Measures to curb the climate change impacts of aviation

Summary

High time for action

- In 2000, aviation was responsible for 4 to 9 per cent of the climate change impact of global human activity – the range reflecting uncertainty surrounding the effect of cirrus clouds
- International aviation is not subject to Kyoto or other climate commitments
- aviation has by far the greatest climate impact of any transport mode, whether measured per passenger kilometre, per tonne kilometre, per € spent, or per hour spent
- Aviation increases the EU's oil import burden by over €20 billion per year;
- today's passenger aircraft are no more fuel-efficient than those that flew half a century ago
- the importance of aviation for the economy and employment is far less than its importance for climate change
- every segment of the aviation industry including manufacturers, airlines and airports is subsidised and enjoys major tax exemptions
- EU-level action does not affect the competitive position of EU airlines compared with their non-EU competitors, provided that policies do not discriminate between EU and non EU carriers flying the same routes (which is obligatory anyway under the Chicago Convention)

Climate policy for aviation: seven 'golden rules' have to be fulfilled

On this basis, we can define seven golden rules for climate policy for aviation. It should:

1. incorporate environmental objectives in line with current (Kyoto -8% by 2010 from 1990) and future (i.e. -30% in EU by 2020 from 1990) EU climate targets;
2. recognise that EU-level action is not bad for the competitiveness of EU airlines, and hence be more ambitious than climate policy for 'exposed' sectors;
3. cover the full climate impact of aviation, as CO_2 accounts for just 20-50%;
4. encompass the widest possible geographical scope, namely emissions from all flights from and to EU airports;
5. comply with the 'polluter pays' principle (i.e. all emissions should be paid for) and thereby help to create 'double dividends' whereby revenues can be used to reduce labour taxes or boost innovation;
6. help to correct historic tax exemptions;
7. significantly reduce the EU's oil dependence.

Only a comprehensive policy-mix will do the job

- A package of measures at EU and national level will be required to tackle all impacts of aviation on the climate and fulfil the 'golden rules' (above). Just inclusion of aviation in the EU ETS will not be enough
- En-route emission charges as well as kerosene taxation and emissions trading can have a role to play as cost-effective instruments to internalise CO_2 and / or NOx emissions
- A dedicated (separate) emissions trading system for aviation (i.e. no trade with other sectors)
- Airport NO_X charges are a necessary complementary instrument;
- The VAT exemption needs to be ended immediately, for example with a ticket tax;
- An overhaul of Air Traffic Management is needed to tackle formation of contrails and cirrus clouds;

Emissions trading can be a part of such a mix, in particular if it is a dedicated emissions trading system for aviation

Trading of aviation emissions is one possible step towards addressing the climate change impacts of aviation. NGOs favour a **dedicated** (separate) emissions trading system for reason of effectiveness and cost effectiveness.

In case aviation would, however, be included on the EU ETS through a gateway mechanism, the following design factors are critical:

- **The geographic scope**: all flights from an to EU airports should be included because then the coverage is over 200 MT of CO_2 emissions, compared with 50 MT for a system limited to intra-EU flights only
- **Non-CO_2 emissions** should be fully included because otherwise every tonne of CO_2 that aviation needs to buy would actually lead to a net increase of global warming rather than a decrease. There is enough scientific evidence on the non-CO_2 impacts to implement ancillary policies like obligatory NO_X airport charges and instructions in air traffic management system. In case such ancillary specific policies could not be implemented in time, a multiplier on CO_2 could ensure environmental integrity.
- **The cap**: the cap should be set in line with current (Kyoto -8% by 2010 from 1990) and future (i.e. -30% in EU by 2020 from 1990) EU climate targets. The cap should be set at EU level. Member States have no incentives to impose a meaningful cap on aviation because the sector is outside of Kyoto and setting a loose cap does not increase necessary compliance efforts by other sectors;
- **Permit allocation**: auctioning should be used as the distribution mechanism as it is the most efficient and fairest way to issue permits, and avoids the errors of the current EU ETS where electricity firms are reported to have made billions of profits from the windfall of grandfathered emissions permits

Even if inclusion had the maximum ambition level – all flights from and to EU airports, non-CO_2 emissions, a rigorous cap and auctioning of permits – additional instruments such as fuel taxation will remain necessary, from the perspective of both effectiveness and cost effectiveness.

