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Impact Assessment

Accompanying the document

Proposal for a Directive of the European Parliament and of the Council

amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowances trading within the Community, in view of the implementation by 2020 of an international agreement applying a single global market-based measure to international aviation emissions

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Disclaimer:

This report commits only the Commission's services involved in its preparation and does not prejudge the final form of any decision to be taken by the Commission.

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A. Need for action

Why? What is the problem being addressed?

CO_2 emissions from aviation are one of the fastest growing sources of greenhouse gas emissions. As the technological potential for emissions reduction is limited in the aviation sector, it is necessary to use market-based measures (MBM) such that the aviation sector can off-set its strong emission growth through funding emission reductions in other sectors. The EU led the way in implementing MBMs by including aviation in its Emission Trading System (EU ETS). Despite its positive environmental effects at low economic costs, the implementation of the EU ETS has had to face significant international opposition. A number of states have claimed that the EU ETS would cover a too high share of international emissions and that the EU would have no competence to oblige their airlines to participate in the EU ETS. Furthermore, even with the EU ETS in place, a global "gap" in emissions reductions continues to exist. Without a further uptake of MBMs on a global level, the aviation sector will not be able to reach its emission reduction goals. The insufficient uptake of MBMs and the opposition against the EU ETS have been caused by the absence of a global political agreement on the key principles for the implementation of MBMs at the International Civil Aviation Organization (ICAO).

What is this initiative expected to achieve?

The EU is committed to move forward the ICAO action on MBMs and to work towards the implementation of an ambitious global MBM in 2020 with a view to close the "gap" in the coverage of international aviation emissions and to reach the sector's emission reduction targets. Based on the proposal by the EU Member States, the 2013 ICAO Assembly adopted a roadmap for the decision on the design of a global MBM in 2016 and its implementation by 2020 to cover all international aviation emissions. In response to this progress and to promote further momentum towards the successful establishment of a global MBM, amendments should be made to the aviation activities covered by the EU ETS.

What is the value added of action at the EU level?

The ETS is the EU's flagship initiative for addressing climate change. The integration of aviation into the EU ETS has been decisive in driving forward the ICAO negotiations. The intensive engagement of the EU in defending its right to regulate while encouraging international negotiations will continue to be crucial in maintaining momentum in ICAO towards a global MBM.

B. Solutions

What legislative and non-legislative policy options have been considered? Is there a preferred choice or not? Why?

In preparation of the 2013 ICAO Assembly, the EU Member States expressed their openness to limit the scope of the EU ETS in proportion to the distance flown within the EEA (hereafter "hybrid option") in case of substantial progress with regard to the development of a global MBM. This hybrid option means that the EU ETS would continue to fully cover all emissions from flights within the EEA but the coverage of emissions from flights to and from 3rd countries would be limited in proportion to the distance flown within the EEA. Depending on how the sea boundaries of the EEA are defined, this would lead to reduced emissions coverage of 39% to 47% compared to the full-scope EU ETS. Alternative options have also been assessed: coverage of emissions from departing-flights only; coverage of 50 % of emissions from all departing and arriving flights; move to an upstream system with fuel suppliers as ETS participants. Even though these options achieve a higher coverage of up to 62%, they are likely to raise the same international objections as the full-scope EU ETS and to obstruct further negotiations on a global MBM. A full exemption of flights to and from 3rd countries, as under the temporary "stop-the-clock" decision for 2012, would reduce coverage to only 26% which is not a viable long-term solution from an environmental point of view. The hybrid option is the preferred option because it strikes the best balance between environmental effectiveness under the EU ETS and progress on the global MBM.

Who supports which option?

The aviation industry has recognized the suitability of MBMs and has urged ICAO to decide on a global MBM to be implemented by 2020. The hybrid option has been proposed by the EU Member States in the ICAO negotiations. European low-cost carriers consider that a complete exemption of flights to and from 3rd countries from the EU ETS would unduly favour large network carriers.

C. Impacts of the preferred option

What are the benefits of the preferred option (if any, otherwise main ones)?

The expected main benefit from a reduction in the scope of the EU ETS will be to facilitate the transition to a global MBM by 2020 to close the global "emission gap" and double the coverage of international aviation emissions (compared to the full-scope EU ETS that covers around 50% of international aviation emissions). If the scope of the EU ETS were not adjusted the political tensions around the EU ETS would be revived and obstruct the negotiations for the future development of the global MBM. Furthermore, a reduced scope of the EU ETS will increase the aviation sector's overall competitiveness in the period up to 2020: under the hybrid option, demand for aviation services is expected to slightly increase within a range of 0.38% to 0.43% up to 2020. No further direct benefits are expected.

What are the costs of the preferred option (if any, otherwise main ones)?

The main negative impact of a reduced EU ETS scope under the hybrid option will be the lower emissions coverage (38% to 46% compared to full-scope EU ETS) up to 2020 for flights to and from 3rd countries. Furthermore, the implementation of hybrid option will necessitate some adjustments in the monitoring, reporting, and verification (MRV) processes. However, as the hybrid option would keep the current MRV system (based on fuel consumption for the whole flights) and re-calculate the reduced coverage based on so-called "distance factors" (i.e. ex-ante defined percentages that are proportional to the distance flown in the EEA), the additional costs should be minimized for aircraft operators as well as national administrations. No further negative economic or social impacts are expected.

How will businesses, SMEs and micro-enterprises be affected?

Currently, the EU ETS covers about 2600 "small" non-commercial operators who are only responsible for 1 % of total emissions. Several simplifications (e.g. streamlining of procedures, de-minimis thresholds) are proposed to reduce the compliance costs for these small emitters.

Will there be significant impacts on national budgets and administrations?

In proportion to the reduced scope, less aviation allowances will be auctioned. The annual auction revenues for Member States are therefore expected to decrease by 39% to 47% (e.g. assuming a carbon price of €10, total revenues would go down from around €320 million to €120 to €150 million). The changes in the MRV may slightly increase administrative costs (as explained above).

Will there be other significant impacts?

The preferred hybrid option will eliminate some risks for competition distortions that would exist under other options. A level-playing field is ensured for all airlines. See section 5.2.2 of the IA report.

D. Follow up

When will the policy be reviewed? Maximum 4 lines

It will be important to closely follow the ICAO negotiations: Depending on the outcome of the 2016 ICAO Assembly, further adjustments to the EU ETS may become necessary to ensure a full transition to a global MBM in 2020. The Commission shall therefore report to the European Parliament and the Council in 2016, together with proposals as appropriate.

1. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

1.1. Impact assessment steering group (ISG)

Work on the impact assessment was carried out by an Inter-Service Steering Group (ISG) set up by DG CLIMA which met two times. The following Directorates-General (DGs) participated in the work of the group: Secretariat-General (SG), Legal Service (SJ), EEAS, DG ENTR, DG MOVE, and DG TRADE.

1.2. Consultation of the Impact Assessment Board (IAB)

The IAB gave an overall positive opinion with recommendations concerning an improved presentation of the gap in global emission coverage and further issues regarding the implementation of the EU ETS; a clearer description of the different scenarios following the 2013 Assembly of the International Civil Aviation Organisation (ICAO); a strengthened sensitivity analysis; a better presentation of the results; and an added explanation of the main concerns voiced by different stakeholder groups.

1.3. Consultation and expertise

1.1.1. External support

The underlying econometric modelling and analysis was carried out by Ricardo-AEA Ltd. Additional support in relation to small emitters was undertaken by a consortium of Price Waterhouse Coopers and CE Delft.

1.1.2. Stakeholder meetings

Aviation experts were consulted on the international developments with regard to market-based measures (MBMs) for aviation on 1 July 2013 (see Annex II for the minutes) and on 17 September 2013 (minutes to follow). The meetings took place in the presence of Member States within the framework of the European Environment Expert Group that has been extablished by the European Civil Aviation Conference. A stakeholder meeting with regard to simplifications for small emitters was held on 30 July 2013 (see Annex II for the minutes).

1.1.3. Public on-line consultation

An online public consultation was held from 21 June to 13 September 2013, i.e. 12 weeks. The public consultation was carried out using the "General principles and minimum standards for consultation of interested parties by the Commission".

The public consultation confirms strong support for MBMs from public authorities, NGOs and the airlines. All respondents favour MBMs for the aviation sector, with one association opposing regional MBMs in advance of a global MBM. With regard to regional action, airlines emphasise administrative simplicity and political acceptability, as well as environmental effectiveness and avoiding discrimination on routes and between operators. Public authorities and NGOs emphasise covering meaningful emissions, administrative simplicity and political acceptability.

The results have been presented to the Impact Assessment Board at the meeting of 18 September 2013 and subsequently included in Annex III.

2. PROBLEM DEFINITION

2.1. The problem

The EU is strongly committed to achieve the climate objective of limiting global average temperature increase to less than 2 degrees Celsius above pre-industrial levels. As the EU emissions will constitute a smaller share of global emissions in the future, multilateral efforts will become the most effective means to address climate change. As arguably strongest proponent of multilateral action, the EU has put international cooperation and global solution at the fore-front of its policy-making.

Science tells us that in order to have a likely chance to stay below 2° C, the growth of global GHG emissions will have to be reversed before 2020 and decline thereafter, reaching at least 50 % below 1990 levels by 2050. To this end, one of the headline targets of the Europe 2020 Strategy for smart, sustainable and inclusive growth is to reduce greenhouse gas emissions by at least 20% compared to 1990 levels. As part of the necessary economy-wide efforts, the limitation of greenhouse gas emissions from aviation is an essential contribution in line with this commitment.

1.1.4. Strong growth of emissions from aviation sector

According to the International Energy Agency, global CO2 emissions from civil aviation stood at 740 million tonnes per annum in 2010, amounting to 2.5% of global CO_2 emissions. Aviation was also one of the fastest growing sources of greenhouse gas emissions (GHG) in the preceding decade.

Looking forward, the International Civil Aviation Organisation (ICAO) forecasts that by 2036 international aviation emissions will increase by between 155% and 300% compared to 2006, depending on the level of technological and operational improvements (see **Figure Error**! No text of specified style in document.**-1**). The international aviation's share of total CO_2 emissions is projected to reach at least 4% of total emissions by 2050 without any further mitigation efforts.[1]

1.1.5. Limited technological possibilities for emission reductions in the aviation sector

In the short-term up to 2020, several technological measures or operational measures could achieve 10 to 15 % emissions reduction (e.g. through improved air traffic management and more efficient operation of the aircraft in the air and on the ground). In the longer term until 2025 and beyond, investment in new aircraft could reduce emissions by another 20 to 30%. Finally, the use of sustainable biofuels could be a further source for emission reductions; however considerable uncertainty exists over their availability and sustainability (see Annex IV for more details on technological and operational measures).

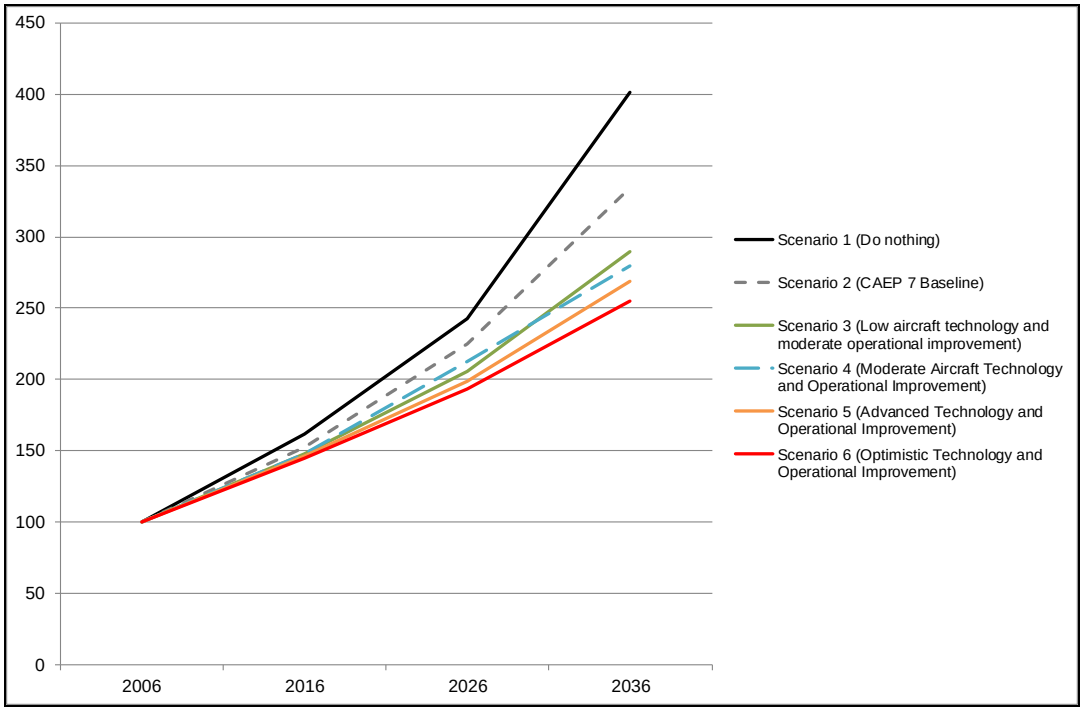
Even under the most optimistic scenario about the effectiveness of technological measures, aviation CO_2 emissions in 2036 are still expected to be 2.5 times higher than 2006 emissions due to the forecast strong increase in demand for aviation. Although technological improvements and biofuels are highly important, they are not sufficient to limit the increase of aviation emissions. Furthermore, the economic viability of biofuels has not yet been proven.

The emissions growth forecasts are at odds with both the EU and US goals of stabilising international aviation emissions at or below 2005 levels by 2020, and the reduction goals in

[1] Lee et al. (2013). Shipping and aviation emissions in the context of a 2°C emission pathway, Working paper, Manchester Metropolitan University.

the International Civil Aviation Organization (ICAO) 2010 Assembly Resolution. The ICAO goals are for a global annual fuel efficiency improvement of 2% through to 2020 and an aspirational goal of 2% per annum from 2021 to 2050. The 2010 ICAO Assembly also agreed a medium term aspirational goal of maintaining global net CO_2 emissions at 2020 levels, and cites the aviation industry target to halve emissions by 2050 compared to 2005 levels (endorsed by the International Air Transport Association (IATA)). In view of the strong emission growth under even the most optimistic scenarios[2] (see Figure 2-1), technological measures on their own are insufficient to stabilize emissions at 2020 levels or to even achieve a 50% reduction of aviation emissions in 2050 compared to 2005 levels.

Figure Error! No text of specified style in document.**-1 Global aviation CO_2 emissions projections (in percentage relative to base year 2006)**



Source: ICAO Global Aviation CO_2 Emissions Projections to 2050

1.1.6. Insufficient uptake of market-based measures to achieve the aviation sector's emission reduction goals

As the technological abatement of emissions is more limited and more costly in the aviation sector than in other sectors, an economic rationale exists therefore to fund emission reductions outside the aviation sector.[3] The use market-based measures (MBM) enables the aviation sector to off-set its strong emission growth through the acquisition of emission units from other sectors. The aviation sector will therefore be able to contribute its fair share to global emission reductions without compromising growth. As abatement costs are lower in other sectors, MBMs are an effective means to reduce environmental costs for the aviation

[2] The scenario calculations were produced by the Committee on Aviation Environmental Protection (CAEP) that carries out ICAO's environmental activities. The scenarios do not include the impact of biofuel.

[3] See for a recent study: Winchester et al. (2012), The impact of Climate Policy on US aviation, Journal of Transport Economics and Policy 47(1), p 1-15.

industry, whilst still incentivising the introduction of new technologies and energy-efficiency measures.

