECTIVES

The **overall objective** is to address aviation's growing climate impact and ensure that it contributes to the EU's overall objective of limiting the increase in the global annual mean surface temperature to a maximum of 2°C above pre-industrial levels. The **operational objective** is to include aviation in the EU ETS.

<sup>3</sup> EUROSTAT: Statistics in focus, 37/2005.

## 4. POLICY OPTIONS

### 4.1. Introduction

In designing the proposal, the need to maintain **equal treatment of operators regardless of their nationality consistent with the Chicago Convention is fundamental**. It is also important to take into account **lessons learned from the existing EU ETS**. Therefore, more harmonised solutions for aviation have been considered.

### 4.2. Open or closed system

The Communication concluded that the best way forward lies in including aviation in the EU ETS. An alternative would be to develop a separate scheme for aviation (a "closed" system). The analysis demonstrates the impacts of a closed system.

### 4.3. Geographical scope

In considering the geographical scope of the scheme, the environmental impacts, the range of economic impacts, and the potential for the scheme to provide a model for expansion were examined. The options are: **intra-EU flights only**; **all flights departing** from EU airports; **all arriving and departing flights**. The analysis focuses on these options.

### 4.4. Non-CO<sub>2</sub> emissions

Aviation's climate impact is greater than the effect of its GHG emissions alone due to a number of indirect effects (primarily NO<sub>x</sub> emissions and enhancement of cirrus cloud coverage). Two options for addressing these effects have been short-listed: a requirement for aviation to surrender allowances corresponding to its CO<sub>2</sub> emissions **multiplied by a precautionary factor** reflecting other impacts; or an approach where only CO<sub>2</sub> is included, but instruments such as **modulation of airport charges according to NO<sub>x</sub>** are implemented in parallel.

### 4.5. Remote and isolated regions

The Council and the Parliament urged the Commission to analyse the effects on the diversity of situations in various regions of the Community (including islands and the outermost regions). Three options have been analysed: make **no special provisions** for any type of region; make **special provisions for outermost regions**; **define further types of regions for which special provisions could be made**.

### 4.6. Project credits

Aviation should be able to use project credits generated under the Kyoto Protocol for compliance purposes, consistent with current practice in the EU ETS. To avoid discrimination between aircraft operators, a harmonised approach is needed. The analysis considers two options: **use of credits up to a limit equivalent to the average limit being imposed by Member States under the EU ETS**; or **unlimited access**.

#### 4.7. Total quantity of allowances

Including aviation in the EU ETS means that the sector will receive an initial quantity of allowances which can then be increased through purchasing from the market. In the existing EU ETS, the emissions caps for both the periods 2005-2007 and 2008-2012 are driving emissions to stabilise at, and then fall below, 1990 levels. However, **requiring aviation to stabilise emissions at or below 1990 levels in the near future would seem unrealistic. Therefore, the analysis assumes a cap requiring aviation to stabilise emissions at 2005 levels.**

#### 4.8. Allowance allocation

Allowance allocation raises two questions: whether allowances are granted free of charge and how allowances granted free of charge are distributed. "Grandfathering" (granted free of charge based on historic emissions levels) rewards the polluter, penalises early action and can discourage emission reduction measures. The analysis has therefore focused on "**auctioning**" (issued against payment) and "**benchmarking**" (granted free of charge based on an efficiency parameter).

### 5. ANALYSIS OF IMPACTS

#### 5.1. Introduction

The assessment has used three formal models – AERO, PRIMES and TREMOVE. Air-traffic analysis has also been performed on the basis of data provided by the European Organisation for the Safety of Air Navigation.

The allowance price in the EU ETS is a critical input for the analysis and at the same time an output of PRIMES. Therefore, two values (€ and €30) from the lower and upper ends of the PRIMES results have been used for the non-PRIMES analysis.

#### 5.2. Environmental impacts

The environmental effectiveness of a trading scheme is dependent on the cap, which equates to the number of allowances issued. For a given cap the GHG reductions depend on the assumptions in the business-as-usual (BaU) scenario. The baseline growth in CO<sub>2</sub> emissions was computed by the AERO model on the basis of assumptions produced by the International Civil Aviation Organisation (ICAO). To reflect improvements in air traffic management from Community initiatives, an extra improvement of 1% per year is assumed for 2013 to 2019.

Table 1 gives an overview of the GHG reductions under different geographical scopes, comparing aviation's BaU emissions with stabilisation at 2005 levels.