An overview of policy development

The climate change impact of aviation has been on the radar screen since the mid 1990s. In 1999 and 2002 the Commission issued studies into kerosene taxation and greenhouse gas charges respectively, without proposing specific action. The 6th Environmental Action Programme, decided upon in 2002, mentioned

'These objectives shall be pursued by means, inter alia, of the following priority actions: (…) identifying and undertaking specific actions to reduce greenhouse gas emissions from aviation if no such action is agreed within the International Civil Aviation Organisation by 2002;'

Only as late as 2005, however, the climate impacts of aviation have finally landed squarely on the EU's political agenda, resulting in, and also resulting from, the publication of the Commission's Communication 'Reducing the climate change impact of aviation' (July 2005). This Communication stressed the need for action, presented inclusion of emission trading into the European Emissions Trading System (EU ETS) as the most feasible way forward, called for all departing flights from EU airports and the non-CO_2 impacts of aviation to be included in a policy, and stressed the need to keep all other options such as kerosene taxation on the table.

In December 2005, the 25 Environment ministers adopted under the UK Presidency conclusions that were largely supportive of the Commission Communication. In July 2006, the European Parliament adopted a Resolution on this topic that stressed that a broad package of measures is necessary to tackle the climate change impact of aviation, including EU-wide kerosene taxation. The Resolution also proposes the set up of a dedicated, separate emissions trading system for aviation.

The Commission has the intention of publishing a legal proposal before the end of 2006, in which the views of all institutions on the Communication will be taken into account. This proposal will be sent to the Council and Parliament for a co-decision procedure.

Quick action is also needed to prevent the US and other states from stalling progress at the next ICAO Assembly which is due for October 2007. At the ICAO's last general Assembly October 2004, the EU narrowly retained the right to unilateral introduction of economic instruments on air travel. If the EU does not act swiftly, progress could be severely hampered at the next Assembly of October 2007.

1. Aviation and climate change: high time for action

A significant and fast-growing source of climate change …

Aviation contributes to climate change in a number of ways. Aircraft emit carbon dioxide (CO_2) and nitrogen oxides (NO_X), they cause vapour trails and influence the formation of cirrus clouds, all of which increase the natural greenhouse effect. A 1999 report by the international scientific body IPCC[1] states that these combine on average to a climate impact of 2.7 times the impact of the CO_2 emissions alone. More recent assessments confirm that the total climatic impact is two to five times that of CO_2 alone, depending on the still relatively uncertain climatic impact of aviation-induced cirrus clouds. In addition, the share of aviation in total man-made climate change is substantial, at some 4 to 9 per cent in 2000, again depending on cirrus clouds. While the science on the quantification of some of these impacts is still improving, emissions are steadily rising at a pace just below that of air travel itself, at around 3 and 4 per cent per year respectively. In 2004 alone, CO_2 emissions from international aviation in the EU increased by 7.5 per cent.

… which is the worst climate choice of all transport modes …

Aviation is the worst choice of transport modes when it comes to climate change. Per passenger kilometre, aircraft score is about three times worse than cars. Per tonne kilometre of freight, aircraft score about an order of magnitude worse than lorries.

… that is not covered by, or subject to, any climate commitment or policy …

[1] The Intergovernmental Panel on Climate Change (IPCC) (www.ipcc.ch) was established in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Program (UNEP) to gather the state of knowledge on climate change.

Despite these manifold and growing impacts on the climate, international aviation is not covered by the obligations of the Kyoto Protocol, due to disagreement on how to share responsibility for international aviation between countries. It has, therefore, also so far been untouched by policies meant to help achieve Kyoto targets or to reduce greenhouse gases otherwise.

… that raises the EU's oil import bill by over €20 billion …

European aviation is responsible for consumption of over 1 million barrels of oil per day, which is some 15 per cent of the total oil demand by transport. At today's prices (some €60 per barrel), this demand raises the EU's annual oil import bill by over €20 billion per year, which is, for example, half of what the EU spends on development aid. From an energy dependence point of view, oil is the 'worst' of fossil fuels. By 2020, the EU will import 86% of its oil, and supply is increasingly concentrated in a small amount of countries. In addition, aviation is the 'worst' sector in terms of oil dependence, as virtually everyone agrees that suitable alternatives to kerosene-powered aircraft are not in sight for the next 50 years.