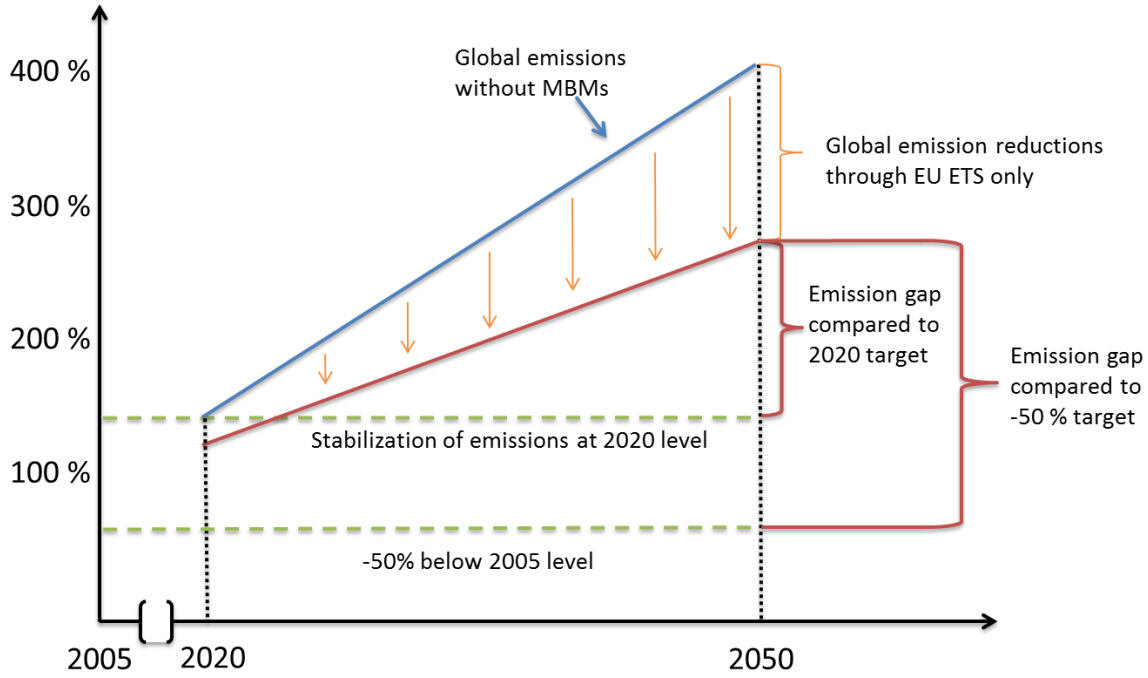
The suitability of MBMs for international aviation has long been recognised. ICAO endorsed the application of open emissions trading systems to aviation in 2004. More recently the aviation industry has urged ICAO to decide on the development of a global MBM (see also section 2.4.1). However, no multilateral agreement has been up to now reached by States working through ICAO to develop such a global MBM.

The EU led the way in implementing MBMs by including aviation activities in its Emission Trading System (EU ETS). The EU decided in 2008 to integrate aviation activities into the EU ETS and started the implementation in 2010. Despite the extensive public consultations prior to 2008, the integration of aviation into the EU ETS has had to face significant international opposition from airlines and other states (see section 2.3.2.). A number of states have opposed the EU ETS alleging that it would cover a too high share of international emissions and that the EU would have no competence to oblige their operators to participate in the EU ETS.

Irrespective of the international opposition, the EU ETS, although it delivers a significant contribution to the reduction of aviation emissions, will not be sufficient to stop the strong global growth of aviation emissions ahead. Indeed, the EU ETS only covers about 35 % of global emissions (i.e. emissions from domestic and international flights) and about 50 % of emissions from international aviation. Without further MBMs, not even the target of stabilisation at 2020 levels would be reached because 50 % of the emission growth would not be addressed (see Annex IV for more details on the "emission gap" with and without MBMs).

Therefore, even with the EU ETS in place, the problem of insufficient uptake of MBMs persists on a global level (see **Figure Error**! No text of specified style in document.**-2**). This global "gap" in coverage exists because no other regions apart from the EU have implemented or plan to implement MBMs and there has also not yet been agreement for a single global MBM as proposed by the industry itself.

Figure Error! No text of specified style in document.**-2 Global emission "gap" with EU ETS in place (schematic view of development of CO_2 emissions relative to base year 2005)**



Based on David S. Lee (2013) Bridging the aviation CO2 emissions gap: why emissions trading is needed (see Annex IV)

2.2. Problem driver

The problem drivers for the strong emission growth are, apart from the limited technical possibilities for in-sector emission reductions, of political nature. The insufficient uptake of MBMs and the strong opposition against the EU ETS have been caused by the absence of a global political agreement: It has neither been possible up to now to establish a clear commitment to the development of global MBM at ICAO nor to find an agreement on generally accepted principles for the implementation of regional MBMs, such as the EU ETS.

The negotiations to develop and implement a single MBM, which would cover all global emissions from international aviation, have been complicated by the divergent views on how to reconcile the principle of non-discrimination in the Chicago Convention on International Civil Aviation (Article 11 - all regulations are to apply equally to aircraft of all countries, without distinction as to nationality) and the principle of common but differentiated responsibilities and respective capabilities of states (CBDR RC) under the UNFCCC. The spill-overs from the UNFCCC negotiations have complicated the ICAO negotiations.

Furthermore, there has been no agreement within ICAO on a framework that would facilitate the application of MBMs by states or regions. The EU ETS is consistent with the 15 principles for MBMs in the 2010 ICAO Resolution, but international agreement on the geographical scope of MBMs has yet to be found (i.e. to which extent a state or region can cover international flights under its own MBM). Furthermore, it has been claimed that non-discriminatory application of any national or regional MBM to an airline registered in another State should be dependent on permission of the states in which an airline is based. The EU does not accept the claim as having any basis in international law and which would make implementing an effective and non-discriminatory MBM impossible.

To overcome these political tensions and to work towards a global MBM, the EU has already sought to move forward multilateral action at ICAO (see section 2.4). The next ICAO Assembly of September 2013 is expected to agree on the development of a single global MBM, which should cover all emissions from international aviation from 2020 onwards, and a framework for regional and national MBMs – like the EU ETS – that should apply until 2020.

As stated in the "stop-the-clock" decision No. 377/2013/EC (see section 2.3.3), the EU will consider whether changes to the EU ETS for aviation are required to allow for an optimal interaction between the EU ETS and the 2013 ICAO Assembly outcome with a view to facilitate and to accelerate the implementation of MBMs on a global level.

To address the problem of the global "gap" in emission coverage, any amendments to the EU ETS for aviation should aim to further facilitate the transition to a global MBM and to remove the political obstacles at the international level without compromising on the environmental integrity and the principle of non-discrimination.

2.3. EU action in a difficult international environment

1.1.7. Integration of aviation into EU Emission Trading System (EU ETS)

In view of the 2004 ICAO Assembly's decision not to develop a single global MBM but to favour inclusion of aviation into open regional systems, the EU proposed in 2006 to integrate aviation into the EU ETS. Directive 2008/101/EC amended the EU ETS Directive 2003/87/EC and included aviation activities within the scope of the ETS:

- All Member states from the European Economic Area (EEA) – including Iceland, Norway, and Liechtenstein – participate in the EU ETS.
- Total emissions are covered from flights that depart and arrive at EEA aerodromes (hereafter "intra-EEA flights"), from flights that depart from EEA aerodromes to destinations in third countries, and from flights that arrive at an EEA aerodrome from third countries (the flights to and from third countries are hereafter referred to as "extra-EEA flights").
- The emission cap from 2013 onwards has been set at 95 % of the average historic aviation emissions for the period from 2004 to 2006.
- Aircraft operators have been obliged to start emissions reporting in 2010 and full compliance – including surrendering of allowances – in 2012.

The inclusion of aviation into the EU ETS was based on the 2006 Impact assessment[4] that covered in detail the environmental, economic, and social impacts. It was based on an extensive public consultation. It concluded that the broadest possible geographic scope of all departing and arriving flights would give the highest environmental benefits without neither significantly affecting the demand for aviation services nor the competitive position of individual airlines.

1.1.8. International reactions

The inclusion of aviation in the EU ETS led to unsuccessful legal challenge from US commercial airlines, as well as diplomatic objections from a number of countries including China, India, and the US.

- Legal challenge by US airlines

[4] See http://ec.europa.eu/clima/policies/transport/aviation/docs/sec_2006_1684_en.pdf

The Air Transport Association of America (ATA) and major US airlines challenged the legality of the EU ETS arguing, among others, that it would be contrary to customary international law to apply the EU ETS to those parts of a flight that took place outside the airspace of the EEA countries. The European Court of Justice (ECJ) rejected those claims and confirmed that the EU had the competence to extend the EU ETS to the full distance of flights which depart or arrive at EU airports[5] (see also Annex IX). Furthermore, the ECJ confirmed that the EU ETS was in line with the non-discrimination principle and did not constitute a tax in violation of the EU-US Open Skies Agreement, including provisions similar to those in the Chicago Convention.

- Joint declarations by opposing States (*"coalition of unwilling"*)

Representatives from around 20 to 25 states – including Belarus, China, Cuba, India, Russia, and USA – signed declarations on 30 September 2011 in New Delhi and 23 February 2012 in Moscow opposing the EU ETS. They alleged that the EU ETS would be contrary to international law and should not apply to aircraft operators registered in their countries, and saying they would consider initiating proceedings under the Chicago Convention or barring the participation of aircraft operators in the EU ETS. On 2 November 2011, the ICAO Council endorsed a statement by 26 of its 36 Member States that had repeated parts of the New Delhi declaration.

- Non-compliance by most Chinese and Indian operators since 2011

Chinese mainland airlines and most Indian airlines have not complied with the EU ETS requirements. Claims have been made that the EU action to reduce emissions through the EU ETS is in violation of the UNFCCC's principle of common but differentiated responsibilities and respective capabilities (CBDRRC).

- US "Thune bill"

In 2012, the US Congress passed the Emissions Trading Scheme Prohibition Act ("Thune Bill") which would allow the US Administration, following public consultation, to issue an order that US-registered airlines should not comply with the EU ETS. No such order has been proposed so far. The bill also states that the US Administration should act to advance global action to tackle emissions from aviation.

1.1.9. "Stop-the-clock" decision No. 377/2013/EC

The EU has a strong history of multilateralism and has continuously sought to move forward the ICAO action on MBMs. To prepare for the 2013 ICAO Assembly Resolution with regard to MBMs, the ICAO Council decided on 9 November 2012 to set up the High-level Group on Climate Change (HGCC) that would develop guidance for the implementation of a single MBM covering all international aviation emissions (hereafter "global MBM") as well as for a framework for national and regional MBMs (hereafter "MBM Framework"). To encourage these positive developments at ICAO, the EU adopted the "stop-the-clock" decision to temporarily defer the enforcement of the EU ETS compliance obligations for flights to and from most third countries for 2012.

The EU "stopped the clock" in order to provide time for the 2013 ICAO Assembly to agree on a global MBM with a realistic timetable for further development and implementation, and the adoption of a framework for facilitating States' application of MBMs to international aviation pending the global measure's application. While many countries welcomed the "stop-

[5] Case C-366/10

the-clock" legislation, it raised complaints from EU airlines, in particular low cost carriers, claiming that it favoured airlines operating routes to third countries compared to airlines that operated flights mainly within Europe.

The vast majority of commercial operators – also from States whose representatives had previously signed declarations against the EU ETS – fully complied with their obligations for 2012 emissions. This was notably the case for the US where the US "Thune bill" was not put into effect and all US airlines complied with the "stop-the-clock" decision. China and India were the only two States from where no airline complied in 2012.

2.4. Recent developments in the run-up to the 2013 ICAO Assembly

The establishing of the HGCC in ICAO and the EU's "stop-the-clock" decision have created positive momentum for the 2013 ICAO Assembly to move forward on the development of a global MBM and an agreement on a MBM Framework which would apply until a global MBM will be implemented in 2020.

1.1.10. Global MBM

There is a broad agreement – including within the aviation industry – on the necessity and desirability of a global MBM to apply from 2020 in order to cap CO_2 emissions.

- EU Proposal for roadmap to global MBM

EU Member States in the HGCC have proposed[6] that the 2013 ICAO Assembly should decide on a binding roadmap for the development of a global MBM: the work on the various design elements for a global MBM shall be completed by the next ICAO Assembly in 2016 and a global MBM would be implemented no later than by 2020.

It is important to note that this decision by the 2013 ICAO Assembly would only be the start of the negotiations on the key elements of a global MBM to be finally decided by the 2016 ICAO Assembly. Issues such as agreement on detailed architecture of the system; a common set of monitoring, reporting, and verification (MRV) standards; and the types of emissions units allowed into the system should also be developed as a matter of priority. The EU recognises that States have different circumstances and capabilities, and believes this can be taken into account in a non-discriminatory way, for example through phased-in route coverage and temporary exemption of certain routes.

- Proposal for global MBM by IATA

The International Air Transport Association's (IATA) Annual General Meeting on 3 June 2013 approved a resolution with an overwhelming majority in favour of a global market-based measure, albeit with opposition from Chinese and Indian airlines. IATA encourages governments to adopt, at the ICAO Assembly in September 2013, a commonly agreed, single global MBM to be applied from 2020 to offset the industry's growth in emissions from then on, leading to emissions 50% below 2005 levels by 2050. The EU welcomes the industry's support for action which contains a number of useful elements for the design of a global MBM (e.g. common MRV standards).

1.1.11. Framework for regional and national MBMs

The MBM Framework should provide guidance to ensure the consistent application of national and regional MBMs. In particular, the objective of a framework would be to avoid

[6] See http://ec.europa.eu/clima/consultations/0022/co2_civil_aviation_en.pdf

double counting emissions through different regional or national MBMs. Ideally, when a global MBM system is applied, the MBM Framework will no longer be needed.

- "Mutual agreement"

Some states still claim that – regardless of the establishment of a framework – any MBM must be subject to permission from states whose airlines fly in States applying an MBM. However, the very reason for having a MBM Framework is to enable some meaningful action to take place now, to prevent a fragmented outcome based on numerous different bilateral agreements, and to encourage action beyond what is already catered for by the existing international agreements such as the Chicago Convention. The EU and a considerable number of other States therefore do not agree with this claim.

- Geographic scope of a regional or national MBM

Another key issue relates to the coverage of international aviation emissions under a national or regional MBM. In the context of a MBM framework, the EU would have favoured a departing-flights approach which, as shown by a submission by EU Member States to the HGCC[7], would enable international aviation emission to be comprehensively addressed if and when all States act. Compared to the full scope EU ETS, emissions from all flights that depart from and arrive at an EEA airport would remain fully covered together with emissions from departing flights to non-EEA countries. The flights arriving in the EEA from 3rd countries would consequently be covered by the state of origin.

However, a large number of ICAO Member states oppose the departing-flights approach for a MBM framework because it would include emissions over the territory of other states (while not ruling it out for administration of a global MBM). Many ICAO Member states would prefer a framework to limit a regional MBM to emissions within the region in question. In a spirit of compromise and provided the level of ambition on the global MBM is high and the 2013 Assembly Resolution does not purport to require "mutual agreement" for non-discriminatory coverage of flights, the EU Member States would be ready to accept the following approach in advance of the application of the global MBM in 2020:

– Full coverage of emissions from all flights that arrive and depart within a group of States, plus
– A proportion of the emissions from flights that arrive from or depart to third countries outside the group of States, in relation to the total distance travelled across areas associated with the group of States (e.g. for a flight between Paris and Beijing, the EU ETS would cover the distance over EEA states to and from the border with a third country, in this case Russia).

The ICAO Council meeting of 4 September 2013 adopted a proposal for the MBM Framework along these lines for submission to the Assembly. Furthermore, the ICAO Council also proposed de minimis exemptions for developing countries to take account of special circumstances and respective capabilities (see Annex X).

2.5. Outcome of the 2013 ICAO Assembly

The ICAO Assembly adopted the proposed roadmap to a global MBM in 2020. However, no consensus could be found on guidance for regional MBMs to be applied in the meantime. The MBM Framework submitted by the ICAO Council was not adopted but a text proposed by Russia stating that "mutual agreement" would be needed for the implementation of national

[7] See http://ec.europa.eu/clima/consultations/0022/co2_coverage_en.pdf

and regional MBMs. As at previous ICAO Assemblies, the EU Member States – together with other major aviation States – rejected this claim and made reservation with regard to the requirement of "mutual agreement". See Annex XI for the final resolution text.