Geographical scope	Reduction by 2015		Reduction by 2020	
	%	Mt CO <sub>2</sub>	%	Mt CO <sub>2</sub>
Intra EU	36%	31	45%	44
All departing	36%	77	46%	115
All arriving and all departing	36%	122	46%	183

Table 1: Absolute and percentage reductions

### 5.3. Economic and social impacts

#### 5.3.1. Impacts on airlines, airports and customers

The results of the analysis indicate that aviation's inclusion in the EU ETS would have only a marginal effect on profitability:

- Since every airline on each covered route would be treated equally, **airlines would be expected to be able to pass on, to a large extent or even in full, the cost of participating in the scheme to their customers.** Whether airlines receive allowances free of charge would not be expected to make any difference to this cost pass-through decision. In this respect, airlines have similar characteristics to, for example, European power generators.
- Fully passing on costs to customers would mean that *by 2020* airline tickets for a return journey could increase by €4.6 to €9.6, depending on the journey length. This assumes coverage of all departing and arriving flights and a high allowance price of €30. **This would have only a small effect on forecasted demand growth** from business-as-usual levels of 142% to a minimum of 135%.
- **This small impact on growth reflects demand for aviation being, in general, not very price sensitive.** This is partly because, according to data on the socio-economic distribution of air transport users, increased ticket prices would be borne predominantly by the wealthier segments of the population. An additional explanatory factor is that both GDP and disposable income are projected to continue to increase in real terms into the future.
- Since all airlines would be treated equally, **competition between airlines would not be expected to be significantly affected.** The main difference between airlines is the length of journey undertaken, the age of the aircraft used and the payload carried. Therefore carriers travelling shorter distances, using older aircraft or carrying fewer passengers or less freight would be affected to a greater extent than more fuel-efficient carriers. **The choice of geographical scope is not likely to change this conclusion.**
- Competition between airports and tourism would not be significantly affected since forecasted demand growth remains high; there will always be an economic rationale for providing air services through EU airports; and the majority of tourism in the EU is generated by EU citizens. **The choice of geographical scope is not likely to change this conclusion for airports. However, any risk to**

**tourism would likely be decreased if the scope covers all departing and arriving flights.**

### 5.3.2. *Impacts on the EU ETS*

Closed system: The Commission's preference for an open system is clearly supported by the modelling results: **in a closed system covering all departing flights aviation would face an allowance price of between €14.1 and €325.8 by 2020.**

Open systems: Using PRIMES growth assumptions, by 2020 in a system covering all departing flights but with *no* access to project credits, including aviation would change the allowance price from €1.3 to €4.6. Using ICAO growth assumptions, the price would change from €1.8 to €4.6. However, neither of these scenarios is very realistic since aviation *will* have access to credits. **With limited access to credits, aviation would have no significant impact on EU ETS prices. Instead the quantity of project credits purchased would increase.**

### 5.3.3. *Tourism*

Tourism in the EU is essentially driven by the demands of its own citizens which account for about 80% of all overnight stays. Around 25% of tourist trips involve air travel. In summary the conclusions are that:

- Extra costs would amount to some 2% of the average expenditure on a typical holiday trip by air in Europe, assuming a high allowance price of €30. Only for regions whose tourism receipts depend almost completely on inbound air travel can a somewhat greater impact be expected. **For almost all Member States, the effects would be expected to be less than 2% of average holiday expenditure, and in all Member States it would be comparable to yearly fluctuations due to trends in tourist flows.**
- Experience from past oil price shocks indicates that an increase corresponding to a high allowance price of €30 is unlikely to have a significant impact on international tourism demand. **Despite a 49% average increase in fuel costs, ICAO registered strong growth in passenger traffic in 2005.**

### 5.3.4. *Impacts on remote and isolated regions*

The results for the **outermost (ultra-peripheral) regions (UPRs)** for the different geographical scope options, for allowance prices of €6 and €30 and for different assumptions about the share of allowances auctioned, are shown in Table 2.

Geographical scope	CO <sub>2</sub>	Allowance price €6			Allowance price €30		
		Auctioning			Auctioning		
		10%	20%	40%	10%	20%	40%
Intra-EU	0	0	0	0	0	0	0
All departing	3,4	2	4	8	10	20	40
All departing/all arriving	6,7	4	8	16	20	40	80

Table 2: Extra costs for services to UPRs (€million). Estimated for 2005.