… that still enjoys obsolete and socially unjustified financial support

In addition, aviation still enjoys a string of historic privileges that stem from a time when governments were intent on supporting the development of the fledgling aviation sector in general, and their 'flag carriers' in particular. Fuel is exempt from taxation in the EU (in contrast to petrol for road transport). International tickets are exempt from value-added tax (VAT). Duty-free sales still thrive on flights from and to the EU. Airports regularly get direct and indirect financial support from governments for their expansion plans. Also, aircraft manufacturers have received dozens of billions in direct and indirect subsidies, despite a 1992 agreement that intended to seriously reduce these state aids. This case has now been brought to the WTO.

All this direct and indirect financial support eventually benefits the airlines and their customers. Socio-economic data show that these people, air passengers, fall in the higher income categories. Removing the subsidies can therefore not be characterised as an anti-social measure – as the revenue of such a move can be spent to the benefit of the poor.

EU action would NOT harm competitiveness of EU carriers

Many people argue that issues of competitiveness prevent 'unilateral' (e.g. EU-level) action on aviation in the field of climate change policies and the reduction of financial support to airlines and their customers. Available studies, however, show that well-designed instruments, i.e. instruments that do not discriminate between carriers on the same routes, do not lead to significant economic distortions and do not significantly harm the competitiveness of EU airlines. The reason for this is easily explained: aviation policies can, and should, be designed in a non-discriminatory way. i.e. irrespective of the nationality of the carriers. This is even a requirement of Article 11 of the Chicago Convention, the 'constitution' of ICAO's aviation policy. If all carriers are treated identically on identical routes, there will be no competitive disadvantage for EU carriers.

As the CE Delft report for the Commission 'Giving wings to emission trading' puts it:
To bring things into perspective, although aviation is an international business, it is less vulnerable to economic distortions than other sectors of the EU economy. This is for two reasons. First, the 'product' in the aviation industry, transportation, is by definition geographically bounded (to a major extent), with passengers and freight having relatively fixed origins and in many situations also relatively fixed destinations. An increase in the cost of European flights will not make a Frenchman with business in Denmark buy a ticket to America instead, and any air carrier operating between e.g. Paris and Copenhagen will be subject to exactly the same competitive conditions. In comparison, many other products would appear to be more vulnerable, as the only relevant aspect here regarding their purchase and use anywhere in the world is the cost associated with production of the product and transportation to its place of use. A second reason is that the air transport market is highly regulated by bilateral air service agreements that limit competition from airlines outside the EU.

This is in contrast to the situation of 'exposed' sectors that are characterised by the production of energy-intensive and export-sensitive products. Products like aluminium, cement, paper, iron and the like are energy-intensive and CAN be imported. These sectors are 'exposed' sectors and strong climate policies can indeed harm the competitive position of these industries and give rise to re-location (although the extent to this will indeed happen is often overstated). It is therefore effective and cost effective for the EU to have a climate policy with differentiated CO_2 prices: higher for sectors that can be treated in a non-discriminatory way and/or face few competitiveness concerns (such as transport and households) and lower for vulnerable sectors.

2. Seven 'golden rules' for climate policy for aviation

Seven principles that climate policy for aviation should fulfil are the following:

Principle 1: efforts by aviation in line with other EU targets

Aviation can no longer be excluded from climate change mitigation efforts and needs to face up to and stop its growing impacts. The environmental objective set for aviation must be in line with current (Kyoto -8% by 2010 from 1990) and future (e.g. minus 30% in EU by 2020 from 1990) EU climate targets. Other sectors must reduce their own contribution and cannot compensate growth in aviation in the long run. From 2012 onwards, emissions from international aviation must be included in any future international climate treaty framework.

Principle 2: strong policies designed for a 'sheltered' sector

As we described earlier, aviation is a 'sheltered' sector in which strong climate policies can be implemented without significant negative impacts on the competitiveness of EU carriers, since it can be introduced in a non-discriminatory sense, i.e. apply to all carriers offering flights on specific routes. It can, therefore, bear much higher carbon prices than other, more exposed, sectors.

Principle 3: the full range of climate impacts from aviation must be accounted for

Climate policy for aviation should obviously account for all climatic impacts of the sector, and not just the impacts of CO_2 alone. For maximum effectiveness, ideally different instruments should be used for different impacts. As long as such a package is not in place, environmental integrity could be ensured with multipliers on CO_2 emissions.