2.6. Further issues regarding the implementation of the EU ETS for aviation

The EU ETS Directive foresees in Article 30 (4) that the Commission shall review the functioning of the Directive and give consideration to on-going improvements and refinements. The Commission has launched in early 2013 a study to investigate the costs and benefits of the inclusion of small emitters in the EU ETS.

Currently, the EU ETS covers about 300 "large" aircraft operators – with annual emissions higher than 25,000 tons CO2 – who are responsible for about 99 % of emissions and around 2600 non-commercial small emitters[8] (e.g. business jets) who are responsible for only 1 % of emissions.[9]

The study by PWC et al. shows that the obligations with regard to Monitoring, Reporting, and Verification (MRV) generate relatively higher administrative costs for small than large operators (see explanations in Annex II). Compared to the level of EU ETS revenues raised from a small emitter, the administrative cost can be up to 4 times higher.

In view of the low level of emissions compared to the high administrative burden, the administrative efficiency of the inclusion of non-commercial small emitters into the EU ETS can be questioned.

Concerning the transposition of the EU ETS in national law, the Commission is currently carrying out a study on the implementation by the different Member States.

1.2. EU's right to act

The EU ETS Directive 2003/87/EU, as amended by Directive 2008/101/EC, is based on Article 192(1) of the Treaty on the Functioning of the European Union.

The Commission will have to report on the results achieved at the 2013 ICAO Assembly to European Parliament and Council (according to Article 5 of the "stop-the-clock" decision. Furthermore, the "stop-the-clock" decision proposes in its recital 10 that the EU could consider further steps to facilitate the optimal interaction between the outcome of the 2013 ICAO Assembly and the EU ETS.

2.8. Baseline scenario – full-scope EU ETS

The full scope EU ETS for aviation is the baseline against which the other policy options will be assessed. The key features of the EU ETS that are applicable for aviation from 2013 as specified in Directive 2003/87/EC and amended by Directive 2008/101/EC are summarised below.

Table Error! No text of specified style in document.**-1 Key features of the EU ETS for aviation**

EU ETS feature	Description
Geographical coverage	European Economic Area (EEA) which includes the 28 EU Member States, Iceland, Norway and Liechtenstein).

[8] Aircraft operators operating fewer than 243 flights per period for three consecutive four-month periods and aircraft operators operating flights with total annual emissions lower than 25 000 tonnes CO2 per year are considered as small emitters.

[9] Contrary to non-commercial operators, commercial aircraft operators (i.e. airlines offering scheduled flights) benefit from an exemption from the EU ETS in case that they emit less than 10 000 tonnes CO2 per year.

	Territories of Member States are treated as follows: - The 13 territories that are part of the EU are included in the EU ETS for aviation: Guadeloupe, French Guiana, Martinique, Reunion, the Azores, Madeira, the Canary Islands, Aland Islands, Akrotiri, Dhekelia, Ceuta, Melilla and Gibraltar - All other territories of Member States that are not part of the EU are outside of the scope of EU ETS for aviation (e.g. Greenland or Channel Islands)
Flights covered	All flights landing at or departing from EEA airports.
Emissions coverage	All CO_2 emissions released during the whole flight.
Open or closed system	Aviation is regulated under the same rules as the general EU ETS i.e. as an open system, but allowances are specific to the aviation sector (i.e. they cannot be used by other EU ETS operators).
Quantity of allowances	▪ Total number of allowances (cap): 210,349,264 per annum from 2013 ▪ Free allowances: 172,486,396 per annum from 2013 ▪ Allowances to be auctioned: 31,552,390 per annum from 2013 ▪ Special reserve: 50,483,824
Allocation of allowances	82% of allowances are allocated for free to operator based on a benchmark in line with their activity levels in 2010. In addition, 15% of allowances can be purchased through auctions. The special reserve shall ensure access to the market for new aircraft operators and to assist aircraft operators which increase sharply the number of tonne-kilometres that they perform.
International credits	Aircraft operators may use Certified Emission Reductions and Emission Reduction Units for up to 1.5 % of the number of allowances they are required to surrender.
Exclusions	Commercial airlines that operate fewer than 243 flights per period for three consecutive four-month periods or flights with total annual emissions lower than 10,000 tonnes per year. Other types of special purpose aircrafts are also excluded (e.g. military flights, medical / rescue / scientific research flights or flights performed in the framework of public service obligations on routes within outermost regions or on routes where the capacity offered does not exceed 30,000 seats per year). A full list is in Annex I to the Directive.
MRV approach	CO_2 emissions are based on applying an agreed emission factor (tCO_2/km) to fuel consumption measured by considering tank levels at specific points in time as well as fuel uplift at the airport. A simplified approach is available for small emitters with emissions estimated using a standardised distance flown based on Great Circle Distance.

Regarding the environmental impact, the full-scope EU ETS puts a cap of around 210 million tons CO2 emissions on flights to and from the EEA. As the technological and operational measures are not sufficient to bring the aviation emissions below this level, the aviation sector needs to acquire general EU allowances and international credits to fulfil its emission target in the EU ETS. The aviation sector is expected to be short of 20 to 30 million allowances in 2013 under the full-scope EU ETS. Depending on the assumed growth of aviation sector, the shortage is projected to be in a range of 40 million to 140 million allowances by 2020 (see section 5.1.3).

As shown by the 2006 Impact assessment and confirmed by this study, the full-scope EU ETS does not have a significant negative impact on the aviation sector's competitiveness: According to the updated calculations, the EU ETS is expected to slightly decrease demand for aviation services in the magnitude of 0.12% by 2016 and 0.86% by 2030.

Empirical evidence on ticket prices for consumers confirms the minor economic impact: Based on a sample of EU and US airlines, the EU ETS seems to lead to price increases between 0.43 % and 0.94 % for passenger tickets (excluding taxes and charges).[10] Ryanair has been one of the most transparent airlines by publishing figures of the cost to passengers of climate change measures. These are cited as being €0.25 for passengers flying from continental Europe[11], and £0.25 for passengers buying tickets in the UK. Concerning transatlantic flights, US airlines have included fees around $3 to cover for EU ETS costs in their ticket prices.[12] This price top-up due to the EU ETS is much lower than most airport taxes and charges (e.g. US charges of $16 for passengers to arrive and to depart).

Even though the EU ETS only puts small costs on the aircraft operators and the ECJ has unequivocally confirmed the legality of the coverage of all departing and arriving flights, it cannot be expected that international opposition would cease if the EU ETS were continued in its full scope. In particular, Indian and Chinese operators would probably continue their non-compliance with the EU ETS and the US government would be pushed to activate the "Thune bill". Furthermore, a full coverage of departing and arriving flights is currently not among the options that are considered for the 2013 ICAO Assembly. An application of the EU ETS in its full scope from 2013 onwards may therefore risk obstructing future ICAO negotiations on the development and implementation of MBMs (in particular if the 2013 ICAO Assembly endorses a MBM Framework with a reduced geographic scope).

Negative spill-over to sectors outside aviation have not been observed up to now. However, if the EU ETS were continued and the US activated the "Thune bill", negative impacts on the on-going trade negotiations with the US would seem likely.

3. OBJECTIVES

3.1. General objectives

The general objective – to ensure the contribution of the aviation sector to reducing the impacts of climate change – has not changed since the integration of aviation into the EU ETS through Directive 2008/101/EC. Furthermore, the EU continues to strive for achieving effective multilateral solutions to address climate change.

3.2. Specific objectives

The specific objectives are twofold with regard to amendments to the EU ETS for aviation following the 2013 ICAO Assembly:

- Facilitation of the development and implementation by 2020 of a global MBM covering all emissions from international aviation;
- Continuation of the EU ETS to cover emissions from all flights departing and arriving in the EEA, pending the implementation of a global MBM in 2020.

The results of the public consultation confirm that all stakeholders – industry, public authorities, and NGOs – strongly agree to the use of MBMs in the aviation sector.

[10] Bloomberg New Energy Finance, Is the EU ETS eating into airline profits?, 12 January 2012.

[11] See http://www.ryanair.com/en/news/ryanair-to-introduce-0-25-euro-ets-levy-to-cover-new-eu-eco-looney-tax

[12] US Congressional Research Service (2012), Aviation and the European Union's Emission Trading Scheme report prepared for Members and Committees of Congress, page 19, http://www.fas.org/sgp/crs/row/R42392.pdf, Consulted 31/7/2013

3.3. Operational objectives

As stated in the "stop-the-clock" decision, in case that the 2013 ICAO Assembly achieves a meaningful outcome, the EU will consider whether changes to the EU ETS are required to allow for an optimal interaction between the EU ETS and the ICAO Assembly outcome. Any amendments of the EU ETS after the 2013 ICAO Assembly should deliver on the following operational objectives:

- Maintain environmental effectiveness (compared to emission coverage under full-scope EU ETS)
- Maintain competitiveness of aviation sector (compared to EU ETS costs for airlines and level of demand under full-scope EU ETS)
- Maintain level playing field in the internal market for aviation
- Limit additional administrative costs for aircraft operators and Member States' administrations
- Ensure coherence with international law and with non-binding ICAO Assembly resolutions, insofar as consistent with EU statements on such resolutions.

The environmental effectiveness, low administrative costs, and political acceptability are the main considerations that stakeholders have put forward in the public consultation.

4. POLICY OPTIONS

To respond to the positive outcome of the 2013 ICAO Assembly with regard to the devleopment of a global MBM and to provide further positive momentum to this process, the EU can consider further steps to adjust its EU ETS:

In particular, the draft text on the MBM Framework as poposed by the ICAO Council of 4 September (see section 2.4.2), but finally not adopted by the ICAO Assembly, can serve as a base for further policy development: It will be possible to maintain the full coverage of emissions from intra-EEA flights but the coverage of emissions from extra-EEA flights will have to be cut back in proportion the distance travelled within the EEA (hereafter "hybrid option"). The reduced coverage will be effective until the implementation of the global MBM in 2020. If the 2016 ICAO Assembly fails to agree on a global MBM the EU ETS will return back to its full scope.

Besides the hybrid option, alternative options have been discussed to adjust the EU ETS coverage of extra-EEA flights :

- Departing-flights option: All intra-EEA flights are covered but only the departing flights to third countries. This approach was the EU's initial proposition for the geographic scope of the MBM Framework but rejected by a large number of ICAO Member states (see section 2.4.2).
- 50/50 option: As shown by the public consultation, the majority of environmental NGOs have also proposed to limit the EU ETS coverage to 50 % of the departing and arriving flights for extra-EEA flights. However, this option has never been discussed at ICAO.
- A general exemption of extra-EEA flights (similar to the "stop-the-clock" decision) would only leave intra-EEA flights covered.
- Upstream option: A switch to an upstream system would make fuel suppliers the compliance entity instead of aircraft operators. This option would have similar emission

coverage to the departing-flights option because fuel suppliers would surrender allowances corresponding to fuel sold to EEA airports.

Any changes to the EU ETS would not be expected to prejudge the development of the global MBM because regional MBMs and development of a global MBM are considered as two different tracks under the ICAO negotiations. Only changes with regard to exemptions for developing states may risk setting a precedent for the global MBM.

The different options will be explained in more detail in the following sub-sections:

4.1. No policy change – full-scope EU ETS

In case that the EU will not decide to amend the EU ETS in response to the 2013 ICAO Assembly, the EU ETS will apply in its full scope from 2013 onwards. This means that aircraft operators remain responsible for emissions for all flights departing from or arriving at EEA airports.

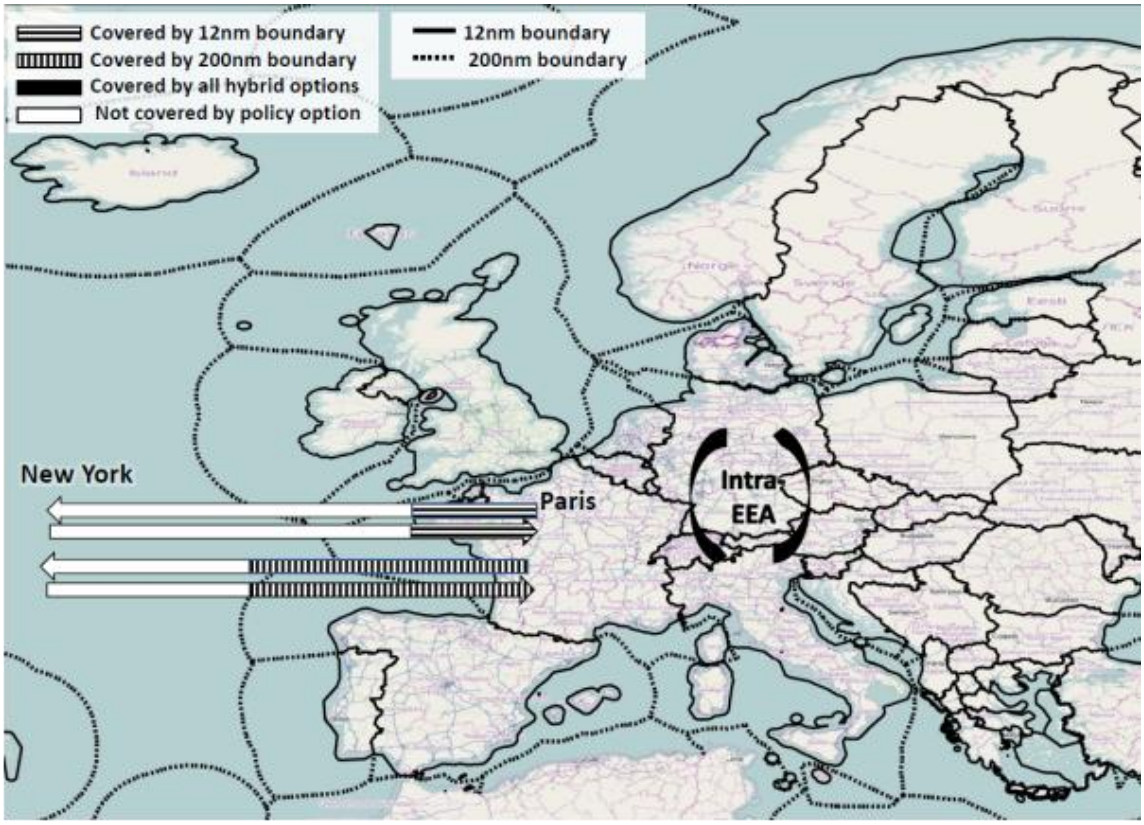
4.2. Hybrid option

It will be possible to maintain the full coverage of emissions from intra-EEA flights but the coverage of emissions from extra-EEA flights will have to be cut back in proportion the distance travelled within the EEA. While the emissions of a flight between London and Stockholm are fully covered, but the emissions of a flight between London and Dubai are only covered in proportion to the distance travelled within the EEA.

To determine distances travelled within the EEA, the land borders to non-EEA countries are clearly defined. However, various approaches exist with regard to the coverage of distances travelled over the sea. The impact of the territorial sea boundary, which extends to 12 nautical miles (nm), and of the exclusive economic zone (EEZ), which extends to 200 nm, will be assessed in more detail. Other boundaries could be considered[13], although third country concerns might be anticipated if the coverage included areas that third countries are associated with.

[13] The HGCC discussed an alternative definition based on the Flight Information Regions (FIR) that are used for air-traffic control purposes. However, this definition has not been retained for consideration at the 2013 ICAO Assembly. Even though the areas covered by the FIRs of EEA Member States are not identical to the areas covered by their EEZ, a similar coverage of emissions is achieved in both cases. More information on the legal definition of FIRs can be found in the last section of Annex IX.

Figure Error! No text of specified style in document.**-3 Hybrid option coverage (12 nm and 200 nm being assessed)**



The emission coverage would be adjusted on the routes to non-EEA destinations in proportion to the distance travelled up to the defined area borders. The route-based approach of the EU ETS is therefore maintained and over-flights – which do not depart or arrive at EEA airports – are consequently not covered. This approach is therefore not an "airspace" approach, which has been recognized as impracticable by ICAO, but an approximated scale-down of the EU ETS coverage which corresponds to the distance travelled within the EEA on routes to non-EEA countries. The amount of allowances to be auctioned and free allowances has to be adjusted accordingly.