However, airlines flying to UPRs tend to operate commercial services. Therefore, these cost increases would be expected to be passed on to customers, to a large extent or even in full, with limited effects on demand.

The situation is different for **other disadvantaged regions and some UPR routes**, where airlines tend not to operate commercial services but are subsidised by Member States. The potential extra costs for maintaining existing air services known to be subject to public service obligations (PSOs) has been estimated, assuming that all additional costs would need to be paid by Member States. Apart from Italy, which has relatively-speaking more PSOs, only countries that have UPRs would risk having to spend more than €1 million per year to neutralise the effects on PSO routes.

Finally, potential impacts on **flights serving airports located on islands have been assessed**. In three Member States extra costs for these services could be just over €1 million per year, under the cheapest scenario, and more than €20 million per year, under the most expensive scenario. The costs are substantially less for all other Member States with islands.

## 6. COMPARISON OF THE OPTIONS

In section 5, the effects of varying individual parameters were examined and compared. Based on this analysis, **the best possible combination of the different design parameters is set out in this section**.

The analysis confirms the conclusion drawn in the Communication that **an open system would be preferable to a closed system**. A stand-alone aviation system would not be able to achieve the same environmental benefits without much higher costs.

The analysis confirms that the broadest possible **geographical scope of all departing and arriving flights** would give the biggest environmental benefits, would be neutral from a competition point of view considering the alternative scope options, and would be the best option for tourism. On the first point: it would most adequately reflect the higher external costs associated with long haul trips. On the second point: competition between airlines and airports is unlikely to be affected by the geographic scope chosen. **However, regarding tourism, even though impacts are estimated to be limited, they would likely be decreased with the largest scope**. Therefore, the proposal covers all departing and arriving flights from 2012 onwards. However, the proposal begins by covering intra-EU flights during the year 2011 only, in order that aircraft operators can gather practical experience from participating in the scheme before the coverage widens.

With regard to the **remote and isolated regions**: the only clearly defined type of region is the outermost regions (Article 299(2) of the Treaty). However, some of these regions are actually relatively close to the European mainland, so special provisions for these regions may introduce distortions of competition vis-à-vis the mainland. All other regions potentially eligible for subsidies are identified on a case-by-case basis. Therefore, **any special treatment should be addressed within the existing framework regulating subsidies to air transport**.

With respect to the **non-CO<sub>2</sub> climate effects**, by the end of 2008, the Commission will put forward a proposal to address the NO<sub>x</sub> emissions from aviation, after a thorough impact assessment, to provide incentives for manufacturers and operators to invest in low NO<sub>x</sub> technologies.

Consultation with stakeholders confirmed a very strong desire for the allocation to be harmonised at EU level, which is also consistent with maintaining equal treatment regardless of nationality, as required under the Chicago Convention.

The analysis shows that auctioning a proportion of allowances would not imply unreasonable costs. **This is because, firstly, airlines would be expected to be able to pass on, to a large extent or even in full, the cost of participating in the scheme to their customers and, secondly, whether allowances are received free of charge or against payment would not be expected to make any difference to this cost pass-through decision.** Auctioning a proportion of allowances would also make the initial allocation more efficient. Therefore, for the period 2011-2012 the proportion being auctioned will be equal to the average percentage proposed by the Member States including auctioning in their national allocation plans. Thereafter this will be reviewed in the light of the results of the general review of the emissions trading scheme. Finally, auctioning revenues would be used by Member States to mitigate GHG emissions, to adapt to the impacts of climate change, for example in developing countries, to fund research and development, and to cover administrative costs.

With respect to **allowances allocated free of charge**, benchmarking would, in contrast to grandfathering, reward operators which have taken early action, and would reward cleaner aircraft *as well as* more efficient *use* of aircraft. A **benchmark based on emissions per tonne-kilometre seems the best way forward.**

Regarding the **quantity of allowances**, this would be the main determinant of the environmental outcome of the scheme. The analysis has shown that while reductions would occur in the aviation sector itself, the majority of emissions reductions would take place in other sectors. This will increase cost-effectiveness. Provided aviation has some access to project credits, stabilising emissions at 2005 levels over the period 2011-2022 would be realistic and would not put significant pressure on EU ETS allowance prices.

## 7. MONITORING AND EVALUATION

Emissions trading inherently implies stringent monitoring mechanisms, so the **core indicators for progress** will be **timely implementation** and **effective enforcement**.