Principle 4: policies should have the widest geographic scope possible

Aviation's climate impacts must be regulated within the EU to the greatest extent possible. The scope of measures should include all flights in EU airspace, plus the remaining emissions from flights departing from EU territory to destinations outside the EU.

Principle 5: double dividend: polluter pays, society benefits

No matter what the policy instrument, all emissions should be paid for by the polluter. This strengthens the incentive to invest in cleaner technology and reduce emissions. An important advantage of economic instruments for environmental policy is that they are able to generate revenues, that can be used to lower 'bad' taxes such as those on labour or invested to create additional environmental benefits. This is the classical 'double dividend' argument and it should be exploited in full in this case.

Principle 6: end obsolete privileges

Climate change policies should also contribute to ending the historic, obsolete and anti-social tax privileges the aviation industry currently enjoys – privileges tat have spurred growth in emissions of and demand for air travel. Climate change and fair taxation objectives go hand in hand. Obviously, again 'bad' taxes such as those on labour can be reduced in parallel – the aim is not to increase taxation but to increase the fairness and efficiency of the taxation system.

Principle 7: reduce oil dependence

Finally, climate change policies for aviation should seriously reduce the EU's dependence on oil. This is a sheer economic necessity in the light of the expected rapid growth of consumption of the sector and high oil prices.

3. A policy mix to meet the 'golden rules'

Designing one single policy that can adequately address all the climate impacts of aviation will be difficult – a comprehensive policy mix will be needed to fulfil the principles and rules. These are listed below.

1. EU-wide measures promise the greatest environmental benefit

Charges, taxes and trading can all be implemented at EU level. All three could cover the direct emissions output (CO_2 and NO_X) and could also be extended to account for the full climate impact of aviation. Any primary policy tool will need to meet essential design criteria to ensure and maximise its environmental benefit (ambitious targets, paying for all emissions, strong sanctions regime).

2. Kerosene taxation is long overdue and has significant climate benefits

Kerosene taxation is long overdue – the exemption is not justified on economic, social or environmental grounds. Besides, kerosene taxation is needed to level the playing field in the transport sector.

The Directive on the Taxation of Energy Products 2003/96 allows taxation of kerosene for flights between EU Member States on the basis of mutual agreement. Kerosene taxation can lead to significant emission reductions – e.g. a tax of 12.5 cents per litre (one fifth of the level of road fuel taxes) would already reduce CO_2 emissions by ten per cent. On a national level, kerosene taxation is already being put in place, e.g. in the Netherlands, but also in countries as diverse as Norway, Japan and the US.

3. Ticket taxes to make up for VAT exemption

The exemption of air tickets from VAT is another major tax exemption without economic, environmental or social justification. Introducing ticket taxes may turn out to be easier than the factual introduction of VAT on international air tickets, and the purpose is more or less identical.

Member States have policy freedom in this area – some Member States such as the UK and France have already introduced taxes on tickets, differentiated on the basis of destination and economy / business class.

4. En-route emission charges: a powerful option

En-route emission charges are a potentially powerful tool. They can be levied on different types of emissions, they can be applied at quite a broad geographical scale (e.g. EU airspace) and they can be decided upon under qualified majority voting, just like, for example, the Eurovignette Directive for lorry charging. Furthermore, they overcome the “tankering” problem (untaxed extra fuel being bought and flown into the EU from outside) associated with kerosene taxation. En-route emissions charging is, in administrative terms, relatively straightforward as it can be relatively easily be integrated into EUROCONTROL’s air navigation charges.

5. Airport NO_X charges: a necessary complement

A string of European airports in Sweden, Switzerland and the UK already operate landing and take off charges on the basis of the NO_X emissions of aircraft, in an attempt to improve air quality around the airport. However, such charges are also very likely to have an impact on NO_X emissions at higher altitudes, and can therefore be a very useful complement to instruments that insufficiently capture NO_X emissions.

6. Avoiding contrails and cirrus clouds with Air Traffic Management overhaul

Contrail formation and thereby cirrus cloud build-up can largely be avoided by making aircraft fly at altitudes and flight paths where meteorological circumstances are more favourable. Often minor changes are enough to avoid most of the impacts. Restructuring the system of air traffic management to better take into account these impacts is therefore urgently needed.

7. A dedicated (separate) emissions trading system for aviation

In line with the views of the European Parliament in its Resolution on Reducing the Climate Change Impact of Aviation, environmental NGOs favour the setup of a dedicated, separate trading system for aviation, for reasons of effectiveness and cost effectiveness.