With regard to MRV, two options will be considered:

– On-board measurement of fuel consumption: Aircraft operators would have to use on-board equipment to report fuel consumption.

– Approximated fuel consumption: Fuel consumption for the full flight would be measured in the same way as it has been done since 2010 but compliance obligations for extra-EEA flights would be limited based on a distance-factor (i.e. the % of the total flight which takes place within the EEA).

4.3. Alternative options

1.2.1. Departing-flights option

As explained above, the EU members of the HGCC have put forward the departing-flights option as the most practicable form for a regional or national MBM[14]. However, this option

[14] See http://ec.europa.eu/clima/consultations/0022/co2_coverage_en.pdf

has not been considered further by the ICAO Council due to the strong opposition by other States. Applied to the EU ETS, all emissions from intra-EEA flights and from departing flights to third countries are covered while emissions from incoming flights from third countries are excluded.

The total cap as well as the quantity of the free allowances and the allowances to be auctioned is adjusted in proportion to the emissions coverage. The MRV approach is the same as under the full scope EU ETS.

1.2.2. 50/50 option

Environmental NGOs have proposed to share the responsibility for emissions coverage for departing and arriving flights by 50/50 between the State of arrival and the State of departure. They consider that the concept of states sharing responsibility for emission reductions may be more attractive to those countries that have opposed the EU ETS than covering the whole trajectory of a flight as under the full-scope EU ETS or the departing flight option.

The emission coverage of this option is broadly similar to the departing-flight option, so the economic and environmental impacts will be the same. The 50/50 option does therefore not need to be modelled separately but the results from the departing-flights option will be relevant. Furthermore, it should be noted that third countries have not raised the 50/50 option in the HGCC or in other ICAO fora. Opponents to the EU ETS would bring forward the same sovereignty objections as with the departing-flights option.

The MRV approach would be similar to the full-scope EU ETS and the departing-flights option.

1.2.3. Coverage limited to flights within EEA and closely connected areas (as under the "stop-the-clock" decision)

The "stop-the-clock" decision provides for the most significant cut-back in coverage of extra-EEA flights. As explained in section 2.3.3, the "stop-the-clock" decision was adopted as a one-year measure to facilitate a meaningful outcome at the 2013 ICAO Assembly. The effective coverage of the EU ETS was in 2012 limited to intra-EEA flights and flights between aerodromes in the EEA and closely connected or associated areas such as Switzerland, Croatia and EEA Member states' dependencies and territories. The enforcement of compliance obligations was deferred for all other flights to non-EEA destinations.

The amounts of allowances to be auctioned and free allowances were adjusted accordingly. The same MRV approach as under the full-scope EU ETS was used.

1.2.4. Upstream option

Under this option, aviation fuel suppliers will become the compliance entity under the EU-ETS, instead of aircraft operators. This is the same approach as the Waxman-Markey bill that passed the US House of Representatives (H.R. 2454[15]) but was finally not adopted in the US Senate, which would have covered fuel supply to international flights on a non-discriminatory basis.

This option will have a similar coverage to the departing-flights option because fuel suppliers will surrender allowances corresponding to fuel sold to EEA airports. However, it will have different economic impacts because, with a view to avoid windfall profits for the fuel suppliers, free allowances are not given out but all allowances are auctioned. As several

[15] http://thomas.loc.gov/cgi-bin/bdquery/z?d111:H.R.2454:

studies[16] have discussed, the pricing behaviour on energy markets may facilitate a full pass-through of the EU ETS costs and consequently lead to windfall profits for those suppliers who have received free allowances.

The upstream option will therefore lead to higher fuel prices for the airlines that are eventually passed on through higher passenger and cargo prices. To counter these price increases, it would still be possible to continue the allocation of free allowances to the airlines. The upstream option would then not only have the same environmental but also the same economic effects as the departing-flights or 50/50 option.

As explained in detail in section 5.4.4, the upstream option would require the most significant changes to the MRV system.

4.4. Cross-cutting simplifications to MRV and registry

As explained in section 2.6, the MRV costs are strongly driven by the high number of small aircraft operators included in the EU ETS. There are three main options identified which could further simplify MRV for small emitters:

- Possible introduction of de-minimis threshold for non-commercial operators, to remove any obligations for small emitters below this threshold.
- Streamlining of administrative processes by allowing Member States to apply simplified procedures for small emitters (e.g. removing the requirement for independent verification for those small emitters who are using the Eurocontrol ETS Support Facility combined with either credit card payment or CRCO-billing);
- MRV compliance could be performed centrally by one representative or consultant for a large group of small aircraft operators;

Such simplifications would reduce the administrative requirements for aircraft operators as well as for national administrations und all options described above.

Performing the MRV compliance centrally by one representative or consultant for a large group of small aircraft operators will not be considered further as this would require not only changes to the legislation and the reporting templates, but would mean that aircraft operators could indirectly change their administering Member State by choosing the representative/consultant.

The first two options can also be used in a complementary way (e.g. to exempt small emitters from EU ETS up to a certain threshold and to allow them to use simplified administrative procedures above this threshold).

5. ASSESSMENT OF IMPACTS

The quantitative assessment of the impacts is based on the AERO Modelling System (AERO-MS)[17]. The AERO-MS model is highly relevant to this project: it was developed as a tool for evaluating economic, regulatory, operational, technical and market-based measures to reduce the impacts of aviation on the atmosphere. It has already been applied for the initial impact assessment concerning the integration of aviation into the EU ETS in 2006 and has also been used to the analysis of policies at ICAO. A key aspect of the AERO-MS method is that it models the effects of policies on supply-side costs and, as they are passed through, on

[16] See for a recent review of modelling and empirical studies: Tim Laing, Michael Grubb and Claudia Comberti, Assessing the effectiveness of the EU Emissions Trading Scheme, Grantham Research Institute on Climate Change and the Environment Working Paper Series, No. 106, January 2013.

[17] EASA (2010) Research Project EASA.2009/OP15 Study on Aviation and Economic modelling (SAVE)

demand for air travel, in a feedback approach. As a result, it generates a balanced view of the effects of policies on economics and the environment. The methodology is explained in more detail in Annex V.

5.1. Environmental impacts

The most important environmental impacts from the options relate to CO_2 emissions as the reduction of CO_2 emissions is the driving objective of public intervention. Impacts on NOx have also been analysed and are reported in Annex IV.

1.2.5. Emissions' coverage of policy options compared to the full EU ETS

The effectiveness of the options is measured in terms of their emissions coverage compared to the full-scope EU ETS. This is presented in **Table** Error! No text of specified style in document.**-2** as percentages of the EU ETS emissions covered by each option, by world region for 2020. Figures for 2012, 2016 and 2030 are provided in Annex IV. The percentages are related to the flights to and from a certain world region.

Table Error! No text of specified style in document.**-2 Percentage of emissions covered in 2020 compared to full-scope EU ETS**

Departure / arrival region	**Departing Flights**	**Hybrid – 200nm**	**Hybrid – 12nm**	**"Stop-the-Clock"**
EEA	100.0%	100.0%	100.0%	100.0%
Africa	50.1%	37.6%	22.5%	0.0%
Europe (non-EEA)	49.4%	72.3%	54.4%	0.0%
Far East	51.1%	19.3%	14.8%	0.0%
Middle America	49.4%	15.4%	7.0%	0.0%
Middle East	50.0%	53.6%	31.0%	0.0%
North America	48.1%	20.9%	9.0%	0.0%
South America	49.0%	15.2%	7.8%	0.0%
Total	**62.4%**	**46.5%**	**38.5%**	**25.3%**

All options fully cover intra-EEA flights. As the departing-flights option covers 50% of emissions from extra-EEA flights and maintains a full coverage of all intra-EEA flights, it will still cover 63 % of emissions compared to the full-scope EU ETS. The upstream and 50/50 options would achieve the same coverage.

The hybrid-options reach coverage between 38.5% (for 12nm) and 46.5% (for 200nm) of the full-scope EU ETS. Both options cover a larger proportion of emissions from shorter extra-EEA flights (e.g. to the Middle East and the rest of Europe) than longer extra-EEA flights (e.g. to South East Asia or the Americas). For instance, the hybrid option with a border of 200nm would cover less than half the emissions from and to North America compared to the departing-flights option. As the "stop-the-clock" option only covers intra-EEA flights and flights to and from closely connected areas but not flights to other non-EEA countries, it only achieves 26% of the full-scope EU ETS' emissions coverage.

It is important to note that the emission coverage under the alternative options is reduced over time by 2 to 5 percentage points compared to the full-scope EU ETS: The sharpest drop is recorded by "stop-the-clock" option with a reduction from 27 % in 2012 to 22 % in 2030, reflecting the role of extra-EEA travel in driving emissions in the future. The departing-

flights option, which covers the highest share of extra-EEA traffic, would only experience a drop of 2 percentage points from 63 % in 2012 to 61 % in 2030 (see Annex IV).

As mentioned earlier, the model is based on the policy options applied to EEA countries. However, there is consideration of full including Switzerland in the EU ETS[18] for 2016 and it is worth considering the impact it would have on the effectiveness of the policies. The full inclusion of Switzerland would increase emissions coverage by 2% under the full-scope EU ETS to around 0.5% for the hybrid options.

1.2.6. Increase in CO2 aviation emissions (in-sector reductions)

As the coverage and consequently the EU ETS costs are reduced for the extra-EEA flights, airlines will have less incentive to curtail their activity and CO_2 emissions will therefore be higher than under the full scope EU ETS. The following table shows the relative changes in CO_2 emissions compared to the emissions under the full-scope EU ETS. The absolute numbers for the reported change in emitted CO2 are in a range of less than 10 million tons.

Table Error! No text of specified style in document.**-3 Change in emitted CO_2 compared to full-scope EU ETS**

	2016	**2020**	**2030**
Hybrid (12nm)	+0.24%	+0.44%	+1.77%
Hybrid (200nm)	+0.21%	+0.39%	+1.54%
Departing Flights	+0.15%	+0.27%	+1.07%
"Stop the Clock"	+0.29%	+0.52%	+2.12%
Upstream	-0.18%	-0.18%	+0.19%

The departing-flights, "stop-the-clock", and hybrid options to higher CO_2 emissions compared to the full-scope EU ETS. In line with the level of emission coverage under the different options, the departing-flights option only records a 1% rise by 2030 while the "stop-the-clock" option has the highest increase of 2%.

The upstream option will lead first to a decrease in CO2 emission because the cancellation of free allowances imposes higher costs on airlines than the full-scope EU ETS. However, in the longer term, emissions will also increase because of the lower coverage on extra-EEA routes.

1.2.7. Decrease in demand for general EU ETS allowances and international credits (out-of-sector reductions)

As already discussed in section 2.8, the aviation sector needs to acquire general EU allowances and international credits to comply with the emission cap under the full-scope EU ETS. The technological and operational measures are not sufficient to cancel out the strong growth of the aviation sector. The aviation sector will remain a buyer of general EU allowances and international credits under all options but the demand will decrease in line with the reduced coverage. This means that relative to the full-scope EU ETS, the demand for general EU allowances and international credits is reduced by between 35 % and 75 % depending on the option chosen.

[18] Flights between airports in Switzerland and EEA countries have already been included in the full-scope EU ETS and the stop-the-clock decision for 2012. The additional coverage comes therefore from flights between airports in Switzerland and non-EEA countries.

Table Error! No text of specified style in document.**-4 Estimated demand for general EU allowances from the aviation sector in 2020, in absolute terms (mt CO_2) and relative to full-scope EU ETS**

	Demand for general EU allowances and international credits (= emissions over cap)		**Demand for general EU allowances and international credits relative to full-scope EU ETS**
	High estimate (based on AERO-MS)	Low estimate (based on PRIMES)	
Full-scope EU ETS	136.4	36.9	100%
Departing Flights	86.1	23.2	63%
Upstream	85.0	22.9	62%
Hybrid (200nm)	69.1	17.3	47%
Hybrid (12nm)	53.7	14.4	39%
"Stop the Clock"	33.6	9.2	25%

The AERO-MS is based on the traffic data projections from the CAEP-ICAO studies (see also Annex V). While this data is commonly used for studies in the aviation sector, it does not take account of the recent economic downturn. It may therefore overestimate the emission growth in the short-term (e.g. up to 2020) while still providing correct estimates for the long-term growth. Depending on how quickly the EU economy will pick up again, the demand from the aviation sector for EU allowances may therefore be lower in the short-term than projected by AERO MS. To have a more conservative estimate, the shortfall for the aviation sector has also been estimated based on emission growth projections for aviation extrapolated from the PRIMES model. Contrary to the AERO-MS, which assumes an annual growth rate of 5.4%, the PRIMES model is based on a significantly lower growth rate of 1.1% for the period up to 2020. Due to the significant difference in assumed growth rates, the absolute values for the shortfall in 2020 are between 3.5 and 4 times higher from the AERO MS than the PRIMES model.

Finally, it is important to note that a reduction in demand due to lower coverage under the hybrid and alternative options will further increase the surplus on the market for general EU allowances. In case that aviation emissions will grow strongly (as predicted by AERO MS), the cumulated demand from the aviation sector under full-scope coverage would be estimated at around 600 million general EU allowances for the period from 2013 to 2020. A reduction in the coverage down to 25 % to 63 % - depending on the option chosen – would lower cumulated demand for general EU allowance from 600 million to around 150 to 400 million for the period from 2013 to 2020 and increase the surplus accordingly. Based on a low-growth scenario (following the PRIMES model), the cumulated demand from the aviation sector would be reduced from around 230 million to around 60 to 145 million for the period from 2013 to 2020 and have a less significant impact on the surplus of general EU allowances.

5.2. Economic impacts

Aviation plays a central role in the EEA and global economies both as a sector which creates value and employment and as a support service which enables trade in other sectors. A change in the cost of air transport may therefore have repercussions on a range of economic agents.

1.2.8. Impacts on airlines' competitiveness

The EU ETS has the effect to increase the competitiveness of fuel-efficient carriers compared to their competitors. Operational measures and investments to increase full efficiency are rewarded through lower EU ETS costs. However, as aviation is an essential mode of transport, attention must also be paid to its overall competitiveness of the sector. The reduction of the EU ETS scope will reduce the competitive advantage of the more fuel-efficient operators but increase the overall competitiveness of the sector through lower costs and a corresponding increase in demand.

- Impact on costs

The requirement to reduce emissions placed on the aviation industry by the EU ETS and the policy options entails compliance costs for operators. Airlines will be required to purchase allowances (through auctions or on the secondary market) or international credits and meet the MRV obligations.

The cost impact of the policy options is modelled by applying the cost of acquired allowances (i.e. auctioned allowances, general allowances, and international credits) as an additional fuel cost for the aircraft operators. The average EU ETS costs is calculated off model based on the required number of emission allowances (which equals emissions less free allowances) and the prices for EU allowances (as shown in **Table** Error! No text of specified style in document.**-5**) and international credits . The number of allowances required on a route is adjusted in proportion to the reduced coverage under the different options in comparison to the full-scope EU ETS. The average EU ETS costs are then integrated into AERO-MS as a mark-up on fuel prices.

Table Error! No text of specified style in document.**-5 Price assumptions for EU allowances (€)**

	2016	**2020**	**2030**
EU ETS	6	10	35

The absolute level of EU ETS costs will be lowered in proportion to each option's reduced coverage (e.g. up to 61.5 % of the hybrid options). As Annex VI show e.g. for 2020, the absolute level of EU ETS costs would be reduced from estimated € 1 633 million for the full-scope EU ETS to € 1 025 million for the departing-flights option and to around € 700 million for the hybrid options. The "stop-the-clock" would in line with its reduced coverage of only 25 % cut the EU ETS costs down to around € 400 million.

Table Error! No text of specified style in document.**-6** shows these reductions in percentage of total costs and over time: Due to the minor share of EU ETS costs in total costs, the substantial reductions in absolute levels will only lead to minor relative changes in total costs in the range of -0.01 % to -0.15 %.[19]

[19] While the EU ETS and options are modelled to apply to EEA countries, the model outputs are only provided at EU-27 level, not the whole EEA.

Table Error! No text of specified style in document.**-6 Aggregated cost impacts compared to full-scope EU ETS (% change)**

Impact on total costs	2016	2020	2030
Hybrid 12nm	-0.01%	-0.03%	-0.13%
Hybrid 200nm	-0.01%	-0.02%	-0.11%
Departing flights	-0.01%	-0.01%	-0.07%
"Stop-the-clock"	-0.02%	-0.03%	-0.15%
Upstream	0.01%	0.01%	0%

- Impact on prices and demand

The impact on the price for passenger tickets and freight rates will depend on the extent of cost pass-through in the aviation sectors. Some commentators[20] have suggested that the airlines would increase prices in line with their marginal EU ETS costs and consequently benefit from a windfall profit in proportion to the free allowances.

However, the research on cost pass-through rates has up to now focused on energy-intensive industries.[21] The market structure and the pricing behaviour in the aviation sector may be quite different from these product markets. In particular, the price pressure from low-cost airlines may not allow all operators to fully pass on costs. The empirical evidence[22] on the announced price top-ups to cover EU ETS also suggests that the airlines would pass on their incurred EU ETS costs only and consumer benefit from the free allowances.

To not overestimate the effect of reduced EU ETS coverage on demand, it is therefore assumed that prices are reduced in proportion to the reductions in incurred EU ETS costs (i.e. expenses for acquired allowances and international credits).

According to the AERO-MS estimates, a reduction of the EU ETS coverage for extra-EEA flights will result in a drop in average ticket prices for economy seats (excluding taxes and charges) of -1.1% to -0.1% compared to the full-scope EU ETS in 2020, depending on the remaining coverage on the routes to non-EEA destinations. The prices for intra-EEA traffic will remain unaffected except for the upstream option which will increase prices for intra-EEA flights.

The reduced ticket prices will increase passenger demand between 0.14% and 2.04% for extra-EEA flights in the period between 2016 and 2030, as summarised in **Table** Error! No text of specified style in document.**-7**.

Table Error! No text of specified style in document.**-7 Change in passenger demand for extra-EEA flights (% change compared to full-scope EU ETS)**

	2016	2020	2030
Hybrid 12nm	0.23%	0.43%	1.72%
Hybrid 200nm	0.21%	0.38%	1.51%
Departing flights	0.14%	0.25%	1.01%

[20] See e.g. CE Delft (2012) The costs and benefits of Stop the Clock

[21] See e.g. Alexeeva-Talebi V, 2010, "Cost Pass-Through in Strategic Oligopoly: Sectoral Evidence for the EU ETS", ZEW Working paper

[22] Bloomberg New Energy Finance, Is the EU ETS eating into airline profits?, 12 January 2012.

"Stop-the-clock"	0.28%	0.51%	2.04%
Upstream	-0.07%	-0.04%	0.41%

The freight rates will also be lower than under the full scope, experiencing a reduction between -1.8% to -0.1%, depending on the coverage of the routes to the different non-EEA destinations. If this decrease in freight rates is passed down the supply chain, the price of some consumer products may also marginally decrease depending on pass-through behaviour by manufacturers and retailers.

The reduced freight rates will increase cargo demand between 0.29% and 3.45% for extra-EEA flights in the period between 2016 and 2030, as shown in **Table** Error! No text of specified style in document.**-8**.

Table Error! No text of specified style in document.**-8 Change in extra-EEA cargo demand (% compared to full-scope EU ETS)**

	2016	**2020**	**2030**
Hybrid 12nm	0.41%	0.74%	2.87%
Hybrid 200nm	0.35%	0.64%	2.47%
Departing flights	0.29%	0.51%	1.97%
"Stop-the-clock"	0.49%	0.88%	3.45%
Upstream	0.01%	0.13%	1.16%

A reduced coverage will therefore lead to an increase in passenger and cargo traffic on extra-EEA routes. However, the overall aggregated impact of the EU ETS – whether in full or reduced scope – will remain small compared to other cost drivers (e.g. fuel prices) or macro-economic drivers (GDP and income growth) that have a much more significant impact on the aviation sector.

The low impact of the EU ETS is also confirmed by a sensitivity analysis with regard to the level of the price of EU allowances. Even if the assumed prices for the EU allowances were increased by 50 % (e.g. € 15 for 2016 and € 70 for 2030 instead of the prices in **Table Error**! No text of specified style in document.**-5**) the changes in demand would remain small compared to full scope. The demand increase for the hybrid option (for 200 nm) would go down from 0.38 % to 0.23 % in 2020 and from 1.51 % to 0.98 % in 2030.

1.2.9. Impacts on level playing field for competition

Competition distortion occurs when a policy applies dissimilar conditions to different trading parties on equivalent transactions. The EU ETS is designed to be neutral with regard to competition: it should not favour certain types of operators (e.g. based on their nationality, their network size, or any other characteristics) and maintain a level playing field.

At the international level, the Chicago Convention (Article 11), Open Skies Agreement between the US and Europe (Article 2) and a number of bilateral Air Service Agreements (ASA) build on the non-discrimination principle to avoid distortions of competition through favouring national operators over foreign operators.

- Competition on direct city-pair routes

City- or airport-pairs are usually taken as the relevant market definition to explore competition impacts because of the absence of widespread demand-side substitution[23], i.e. if the price of travel between Brussels and New York changes, it will not significantly affect demand for flights between Brussels and Miami, although this can vary depending on routes, as well as purpose and direction of travel.

In the European Court of Justice (ECJ) Case 366/10 Air Transport Association of America and Others, the ECJ confirmed that a public measure – like the EU ETS – does not distort competition in favour of certain operators if it is equally applied to all operators active on a certain route. The principle of non-discrimination, as contained in the Chicago Convention, the Open Skies Agreement and the bilateral ASAs, is therefore not violated by the EU ETS.

As all policy options continue to apply uniformly to all operators – irrespective of their nationality or any other characteristics – on a given city-pair, they would remain in line with the principle of non-discrimination and allow operators to compete fairly.

- Competition with one-stop services

In certain cases, one-stop services may be included besides non-stop services in the same relevant market because the connecting one-stop services offer competitive alternative to non-stop carriers in city-pair markets. Depending on the city-pair, a one-stop service may be a suitable alternative for non-premium passengers in long-haul markets where the passengers may be willing to accept a longer time in transit to obtain a lower fare. This approach will be less attractive to business travellers.

As all policy options fully cover intra-EEA flights, possible competition distortions are avoided. As the policy options - depending on different geographical scopes - may not cover non-stop services in the same way as one-stop services, there could be some potential for distortion through the use of hubs outside the EEA in order to limit the quantity of emissions covered by the EU ETS.

For instance, under the full-scope EU ETS, it may be more advantageous to take a flight via a non-EEA hub than a direct flight to a non-EEA destination (e.g. to stop-over in Dubai on a London to Hong Kong flight instead of flying directly) because only the first flight until the non-EEA hub would be covered. This may reduce the attractiveness of EEA hubs and favour airlines which use hubs outside Europe.

The 2006 Impact assessment explored the risk of route change to use extra-EU hubs under the full-scope EU ETS but found that the likelihood of such a distortion would only become positive at a carbon price of €75 per tonne CO_2. This means that at the assumed carbon price up to 2030, there would be no risk for competition distortions. The same is theoretically also possible under the departing flights, 50/50 and upstream options but even less likely because of the more limited coverage of extra-EEA flights.

The "stop-the-clock" option reduces potential competitive advantages for non-EEA hubs because all extra-EEA flights – irrespective of their final destination – are exempted from the EU ETS. However, individual airlines claim that stop-the-clock would nevertheless create "serious distortions of competition in the intercontinental air travel business at the expense of the EU airlines" because a feeder flight to an EEA hub (e.g. from Brussels to Frankfurt) is subject to the EU ETS while a feeder flight to the foreign hub (e.g. from Brussels to Abu

[23] European Commission and United States Department of Transportation, 2010, Transatlantic airline alliances: competitive issues and regulatory approaches, http://ec.europa.eu/competition/sectors/transport/reports/joint_alliance_report.pdf

Dhabi) is exempt. Given that feeder flights within the EEA will tend to account for a small proportion of the total distance flown to overseas destinations and given the low level of current carbon prices, there exists no significant risk for such a distortion.[24]

By relating the scope of the EU ETS to the distance flown within the EEA rather than to the distance to the final destination, the hybrid options eliminate any potential risk of distortions in favour of non-EEA hubs because all flights are treated equally irrespective of their final destination. Non-stop flights and one-stop flights have to pay the same EU ETS costs for their distances flown within the EEA. The only potential source for distortions could come from one-stop flights using hubs in Switzerland due to its specific geographic position in the middle of Europe: As flights from Switzerland to non-EEA countries are currently not included in Switzerland's own ETS, and are not covered under the EU ETS, one-stop flights over Swiss hubs could potentially benefit from an advantage over their competitors. The ETS linking agreement with Switzerland – which is currently negotiated – will remove this potential distortion.

Therefore, while the incentive to use non-EEA hubs will exist to different degrees depending on the policy option considered (see **Table** Error! No text of specified style in document.**-9** for a summary) it is very unlikely that any policy options would generate significant competition distortion in favour of airlines operating from non-EEA hubs or incentivise airlines to relocate their hubs, especially at current carbon prices.

Table Error! No text of specified style in document.**-9 Summary of competition impacts on aviation markets**

	Competition on city-pair markets	**Competition on markets with one-stop services**	
		Potential distortions	**Significance**
Full-scope EU ETS, departing-flights, 50/50, and upstream options	No risk of distortion	Airlines using hubs outside the EEA could benefit from lower emission coverage under EU ETS compared to non-stop flights to the same destination. The risk is lower than under the full scope EU ETS however.	*None at current carbon prices*
"Stop-the-clock" option		Reduced risk because all flights to 3rd countries are exempted from EU ETS.	
Hybrid option	No risk of distortion	No risk of distortion because emission coverage is independent of final destination	*None*

- Competition between tourist destinations

As mentioned in the Section 5.2.1.2, the policy options (except upstream) are expected to result in reductions in ticket prices compared to the full scope EU ETS. This means that

[24] AERO MS estimates EU ETS of 4 cents only for the flight Brussels to Frankfurt (assuming a carbon price of €6).

tourism will benefit from a reduced scope of the EU ETS even though only to a marginal extent (see also Annex VII for the price elasticity in the tourism sector).

With regards to a level playing-field between different tourists destinations, all intra-EEA destinations – including outermost regions (e.g. Azores, Canary Islands, Madeira, and the French overseas departments) – continue to be covered so no destination will gain a comparative advantage over others. As already discussed in the 2006 Impact assessment, in case that aid may be justified in favour of inhabitants of outermost regions to facilitate the access to aviation services, such aid should be granted through specific public service obligations (PSO) and not through exemptions to the EU ETS.

With regards to non-EEA destinations, stakeholders have raised a potential risk for distortions under the "stop-the-clock" option in particular with regard to the Mediterranean area. This is because higher demand substitutability may exist between tourist destinations in this area than in other aviation markets. For instance, if flights to North-Africa or Turkey were completely exempted from the EU ETS, as under the "stop-the-clock" option, compared to flights to EEA destinations in the Mediterranean area, a potential advantage in favour of non-EEA destinations may exist. However, given the low carbon prices, it is unlikely that such risks would materialize in any significant shifts in demand.

With regards to competition with other international destinations, located farther away, the potential distortion across tourist destinations are not a concern in view of the lower price elasticity for long-haul flights and the smaller proportion of the EU ETS costs in relation to total costs.

1.2.10. Impact on auction revenues for public authorities

15 % of the total aviation allowances are auctioned and the revenues are distributed to the Member States. In proportion to the reduced scope, less aviation allowances will be auctioned. The annual auction revenues are therefore expected to decrease from €316 million under the full-scope EU ETS to €122 to €147 million under the hybrid options at assumed carbon prices of €10. The reductions are always in proportion to the reduced coverage. Except for the upstream option, the auction revenues will increase strongly because allowances are not any more given out for free and all allowances are auctioned. See also Annex VI.

Table Error! No text of specified style in document.**-10 Estimated auction revenues from aviation allowances in 2020 (at assumed price of €10)**

	Estimated auction revenues from aviation allowances (€m)	**Percentages relative to full scope**
EU ETS full scope	316	100%
Departing Flights	197	62%
Hybrid 200nm	147	46%
Hybrid 12nm	122	39%
"Stop-the-Clock"	80	25%

Upstream	1280	333%

5.3. Social impacts

The social impacts of a policy are the impacts on people, their employment prospects, and rights, access to services, quality of life, income, health and safety. It focuses on distributional impacts i.e. across and within different social and economic groups, identifying 'winners' and 'losers' and assessing whether it is likely to improve or aggravate existing inequalities. For this study, the main areas of interest are the potential impacts of the policy options on lower income social groups by potentially reducing access to air travel, and on employment if jobs are lost / created as a result of the policy options.

1.2.11. Impact on lower income groups

The minor impact on ticket prices and overall passenger demand has already been established in Section 5.2.1.2. This section investigates whether there is a risk that lower income groups may be disproportionately affected by the policy options.

Access to air travel is closely linked to income levels. This is despite the fact that the growth in Low Cost Airlines (LCAs) is often claimed to have contributed to the democratisation of air-based travel by bringing it within the reach of lower income groups.

LCAs have indeed generated a spectacular growth in air travel since 2000. Between 2006 and 2012 alone, the number of passengers of LCAs has, according to the European Low Fares Airline Association (ELFAA), almost doubled from 105.7m to 202.4m. However, this rapid growth is due to a range of drivers which do not include attracting low income customers. The main ones are: a continued rise in incomes; and the opening of numerous new routes which have captured latent demand. The introduction of low-cost flights has resulted in two main trends: more short trips are made as people take advantage of the cheaper tickets to take weekend breaks or city breaks; and an incentive to buy a secondary home abroad was created.[25] In other words, the main effect of LCAs has been to draw new people to air travel by reaching new markets and increasing the frequency of travel. However this has mostly benefited middle and high income groups rather than low income groups.

As the ticket prices will remain stable for intra-EEA flights and even decrease for extra-EEA flights with reduced coverage, low income groups will not be negatively impacted and there will not be a risk to increase inequalities in Europe.

1.2.12. Impact on employment

Employment impacts may occur from a rise or fall in airlines' activity as a result of the policy options. AERO-MS estimates that by 2020, the full-scope EU ETS is expected to generate a drop of -0.6% in aviation employment at EU level compared to a situation with no EU ETS. By reducing the scope of the scheme, the drop in employment would slightly decrease compared to the full-scope EU ETS (between 0.13% under "stop-the-clock" option and 0.07% under departing-flights option).

5.4. Administrative effort and feasibility

This section provides analysis on the administrative effort and feasibility to implement the policy options with regard to monitoring, reporting and verifying emissions (MRV).

[25] Uittenbogaard A., 2009, A study on the effects of low cost airlines in planning issues, Royal Institute of Technology, Stockholm.

Annex VIII provides additional information on the costs and the implementation timeline for each option.

The main challenge will be to adapt the EU ETS in very short time and to keep to a minimum the necessary legal changes and additional MRV costs for aircraft operators and national administrations. The current MRV system should therefore be maintained as far as possible and not be changed in its principles. Any changes should be simple and easily implementable.

1.2.13. Full-scope EU ETS

At the core of the current MRV system for the EU ETS is the monitoring plan, which aircraft operators submit in advance of the start of the trading period, and which is subject to the approval of the competent authority. The plan includes information on how you obtain, process, record and monitor emissions. The monitoring plan sets out detailed, complete and transparent documentation concerning the methodology of an aircraft operator and is subject to regular update to respond to the verifier's findings and on the basis of the aircraft operator's own initiative. Currently, the main responsibility for the implementation of the monitoring methodology in the plan as specified by requirements in EU legislation remains with the aircraft operator.

On the basis of the monitoring plan, each aircraft operator must report annual emissions by submitting an annual emissions report to the competent authority which must be verified in accordance with EU legislation by an independent accredited verifier prior to submission. The competent authority reviews and approves such reports. In general, emissions are based on an agreed emission factor applied to fuel consumption measured based on methodologies included in the monitoring plan. A simplified approach is available for small emitters whereby emissions are calculated using a standardised distance flown based on Great Circle Distance (GCD) multiplied by the emission factor.