Effectiveness

First, emissions trading alone will not do much to reduce the climate change impact of aviation. To get a feeling of the order of magnitude: a typical price of € 20 per tonne of CO_2 in the ETS corresponds with a kerosene tax of only €0.05 per litre (the average road fuel tax is currently over €0.60 per litre).

This CO_2 price might change in the future, of course. Theoretically it is possible to make the cap far more stringent, thereby driving CO_2 prices up. In practice, though, it is unlikely to come anywhere close to levels equivalent to those mentioned in the 2003/96 Energy Taxation Directive, for example (the €330 per 1,000 litres of kerosene as of 2010 corresponds with € 132 per tonne of CO_2).

It is well known that some sectors in the ETS are sensitive to competitive distortions vis-à-vis foreign competitors, particularly industries making energy-intensive products that are traded on the global market. If the cap in the ETS is seriously tightened, such distortions might become serious enough to lead to relocation of production (or – less visibly – decisions not to start such activities in the EU). This would entail costs to the EU economy and reduce the environmental benefit because of so-called ‘carbon leakage’ to other parts of the world.

The cap of the EU ETS is therefore, unfortunately, quite likely to remain relatively generous and CO_2 prices modest as a result. This limits the environmental effectiveness of the scheme: CO_2 prices in the range of €20 to €40 a tonne, or 5 to 10 cents a litre, are not expected to make much difference in aviation.

Cost effectiveness

Second, many reports state that emissions trading is more cost-effective than other economic instruments such as fuel taxes or emissions charges. The argument runs that emissions trading also covers other economic sectors, which allows measures to be taken where they are cheapest and hence leads to the lowest possible overall CO_2 abatement costs.

The key problem with this analysis, though, is that the costs of climate policy may comprise more than just the costs of abatement. When we consider regional (e.g. EU-level) climate policy, there are also competitiveness costs at stake, as we have seen in the previous paragraph.

Earlier in this paper it was argued that climate policies for aviation do *not* give rise to significant competitiveness costs because they can – and should – be designed on the basis of equal treatment on specific routes, irrespective of the nationally of the carrier concerned, all of this in accordance with the ‘non-discrimination’ Article 11 of the Chicago Convention.

Thus, a cost-effective climate policy for Europe minimises not just abatement costs but competitiveness costs as well. Such optimisation hence implies – assuming equal climate ambitions – stricter climate policies for sectors that would not suffer from competitive distortions (such as aviation) than for those that might suffer as a result (some of the ground-based sources described earlier). It is consequently cost-effective for Europe to pursue more climate policies for aviation than mere inclusion of the sector in the ETS.

For these reasons, a dedicated emissions trading system, and consequently higher CO_2 prices, for aviation is therefore perfectly justifiable in terms of cost effectiveness.

4. What if aviation is to be included in the EU ETS?

In case aviation would, however, be included on the EU ETS through a gateway mechanism, the following design factors are critical:

- **The geographic scope**: all flights from an to EU airports should be included because then the coverage is over 200 MT of CO_2 emissions, compared with 50 MT for a system limited to intra-EU flights only
- **Non-CO_2 emissions** should be fully included because otherwise every tonne of CO_2 that aviation needs to buy would actually lead to a net increase of global warming rather than a decrease. There is enough scientific evidence on the non-CO_2 impacts to implement ancillary policies like obligatory NO_X airport charges and instructions in air traffic management system. In case such ancillary specific policies could not be implemented in time, a multiplier on CO_2 could ensure environmental integrity.
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incentives to impose a meaningful cap on aviation because the sector is outside of Kyoto and setting a loose cap does not increase necessary compliance efforts by other sectors;

- **Permit allocation**: auctioning should be used as the distribution mechanism as it is the most efficient and fairest way to issue permits, and avoids the errors of the current EU ETS where electricity firms are reported to have made billions of profits from the windfall of grandfathered emissions permits

But again, even if inclusion had the maximum ambition level – all flights from and to EU airports, non-CO_2 emissions too, a rigorous cap and auctioning of permits – additional instruments such as fuel taxation will remain necessary, from the perspective of both *effectiveness* and *cost effectiveness.*

This NGOs position paper is initiated by European Federation for Transport and Environment (T&E) in cooperation with CAN-Europe.

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