The administrative tasks involved in the monitoring, reporting and verification (MRV) of emissions under the current EU ETS are broadly summarised in **Table** Error! No text of specified style in document.**-11**.

Table Error! No text of specified style in document.**-11 Key administrative tasks under the EU ETS**

Operators	**Competent authorities in Member States**	**European Commission**
Application for monitoring plan; notifying changes to monitoring plan; setting up monitoring and report systems; collect, and archive data; prepare annual emission report; ensure that annual emission reports are verified by accredited independent verifiers; submit annual emissions report to competent	Approves monitoring plan for each aircraft operator and subsequent updates to the monitoring plan; approves annual emissions reports as verified by accredited verifiers; monitor compliance and enforce in case of non-compliance	Establish and maintain implementing provisions related to monitoring, reporting and verification of emissions, create central templates for reporting of emissions and monitoring plans, subject to approval through comitology process; Issue guidance; update aviation operator list; administer allocations of free

authority;		allowances

The most relevant factors in terms of administrative effort under this system are the large number of aviation operators covered by the EU ETS, the review of the monitoring plan for each and the amount of data reported annually through the annual emissions reports.

1.2.14. Hybrid option

The MRV system would need to change under each of the hybrid options in order to reflect the proportion of emissions or distance covered within a defined area. There are three possible approaches for an adapted MRV process:

- *MRV Option 1 (on-board measurement of fuel consumption),* using on-board equipment on all aircraft to monitor actual fuel flows to the engines combined with GPS data.
- *MRV Option 2 (approximated fuel consumption)* which applies a distance factor to total fuel consumption, as reported under the current MRV system.
- *MRV Option 3 (modelled fuel consumption),* modelling emissions using Eurocontrol's Advanced Emissions Model. This may significantly reduce costs for operators but it would likely reduce accuracy and more importantly it would all but remove incentives for improving fuel efficiency and reducing emissions levels. Modelling is not deemed appropriate as a monitoring approach and is not considered further.

- MRV Option 1 – On-board measurement of fuel consumption

Under this option, the fuel consumption for the distance travelled within the EEA would be monitored with on-board devices tracking fuel flow measurements to the engines combined with GPS data. The fuel flow occurring between fuel uplift for the flight and reaching the EEA border is summed up and considered to be the fuel consumption for that part of the flight.

In order to monitor fuel consumption and geographical position in flight, aircraft operators could use the data recorded by either the Digital Flight Data Recorder (FDR) or, if installed, Quick Access Recorder (QAR). The recorded data on fuel flows in the engines and GPS positions provides a high level of accuracy and as data is digitally logged a detailed verification of the fuel flow data can be performed.

In terms of monitoring, the applicability of this option depends on the extent to which these devices are present on aircraft and the number of operators who would need to invest in such equipment. Regulation and data on aircraft fleet suggest that QAR and FDR systems are available on most commercial airlines. Where FDRs or QARs are not available, this option places potentially significant costs on operators. These include the purchase of new equipment for each aircraft in a fleet and adjusting the relevant flight permit after installation: new QAR equipment can cost between 7,000€ and 10,000€ for the hardware and possibly up to 50,000€-80,000€ for the software.

However, the cost effectiveness of this option is uncertain as a substantial amount of post-flight processing would need to be undertaken. As this option results in a much greater quantity of data collected, significant additional effort in reporting and verification, both for operators and MS' competent authorities, may be required. As a first step, a reporting entity would need to be identified and agreed (e.g. reporting to competent authority directly by the operator or, alternatively, by a central reporting entity (such as Eurocontrol)). Furthermore, depending on how the boundaries of the EEA are defined, there would be additional work to

encode the boundaries (e.g. 12nm or 200nm boundaries) into flight management data bases.[26] In general, it is the reporting element of this approach, rather than the monitoring element, which results in the greatest share of added administrative burden.

Finally, this MRV approach may also be subject to legal constraints. The requirement for on-board equipment may be challenged under the Chicago Convention. According to Article 33 of the Chicago Convention, if a certificate of airworthiness is issued by the state where the aircraft is registered, the EU MSs will be obliged to recognise it, provided that the requirements under which such certificate was issued meet or exceed ICAO standards. Therefore, as long as the required on-board equipment is not recognized as an international standard, it may be difficult to legally oblige all aircraft operators to install it through EU legislation.

In conclusion, MRV Option 1 might be feasible for medium-sized and large aircraft operators, who have already installed the necessary equipment on board, but will increase the administrative costs with regard to the reporting element, not alone because of the significant increase in the amount of data to be reported and the post-flight data processing required by the operator, verifier and/or Member State competent authority.

Smaller operators and those without this equipment would face additional investment costs for the installation of the equipment per aircraft. Operators may face higher independent verification costs and MS' competent authorities would likely have to bear higher costs in validating emission reports because of the added complexity and may further face initial costs related to establishing the required system.

In terms of implementing such an approach, there would be time-consuming steps including the installation of the necessary equipment on aircraft where this equipment is not yet available, and the revision of MRV legislation by the Commission. It is estimated that this option would take at least 2 - 2.5 years to implement, while the precise costs for airlines are not fully known. Though such a system would potentially result in a very high level of accuracy, considering that such an MRV system would potentially only be in place until the implementation of a global MBM in 2020, and in view of the additional effort and cost for parties involved, the risk of legal challenge under the Chicago Convention, and the implementation time, on-board measurement is not considered to be the preferred solution.

- MRV Option 2 – Approximated fuel consumption

With this method, emissions would be determined using a pro rata calculation (proxy) to the fuel consumption by applying a “distance factor” proportional to the distance travelled within the EEA to the total fuel consumption of a flight. Hence, the current MRV system would largely be maintained. This approach maintains the incentive to reduce emissions from aviation, and does so for the whole flight route. In addition, it does not encourage alterations in flight paths merely to avoid covered areas, because the distance factor is set once for the period (phase 3 EU ETS, 2013-2020) and would not change during the period. This approach is not applied as a traditional "airspace" approach, which previous ICAO analysis has considered being "impracticable" but rather a proxy to limit the coverage for extra-EEA flights to the distance flown within the EEA based on best available data. Under this approach, a premium is placed on workability and simplicity.

The distance factors could be pre-determined based on the proportion of the Great Circle Distance (GCD) between city- or country-pairs (e.g. determining the share of GCD within the

[26] Civil Aviation Authority (2013), Practicalities of an Airspace Based Emissions Trading System, to be published on www.caa.co.uk.

EEA as a percentage of the total GCD). Alternatively, the distance factor could be pre-determined using flight plans.

– Reporting based on country-pairs would be in line with existing monitoring legislation and would use the existing reporting template applicable since 2010. It would also require significantly fewer distance factors to be calculated and applied by each aircraft operator as far fewer country-pairs exist relative to city-pairs. This may facilitate earlier implementation of any change. However, defining the GCD for a country-pair may become controversial because of potential claims by some operators will benefit and some will lose out. A loss of accuracy may be claimed compared to more precise calculations such as city-pairs though it is possible that this loss of accuracy would be small, especially with a 12nm boundary, as this represents a small part of the total flight.

– The determination of distance factors based on city-pairs would imply more administrative effort than determining distance factors based on country-pairs. Nonetheless, the administrative effort required to pre-determine distance factors under either approach are considered to be moderate because the existing Eurocontrol Support Facility can facilitate this process. A city-pair approach to the calculation of distance factors would likely require changes to the current MRV legislation. Additional costs from implementing this method would stem primarily from required changes to aircraft operators' or competent authorities' monitoring and reporting systems to allow them to apply relevant distance factors in their annual emissions reports. However, once the required changes have been implemented and the distance factors have been calculated and published, additional reporting effort by the operator would be minimal.

– The approximation based on GCD would have limitations in terms of accuracy because actual flight trajectories can vary considerably from the GCD (because of weather conditions, operators choose flight routes which minimise headwind and maximise tailwind); hence, these approaches do not reflect real fuel consumption patterns. To achieve a higher level of accuracy, the distance factor could possibly be pre-determined based on Eurocontrol's Advanced Emissions Model which uses flight plans as a basis. It should be noted that distance factors pre-determined using this model will nonetheless not represent real time flight data.[27]

As regards the development of distance factors and implementing required changes to reporting systems, it is estimated that this would take 0.75-1.5 years to implement.

- Conclusions

The final choice of approach for the hybrid option will depend on the preferred trade-off between efficiency and accuracy: MRV Option 1 – on-board measurement – would provide the greatest level of accuracy at potentially significant costs to the aviation industry, complex implementation and risk of legal challenge. MRV Option 2 – approximated fuel consumption – is likely to be less accurate but has efficiency gains as implementation of such an approach is relatively straight forward, does not increase the annual MRV costs once it is implemented, and maintains the incentive for efficient flight operations. Furthermore, it will be important to develop a coherent system for intra and extra-EEA flights as most major aircraft operator,

[27] It should be noted that even if a flight plan provides a more accurate measurement of the absolute distance flown than the GCD this will not automatically mean that a distance factor based on a flight plan is more accurate than a distance factor based on GCD. Take for example, a flight for which, according to the flight plan, the total route flown is 30 % longer than the GCD. This does not mean that the distance factors based on flight plan and GCD will automatically differ by 30 %. They will only be different if the relative shares of distances travelled within and outside the EEA differ based on GCD or the flight plan.

operate at both levels. Only MRV Option 2 can apply consistently to intra-EEA and extra-EEA flights.

1.2.15. Alternative options (except upstream option)

The departing-flights option would use exactly the same approach to MRV as the existing EU ETS. Monitoring plans and templates would not need to be resubmitted nor reviewed to accommodate such a change. The primary difference is that the current MRV approach would be applied to fewer flights (i.e. all intra-EEA flights and departing extra-EEA flights) upon the application of such an approach. As a result this option may generate some savings compared to the full scope EU ETS: for operators as fewer flights would need to be monitored, reported and subject to verification; for Member States as they would may have fewer annual emissions report to review and approve. However these cost impacts are likely to be minor.

The 50/50 option would also follow the same approach as the existing EU ETS, applied to the same number of flights (i.e. incoming and departing). The annual emissions figure would be established by monitoring emissions on the entire route, as is currently the case, and then subsequently applying a factor of 50% to the total emissions figure. Hence, the 50/50 approach would result in the same costs as full scope EU ETS.

Under the "stop-the-clock" option, the current approach to MRV would similarly be maintained, but applied to fewer flights (i.e. intra-EEA flights only).

All three of the above options are technically feasible with similar costs and effectiveness in relation to the current system. These could be implemented without delay.

1.2.16. Upstream option

This option would place the responsibility with the suppliers of aviation-related fuels (i.e. refineries) instead of the aviation operators. MRV would rely on invoices and metering data in the same manner as MRV is conducted for fixed installations under the full EU ETS. It is estimated that only around 100 to 200 installations would be covered by this option, reducing the number of compliance entities significantly compared to the other policy options and offering opportunities for cost savings. However, this option raises a number of issues with regards to MRV in terms of the complexity involved in tracking fuel trade.

In terms of cost, the option will require the identification of fuel suppliers and amendments to the MRV process in order to reflect the change in compliance entities. More importantly however, it will result in large sunk costs: while the other policy options build on the existing MRV system, the upstream approach will need to start from the beginning. As a new MRV process would have to be set up, the estimated timeframes for this option are considerably longer than for the other options. The longer timescales stem from the need to revise legal requirements, including the need to change Directive 2003/87/EC, and to set-up a dedicated system to track fuel trade and certify verifiers.

In particular, if ICAO successfully implements a global MBM by 2020, it would mean that an EU ETS based on fuel suppliers would only be in place for 8 years and then would again switch back to aircraft operators.

1.2.17. Comparison of options

Table Error! No text of specified style in document.**-12** briefly summarises how the MRV approaches fare in terms of accuracy, costs and timescale.

Table Error! No text of specified style in document.**-12 Accuracy and costs of MRV options compared to full-scope EU ETS**

MRV Option	Accuracy	Costs	Time required for implementation
Hybrid option			
On-board measurement	=	++ Additional investment costs and increased annual MRV costs for operators and national administrations	2-2.5 years
Approximated fuel consumption	- (lower accuracy for country- than city-pairs)	+ One-time costs for adaptation of distance factors (lower for country-pairs) but no significant increase of annual MRV costs	0.75-1.5 years
Alternative options (departing flights, 50/50, and "stop-the-clock" options)	=	=	No time required: already in place
Upstream option	=	++ Significant costs for complete MRV change	3-3.25 years

While on-board measurement and a switch to the upstream option would require costly and time-consuming changes to the MRV system, the other options can be implemented at low costs.

1.2.18. Impact on MRV costs from simplifications for small emitters

The MRV costs under all options could be reduced through simplifications for small emitters without compromising the environmental effectiveness of the EU ETS.

An in-depth study on small emitters is being carried out by PWC which provides further analysis on the cost placed on small emitters by the EU ETS for aviation and estimates the savings to non-commercial aircraft operators from various options. It also raises other issues relevant to small emitters including streamlining of the simplified MRV and registry requirements (see also the minutes of the stakeholder meeting on small emitters in Annex II for more details).

- <u>De minimis threshold for non-commercial aircraft operators</u>

Introducing a de-minimis threshold for non-commercial aircraft operators to remove any compliance obligation would reduce the costs significantly: PwC in its study estimates e.g. a 33% cost-saving potential by including a threshold of 100t-threshold (compared to the current costs for covered aircraft operators emitting less than 25,000t). This threshold would exempt 1002 small aircraft operators.

Table Error! No text of specified style in document.**-13 Cost savings based on different threshold levels for exemption of small emitters**

tCO_2	**< 10**	**< 100**	**< 500**	**< 1,000**	**< 10,000**	**< 25,000**
Exempted non-commercial operators	191	1,002	1,882	2,201	2,513	2,530
Estimated cost saving potential	1%	33%	72%	84%	99%	100%

- Streamlining processes

The German Emissions Trading Authority (DEHSt) estimated that administrative simplifications (e.g. removing the requirement for independent verification for those small emitters who are using the Eurocontrol ETS Support Facility combined with either credit card payment or CRCO-billing) would reduce costs by at least €1.800 per small emitter.

5.5. Legal impact

This section reviews the key issues under international law and considers the relevance of claims by airlines about the EU law principle of equal treatment.

1.2.19. International law considerations

The analysis on international law is based on a review of customary international law, the Chicago Convention (and ICAO resolutions), Air Service Agreements ("ASAs" - including the EU-US Open skies agreement and other ASAs[28]), World Trade Organisation (WTO) law and the UNFCCC and Kyoto Protocol (and related COP decisions).

The conclusions on international law are under the following four headings:

– Geographic scope of a MBM – as derived from customary international law, the Chicago Convention and ASAs

– Restrictions on taxes and charges – from the Chicago Convention, ASAs and WTO

– Non-discrimination of regulated entities – from the Chicago Convention, ASAs and WTO

– Environmental regulation of international aviation – from UNFCCC text and decisions and ICAO resolutions/discussions (as incorporated by ASAs).

After an assessment of the judgement in Case 366/10, the following sections summarise conclusions by considering the core principles relating to each heading, the conclusion reached by the ECJ in relation to the full-scope EU ETS and the application of international law to the other policy options. Supporting legal analysis is provided in Annex IX.

It is also important to note that there has been political pressure on the EU which is more fundamental than the detailed arguments discussed below. The 'coalition of the unwilling' (see section 2.2.2) claimed that the EU Member States could not regulate flights on a non-discriminatory basis within the territory of the EU, basing this claim on a variety of

[28] Germany-China, Germany-Russia, UK-India, France-China

justifications including 2007 ICAO Resolution A36-22, on which the EU placed a reservation[29] despite it being non-binding, recalling that there is no provision in the Chicago Convention which may be construed as imposing upon the Contracting Parties the obligation to obtain the consent of other Contracting Parties before applying market-based measures to operators registered in other States in respect of air services to, from or within their territory. On the contrary, the Chicago Convention recognises expressly the right of each Contracting Party to apply on a non-discriminatory basis its own air laws and regulations to the aircraft of all States. Some have gone so far as to claim that Member States may not regulate flights within a Member States on a non-discriminatory basis, notwithstanding that ICAO's mandate under the Chicago Convention does not extend to domestic aviation[30]. This political pressure has come from a variety of State and non-State actors and goes well beyond legal issues.

1.2.20. ECJ Judgment in Case C-366/10 - overview

The starting point for any consideration is the ECJ judgment in Case C-366/10 *Air Transport Association of America and Others*. The ECJ found that the amendments in Directive 2008/101/EC were valid, rejecting all of the arguments brought by airlines including their claims on sovereignty, imposition of prohibited taxes and charges, non-discrimination and environmental regulation.

- Geographic scope of a MBM

Principles

It is clear that the competence of states to regulate aviation activities is not unlimited. In particular, customary international law stipulates three relevant principles as follows: (1) Each State has complete and exclusive sovereignty over its airspace; (2) No State may subject the high seas to its sovereignty; and (3) There is freedom to fly over the high seas. These principles have been codified in Article 1 of the Chicago Convention which states that every state has complete and exclusive sovereignty over the airspace above its territory, and Articles 87(1) and 89 of the UN Convention on the Law of the Sea (UNCLOS).

Findings of ECJ in C-366/10

The ECJ considered and rejected airline claims relating to sovereignty in the context of customary international law and the EU-US Open Skies Agreement. The ECJ found the EU ETS not to infringe the principles of customary international law of sovereignty and freedom to fly over the high seas, nor the equivalent provisions in the EU-US Open Skies Agreement. The Directive extended the EU ETS to "all flights which arrive or depart from an aerodrome situated in the territory of a Member State". The applicability of the Directive was founded on the fact that the operators of aircraft chose to operate a route arriving at or departing from an aerodrome situated in the territory of a Member State, and that the EU was free to apply environmental regulations as decided by the European Parliament and Council to such activities. The ECJ found that the fact that pollution may originate in part outside EU Member States does not affect the validity of the approach.

Application to Options

The reasoning of the ECJ with regard to the geographic scope of the EU ETS can be applied to all policy options as flights arrive and/or depart from EEA aerodromes. Therefore where an aircraft operator chooses to operate a flight to and/or from EEA aerodromes, it is subject to the EU ETS. If an upstream approach were taken it would not either raise jurisdictional

[29] See http://legacy.icao.int/icao/en/assembl/a36/docs/A36_MIN_P_9_en.pdf
[30] See http://www.icao.int/environmental-protection/Documents/STATEMENTS/cop4.pdf

issues as it would apply to fuel sold within the European countries to flights departing from European aerodromes.

With regards to the legal issue of applying different limitations on emission coverage for flights to and from the EEA under the hybrid options, the territorial-sea border of 12 nm and the exclusive-economic-zone border of 200 nm are possible coverage limits (see last section of Annex IX for detailed descriptions). It is clear that calculating the portion of flights with reference to the territorial sea of up to 12 nautical miles[31] would provide additional arguments to counter critics of the EU ETS that emphasise that, under the Chicago Convention, states enjoy complete and exclusive sovereignty within the limits of this airspace, in addition to the EU ETS continuing to only regulate flights arriving or departing from a Member State.

Applying a limitation on emission coverage for flights by reference to exclusive economic zones (200nm) could be justified by reference to the spirit of provisions of UNCLOS. According to UNCLOS, coastal states have some sovereign rights and jurisdiction in the exclusive economic zone: sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living and jurisdiction as provided for in the Convention with regard to the protection and preservation of the marine environment. In regards pollution from vessels[32], UNCLOS authorises the coastal states to adopt laws and regulations for the prevention, reduction and control of pollution from vessels giving effect to generally accepted international rules and standards. However, this justification would be by reference to the spirit only, as UNCLOS does not formally extend this principle to aircraft and Article 212 on pollution from or through the atmosphere is limited to airspace of 12 nm and to aircraft of a state's own registry.

Another justification for taking into account distances in the territorial sea or in exclusive economic zones of Member States is that these areas are, by definition, not areas which are the territory of a third country, nor the exclusive economic zone of a third country. This thereby responding to those criticisms made of the EU ETS regarding third countries having complete and exclusive sovereignty over their own airspace. The geographic scope principle from ICAO Assembly Resolution A37/19 is also respected, as there would not be duplication of coverage between the EU ETS and third country measures, and there would be a greater environmental outcome as highlighted in the submission by EU Member States to the HGCC. Other limits to responsibility for flights could also be determined, as long as they are objectively justified and within the margin of discretion of the EU legislator.

- Taxes and charges[33]

Principles

Various provisions of the Chicago Convention and ASAs impose restrictions on taxes and charges by States. In particular:

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[31] The conventional value of 1NM=1852m was adopted under the name "international nautical mile" in 1929 by the First International Extraordinary Hydrographic Conference, held under the Convention on the International Hydrographic Organization. The value is also recognised by the ICAO in the Annex 5 to the Chicago Convention.

[32] The Convention does not define "vessels", but the term is used in shipping context. Where the provisions apply to aircraft, separately aircraft is named.

[33] See http://ec.europa.eu/clima/consultations/0022/co2_coverage_en.pdf.

- Article 15 of the Chicago Convention relates to charges imposed for the use of airports and air navigation facilities, requiring non-discriminatory treatment in regards to the charges between the national aircraft and aircraft of any other contracting state. Similar provision on the user charges can be found from the ASAs (Article 12 of the Open Skies Agreement).
- Article 24 of the Chicago Convention exempts aircraft and fuel which is already on board an aircraft on arrival from customs duties and similar national or local duties and charges. It does not exempt fuel supply from taxation, but the Open Skies Agreement (Article 11(1)) and many other ASAs go further than this by including provisions exempting fuel from taxes and charges that is introduced into or supplied in the territory of a party (Article 11(2) of the Open Skies Agreement).

Findings of ECJ in C-366/10

In relation to the claim that prohibited taxes and charges were being applied, the ECJ found in Case 366/10 that ETS is a MBM, not a duty, tax, fee or charge on fuel load. In reaching this conclusion in relation to taxation on fuel, a key argument which the Court considered was that there was "no direct and inseverable link" between the fuel held or consumed and the burden on the operator, for reasons including costs relating to the initial allocation of allowances, allowance prices being set by the market as well the potential use of biofuels (noting that an operator might even make a profit by selling its original allocation). Unlike a duty, tax, fee or charge on fuel consumption, ETS does not in any way enable the establishment, applying a basis of assessment and a rate defined in advance, of an amount that must be payable per tonne of fuel consumed for flights. Similarly, for the reasons above the ECJ neither found that the scheme can be regarded as an airport charge, and the EU ETS does not infringe the relevant provisions of the Open Skies Agreement.

Application to Options

The ECJ's reasoning in Case 366/10 can be fully followed in the case of all policy options (except for the upstream option). These options are therefore in conformity with the provisions of the Chicago Convention and the ASAs on taxes and charges.

However, changing to an upstream system would risk a renewed claim that the EU ETS is a tax on fuel. As free allowances would not any more given out under this option, the link between the fuel used and the EU ETS costs to an operator would be more direct. Whilst the upstream option would still be different in other aspects from a fixed levy, the legal risk exists that the ECJ might be asked to look at this again.

- Non-discrimination

Principles

Article 11 of the Chicago Convention prohibits discrimination of airlines on grounds of nationality. Similar non-discrimination clause on grounds of nationality is stipulated in Article 2 of the Open Skies Agreement and the other ASAs. Article 2 of the Open Skies Agreement requires parties to allow "fair and equal opportunity for the airlines of both Parties to compete"; more traditional ASAs stipulate that the designated airlines of both contracting parties shall have "fair and equal opportunities in operating the agreed services".

Findings of ECJ in C-366/10

In Case 366/10 the ECJ found that the amendments in Directive 2008/101/EC were not invalid in the light of Article 15(3) of the Open Skies Agreement, read in conjunction with

Articles 2 and 3(4) thereof, inasmuch as it provided in particular for application of the ETS in a non-discriminatory manner to aircraft operators established in the EU and in third states.

Application to Options

All alternative options for the EU ETS provide a uniform application to all airlines regardless of the countries in which they are registered, therefore according an equal treatment to all airlines in accordance with the Chicago Convention and the ASAs.

The upstream option does not set limits on operation of an aircraft or its admittance or departure from the territory of a state, and does not conflict Article 11 of the Chicago Convention on equal treatment, and the measure accords airlines with equal opportunities as the basis of assessment of an amount payable by the fuel supplier per tonne of fuel consumed.

- Environmental regulation

Principles

According to Article 15(3) of the Open Skies Agreement, when environmental measures are established, the aviation environmental standards adopted by the ICAO in Annexes to the Chicago Convention shall be followed except where differences have been filed. Standards and Recommended Practices (SARPS) are adopted by the ICAO Council and its subsidiary bodies and incorporated as Annexes to the Chicago Convention. Annex 16 to the Convention, titled "Environmental Protection" contains two volumes: Volume I on aircraft noise and Volume II on aircraft engine emissions. Volume II however contains standards relating to vented fuel and emissions certification applicable to the classes of aircraft engines, but does not regulate reduction of carbon dioxide. These standards have legal force, unlike Resolutions from ICAO Assemblies which are not legally binding.

The parties to the UNFCCC have adopted the Kyoto Protocol, Article 2(2) of which calls on Parties included in Annex I to pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation working through the ICAO.

In the run-up to the 38th ICAO Assembly, the HGCC has assessed different options on which the geographical scope for a MBM Framework could be based. Building on the work of the HGCC, the ICAO Council Secretariat is currently preparing a draft Assembly resolution.

Findings of ECJ in C 366/10

In terms of compatibility with environmental regulation of aviation, the ECJ concluded that there was no evidence of the ETS infringing an environmental standard adopted by ICAO; and furthermore in as much as ICAO Resolution A37-19 laid down guiding principles for the design and implementation of MBMs, it did not indicate that the ETS was contrary to aviation environmental standards.

In terms of international climate law, the ECJ did not consider Article 2(2) of the Kyoto Protocol (which the applicants claimed gave exclusive jurisdiction to ICAO to regulate emissions from international aviation) was unconditional and sufficiently precise as to allow the applicants to bring a legal challenge on those grounds.

Application to Options

Annex 16 to the Chicago Convention does not regulate the reduction of carbon dioxide; the policy options are therefore not incompatible with the Annex 16 and also with first sentence of Article 15(3) of the Open Skies Agreement.

At the current state of the discussions, where only the hybrid option is likely to be included as an option for the MBM Framework in the 2013 ICAO Assembly resolution. On that basis, it seems that the hybrid option could be the most compatible, recognising that resolutions are in any case not legally binding[34].

The content of Assembly resolutions is binding on a state if and when implemented as national law. Even if not implemented in national law, resolutions however form an important element of regional and national aviation policy as states tend to work within ICAO guidance. It will therefore be politically important to consider the Assembly resolutions on MBMs when designing any amendments to propose to the EU ETS.

1.2.21. Potential claims of unequal treatment under EU law

Following any scaling down of the EU ETS, European airlines that mostly fly within Europe may complain of unequal treatment, as some airlines have done following the "stop-the-clock" decision. Such a complaint could be raised under all options because emissions from intra-EEA flights remain fully covered while the coverage for extra-EEA flights will be less than 100%.

In EU law, according to the settled case-law, the principle of non-discrimination requires that comparable situations must not be treated differently and that different situations must not be treated in the same way, unless such treatment is objectively justified[35]. A breach of the principle as a result of different treatment presumes that the situations concerned are comparable, having regard to all the elements which characterise them[36]. The comparability of the situations must be determined and assessed in the light of the subject-matter and purpose of the EU act which makes the distinction in question. The principles and objectives of the field to which the act relates must also be taken into account[37].

The ultimate objective of Directive 2003/87/EC is the protection of the environment and human health, including by means of reduction of greenhouse gas emissions produced by aviation sector[38]. In the light of the objective, it is suggested that all flights to and from the EU are in comparable positions[39]. Therefore, according intra-EEA flights and extra-EEA flights differential treatment might be claimed to be discriminatory treatment contrary to EU law.

Firstly, it must be recalled that no direct competition exists between operators of intra- and extra-EEA flights because the relevant market consists of direct flights on a city-pair route and possibly one-stop services to the same city (which is either located within or outside the EEA). A change in the coverage of extra-EEA flights will therefore not affect the competitive conditions for intra-EEA flights. It could therefore be argued that operators of intra- and extra-EEA flights are in situations that are not comparable. However, it must also be recognised that the ECJ, when agreeing that it was legal for the ETS to cover steel plants while not covering chemical plants, found that different sectors – e.g. steel and chemical

[34] See statements at http://legacy.icao.int/icao/en/assembl/A37/Docs/10_reservations_en.pdf, pg.11.

[35] See Case 106/83 Sermide [1984] ECR 4209, paragraph 28; Joined Cases C-133/93, C-300/93 and C-362/93 Crispoltoni and Others [1994] ECR I-4863, paragraphs 50 and 51; Case C-313/04 Franz Egenberger [2006] ECR I-6331, paragraph 33.

[36] See Case C-127/07 Arcelor Atlantique and Lorraine and Others [2008] ECR I-9895, paragraph 25

[37] Ibid, paragraph 26

[38] Recitals 3 and 14 of the Directive 2008/101

[39] AG Kokott opinion in Case C-366/10, paragraphs 196-198

sectors – are in a comparable situation with regard to the EU ETS even though they are not in direct competition with each other[40].

Secondly, it has to be recalled that the principle of equal treatment will not be infringed if the different treatment is justified[41]. A difference in treatment is justified if it is based on an objective and reasonable criterion, that is, if the difference relates to a legally permitted aim pursued by the legislation in question, and it is proportionate to the aim pursued by the treatment[42]. Since a Union legislative act is concerned, it is for the EU legislature to demonstrate the existence of objective criteria put forward as justification[43].

It must also be borne in mind that the legislature has wide discretionary powers as to how it shapes the Union's environment policy[44]. According to Article 191(1) TFEU, the Union policy on the environment shall – besides the preserving, protecting and improving the quality of the environment, protecting human health, prudent and rational utilisation of natural resources – also promote measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change. In Decision No 377/2013/EC, in recital 1 the strong international character of the aviation sector EU is acknowledged; and it is emphasised that a global approach to addressing the rapidly growing emissions from international aviation would be the preferred and it would also be the most effective way of reducing aviation emissions.

Different coverage of emissions from extra- and intra-EEA flights can be justified by the EU efforts to promote international measures to combat climate change – as it has been done with the Decision No 377/2013/EC. An ICAO Assembly Resolution encouraging certain application of regional or national MBMs would be another objective reason that could justify differential treatment.

6. COMPARISON OF OPTIONS

The strengths and weaknesses of the options are compared to the full-scope EU ETS in terms of effectiveness, efficiency and consistency:

Table Error! No text of specified style in document.**-14 Criteria for comparison of options**

General criteria	Specific criteria for this Impact assessment
Effectiveness	Coverage of emissions
Efficiency	Competitiveness
	Level-playing field for competition
	Effort and accuracy of Monitoring, Reporting, and Verification (MRV)
Consistency	Consistency with international aviation law

6.1. Effectiveness

6.2. Environmental impact

The hybrid and alternative options cover fewer emissions than the full-scope EU ETS:

[40] Ibid
[41] See Case 106/81 Kind v EEC [1982] ECR 2885, paragraph 22
[42] Ibid, paragraph 47; Case C-292/97 Karlsson and Others [2000] ECR I-2737, paragraph 45
[43] Case C-127/07 Arcelor Atlantique and Lorraine and Others [2008] ECR I-9895, paragraph 48
[44] Case C-341/95 Bettati [1998] ECR I-4355, paragraph 41

– The hybrid option covers emissions between 39% and 47% of emissions compared to the full-scope EU ETS depending on whether the territorial-sea boundary of 12nm or the exclusive-economic-zone boundary of 200nm is used.

– The departing-flights option covers 62% of the emissions compared to the full-scope EU ETS. The 50/50 option as well as the upstream option, by focusing on fuel sold at EEA airports, would have the same coverage.

– Under the "stop-the-clock" option, environmental effectiveness is lowest: only 25% of the emissions will be covered because extra-EEA flights are generally excluded.

6.3. Efficiency

The efficiency criteria relates to the costs of a policy measure compared to the benefits it generates.

1.2.22. Competitiveness

The hybrid and alternative options improve the overall competitiveness of the aviation sector compared to the full-scope EU ETS. The passenger prices and freight rates would decrease on extra-EEA flights due to the reduced coverage. Passenger and cargo demand are estimated to increase between 0.25% and 0.51% in the period up to 2020 (depending on the respective reduction of coverage for extra-EEA flights under the different options).

However, the costs of the EU ETS – whether in full or reduced scope – only have a minor impact on the competitiveness of the aviation sector. Other cost drivers (e.g. fuel prices) and macro-economic drivers (GDP and income growth) have a much more significant impact.

1.2.23. Level-playing field for competition

All policy options maintain a level-playing field on the relevant city-pair markets because all operators are treated the same, regardless of nationality or any other characteristics.

The departing-flights, 50/50, and upstream options could potentially – as the full-scope EU ETS – offer an advantage to airlines which stop over at non-EEA hubs because only the flights to the non-EEA hub are subjected to the EU ETS while the non-stop flights are charged for the whole flight to the final destination. However, at current carbon prices, the likelihood of such distortions is negligible.

The hybrid options avoid these potential distortion risks between non-stop flights and one-stop flights using non-EEA hubs because the emissions coverage only depends on the distance flown in the EEA and not on the location of the final destination. The "stop-the-clock" option also reduces these potential distortion risks because extra-EEA flights are generally exempted.

1.2.24. Efforts and accuracy of MRV

The hybrid option can be implemented based on the current MRV system. In order to achieve the highest accuracy, on-board measurement of fuel consumption would be necessary. However, this could place significant costs on operators who need to purchase on-board equipment. For a consistent and more affordable approach across all operators, an approximated calculation based on actual fuel consumption for the whole flight (as currently reported) will be more appropriate. So-called "distance factors" (i.e. percentage of the total flight distance of extra-EEA flights covered under EU ETS) can be determined on the level of city- or country-pairs depending on the level of accuracy and simplicity desired. It should be possible to implement the necessary changes within a year. While the introduction of these changes will involve some adjustment costs (e.g. update of the reporting template with

country-pair percentages), the annual MRV costs should not be higher than under the current system.

The departing flights, 50/50, and "stop-the-clock" options do not require any changes to the current MRV system because they are based on the same approach as the full-scope EU ETS.

A move to the upstream option would involve significant changes because fuel suppliers would become responsible entities instead of aircraft operators and the monitoring processes would have to be adapted. Significant delays in its implementation would have to be expected.

6.4. Consistency

The ECJ dismissed the claim that the EU ETS would violate the sovereignty of other states and confirmed the competence of the EU to apply the ETS to the total emissions of flights that arrive and depart at aerodromes situated in in the territory of a Member State. As all options continue to apply to arriving and departing flights only and do not include over-flights, all options are in conformity with the principles of customary international law, the Chicago Convention and Air Service Agreements.

The departing-flights and 50/50 options do not differ significantly from the current EU ETS because both options continue to cover emissions from those parts of a flight that take place over the territory of non-EEA countries. These options will therefore not give any new arguments against those who claim the ETS violates the sovereignty of their state.

On the contrary, the hybrid options would provide additional arguments to counter critics of the EU ETS:

– A limitation of coverage by reference to Exclusive Economic Zone boundaries (200nm) would be given justification by the fact that no other State has territorial claims or claims to an EEZ in that area, as well as by reference to the provisions of the UN Convention on the Law of the Sea (UNCLOS) that coastal states have some sovereign rights and jurisdiction in the EEZ.

– A limitation of coverage to the territorial seas border of 12nm would rebut claims made against the EU ETS even more fully, as not only would the distance not correspond to any third countries' territory, but it would only relate to the territorial sea of Member States and, if so decided, areas associated with them such as dependencies and territories.

Furthermore, as the hybrid option is based on the draft MBM Framework, as proposed by the ICAO Council of 4 September 2013 (see section 2.4.2) but finally not adopted by the ICAO Assembly, it seems that the hybrid option could achieve a high acceptability with third countries.

The "stop-the-clock" option has already proven in practice to be accepted by large majority of international partners, which has been a significant step forward compared to the claims previously made against the EU ETS by the "coalition of the unwilling".

The key issue with regards to the upstream option is whether it would be judged to constitute a fuel tax or charge under the Chicago Convention and the Air Service Agreements. As free allowances would not any more given out under this option, the link between the fuel used and the EU ETS costs to an operator would be more direct. Whilst the upstream option would still be different in other aspects from a fixed levy, the legal risk exists that ECJ might be asked to look at this again.

6.5. Conclusions

Depending on the outcome of the ICAO Assembly, the EU will have to consider whether to amend the EU ETS with a view to adapt to a possible MBM Framework and to further facilitate the development and implementation in 2020 of a global MBM. In the choice between the different options, the EU will have to balance the changes in the effectiveness of the EU ETS (i.e. emission coverage), the costs of possible changes in the MRV system, and the consistency of options with international law and the (non-binding) ICAO Assembly resolutions. The economic impacts do not differ so substantially between the options as to change the cost-benefit balance.

- The hybrid options lead to a significantly lower coverage of 39 to 47 % compared to the full-scope EU ETS and would entail some costs for changes in the MRV system. On the benefit side, more limited emission coverage can provide additional arguments to defend the EU ETS against claims about sovereignty violations. It also reduces any potential distortions regarding one-stop flights operating alongside direct flights.
- The departing-flights or 50/50 options offer coverage of 62 % of emissions compared to the full-scope EU ETS and do not involve any substantial changes to the MRV cost. However, these options will not be supported by a majority of the ICAO Assembly. Therefore, compared to full scope, they will not bring new legal arguments in addition to the ECJ judgment to defend the EU ETS.
- The "stop-the-clock" option shows the lowest coverage of only 25 %. It has been accepted in 2012 by most international partners, as a step forward from any of those countries compared to their earlier positions. However, complete exemption of extra-EEA flights is not a viable long-term solution in view of the EU's environmental objectives and the need for aviation to contribute in the same way as other sectors of the economy.
- The upstream option achieves the same emission coverage as the departing-flights option but has a negative impact on competitiveness compared to other options because of the cancellation of free allowances for airlines. Furthermore it would involve a complete change of MRV with significant delays for its implementation. It is also the only option that is not consistent with a global MBM to be implemented from 2020 onwards because it is based on fuel suppliers and not aircraft operators. Finally, it would risk new legal challenges because the ECJ may hear arguments that it is a charge or a tax in the meaning of the Chicago Convention.

	Full-scope EU ETS	Hybrid option	Departing-flights option; 50/50 option	"Stop-the-clock" option	Upstream option	Comments
Environmental effectiveness	**100%**	**39 to 47 %**	**62%**	**25%**	**62%**	Reduced coverage of emissions relative to full-scope EU ETS (i.e. all departing and arriving flights at EEA aerodromes)
Competitiveness	Minor impact on costs and demand	+	+	+	-	Competitiveness increases in proportion to reduced coverage; cost increase under upstream option because free allowances are cancelled
Level-playing field for competition	No distortions at current carbon prices	++	=	+	=	Hybrid option eliminates distortion risks and maintain level-playing field also at very high carbon prices
Effort and accuracy of MRV	Based on fuel consumption	-	=	=	--	Hybrid option can be implemented based on current MRV system (at low additional costs); upstream option would imply complete change of MRV
Coherence with international aviation law	Legality confirmed by ECJ	=	=	=	-	All options are in line with the ECJ judgement because they apply to flights arriving and departing at EEA airports. The upstream option may risk new legal challenges.
International political acceptability	Strong international oppostion	++	=	++	=	The hybrid and "stop-the-clock" options are expected to achieve highest international acceptability because of limited emission coverage within regional airspace

\+ positive impact compared to full-scope EU ETS
\- negative impact compared to full-scope EU ETS
= unchanged compared to full-scope EU ETS

7. MONITORING AND EVALUATION

Core progress indicators and monitoring arrangements are identified with regard to the specific objectives:

Facilitation of the development and implementation by 2020 of a global MBM

It will be important to closely follow the ICAO negotiations on the global MBM that should start after the 2013 ICAO Assembly and deliver a global MBM to be agreed by the next ICAO Assembly in 2016 and implemented by 2020. Depending on the outcome of the 2016 ICAO Assembly, further adjustments to the EU ETS may become necessary to ensure a transition to a global MBM in 2020. It is therefore suggested that, following the 2016 ICAO Assembly, the Commission shall report to the Parliament and the Council on the actions to implement the global MBM to apply from 2020, together with proposals as appropriate.

Emission reductions under the EU ETS pending the implementation of a global MBM

The general concept of ETS inherently incorporates high level of transparency and stringent monitoring mechanisms: The level of compliance is annually monitored and the data on the reported emissions and surrendered allowances is published. Furthermore, based on Article 30 of Directive 2003/87/EC, the Commission is requested to prepare regular reports on the functioning of the EU ETS.

The emission reductions under the EU ETS will therefore be monitored annually.

ANNEX

ANNEX I – GLOSSARY

ASA	Air Service Agreement
CBDRRC	Common But Differentiated Responsibilities and Respective Capabilities
ECJ	European Court of Justice
EEA	European Economic Area; comprises of: EU Member States, Iceland, Liechtenstein and Norway.
ETS	Emissions Trading System
Extra-EEA flights	Flights that depart and arrive at EEA aerodromes
FIR	Flight Information Region
GCD	Great Circle Distance
GDP	Gross Domestic Product
Global MBM	Single MBM to cover all international aviation emission (to be decided by ICAO Assembly)
HGCC	High-level Group on Climate Change at ICAO
IATA	International Air Transport Association
ICAO	International Civil Aviation Authority
Intra-EEA flights	Flights, which depart from EEA aerodromes to destinations in third countries, and flights that arrive at an EEA aerodrome from third countries
LCA	Low Cost Airline
MBM	Market-Based Measure
MBM Framework	Framework for regional and national MBMs (to be decided by ICAO Assembly)
MRV	Monitoring, Reporting and Verification
MS	Member State
Small emitter	Aircraft operators operating fewer than 243 flights per period for three consecutive four-month periods and aircraft operators operating flights with total annual emissions lower than 25 000 tonnes CO2 per year.

UNFCCC	United Nations Framework Convention on Climate Change
UNCLOS	United Nations Convention on the Law of the Sea

ANNEX II – CONSULTATION OF STAKEHOLDERS IN THE AVIATION SECTOR

Stakeholder meeting with aviation experts on 1 July 2013: European Environment Expert Group[45] – Preparations for the ICAO Assembly

Please note that views were sought from stakeholders (not from the European Civil Aviation Conference (ECAC)) on the various options being studied for the purposes of the Impact Assessment prior to the ICAO Assembly.

Participants

Industry associations and environmental NGOs

Airport Council International (ACI Europe)	Chrystelle Damar
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	Olivier Husse
ASD/Rolls Royce	Charlotte Andsanger
ASD/SNECMA/SAFRAN	Francis Couillard
European Business Aviation Association (EBAA)	Guy Visele, Gabriel Destremaut
European Express Association (EEA)	Dave Tompkins
European Low Fares Airlines Association (ELFAA)	John Hanlon
European Regions Airlines (ERA)	Leonardo Massetti
International Air Carrier Association (IACA)	Koen Vermeir
International Emission Trading Association (IETA)	Jeff Swartz
Transport and Environment (T&E)	Bill Hemmings

Organisations

EASA	Ivan de Lepinay, Willem Franken
EUROCONTROL	Rachel Burbidge

[45] The European Environment Expert Group has been established by the European Civil Aviation Conference (ECAC) for the European preparations for the ICAO Assembly.

Commission

Timothy Fenoulhet, Philip Good, Christian Holzleitner, Sylvie Grand-Perret, Koen de Vos

Points discussed

Update by Commission on ICAO process and European priorities

The Commission reported on the latest developments in ICAO and asked stakeholders for their views on the following key issues:

- Commitment by ICAO Assembly to development of a global MBM scheme (e.g. roadmap for development until next 2016 Assembly and implementation by 2020),
- Framework for regional and national MBMs pending the implementation of a global MBM, and
- Recognition of special circumstances and respective capabilities (SCRC) of states in the design of MBMs.

The Commission also referred to the on-going public consultation on the ICAO negotiations and simplifications for small emitters.

Views from stakeholders

Need for market-based measures

The stakeholders expressed unanimous support for market-based measures (MBMs) and recognized that non-market based measures would not be sufficient to reach the goals for emission reductions:

- AEA announced that Air Transport Action Group (ATAG) would submit a paper to the ICAO Assembly in line with the industry proposal, which had been endorsed at this year's IATA Assembly, for a global MBM. The outlook for the ICAO Assembly would be more positive than some months ago because of the industry initiative through IATA.
- IACA also endorsed the IATA proposal but was critical about the grandfathering of emission rights.
- ELFAA did not support the IATA proposal because it would be environmentally less effective than the EU ETS. ELFAA agreed with the Commission's choice of a cap and trade mechanism for EU ETS as a more appropriate and environmentally-effective MBM. ELFAA expressed also criticism with regard to IATA's propoosed grandfathering of emission rights. The IATA proposal would not provide an appropriate reward for investments into emission reductions up to 2020.

With regard to non-market based measures, ASD, AEA, and LH strongly called for a commitment by the Commission and the Member States to emission savings from the Single European Sky.

Non-discriminatory application of SCRC for global MBM

IACA and ELFAA would be rather sceptical about taking account of SCRC if this meant that the revenues from a global MBM were redistributed to less developed countries.

LH and EEA would be more open to taking account of SCRC and expressed readiness to accept temporary exemptions on routes to less developed countries if such concessions were necessary to gain political support for the global MBM. The Commission confirmed that only few emissions were generated on such routes and exemptions would therefore not compromise the environmental effectiveness of a global MBM.

T&E proposed that auction revenues from the EU ETS (in particular from flights to and from third countries) should be used to support environmental action in developing countries.

Possible adjustment of EU-ETS following ICAO Assembly

Stakeholders expressed a large interest on possible Commission proposals amending the EU Emission Trading System (ETS) following the 2013 ICAO Assembly. In particular, stakeholders were interested to know how the Commission would react in case that the ICAO Assembly would decide on a MBM Framework or alternatively would not agree on a MBM Framework.

T&E proposed that the EU ETS should cover 50 % of emissions from incoming and outgoing flights to third countries. Such a 50/50 system would provide a higher environmental effectiveness than approaches covering emissions within a European regional airspace.

ELFAA criticised the current stop-the-clock system as disadvantaging European low-cost carriers compared to major network carriers who would have benefited from the temporary exemption of flights to and from third countries. To avoid such a situation, the EU ETS should go preferably back to its full scope (i.e. coverage of all incoming and outgoing flights) or be completely abandoned (as a fall back option pending the implementation of a global MBM).

The Commission emphasized that, as stated in the stop-the-clock decision, it would evaluate the ICAO outcome – on global MBM, Framework for MBMs, non-MBMs – as a package and propose appropriate further actions if necessary.

Transparency for ICAO process

T&E strongly called for reforms that would lead to more transparency in ICAO which would currently be failing to address environmental issues.

Administrative simplicity

EBAA insisted that any reforms of the EU ETS would need to reduce the administrative burden for business aviation.

Stakeholder meeting on MRV simplifications for small emitters on 30 July 2013

Participants

Name	Member State
BEISTEINER, Dieter	Austria
MERTZ Fanny	Belgium
HILCER Ales	Czech Republik
JENSEN Kiersten	Denmark
Laukia Joonas	Finland
GRANDJEAN Quentin	France
LESOURD Jerôme	France
Hölzer-Schopohl Olaf	Germany
NAUMANN Georg	Germany
O'LEARY Aoife	Ireland
Margrét Helga Guðmundsdóttir	Island
KISIELIUS Vaidotas	Lituania
VASSALLO Saviour Vassallo	Malta
Maliński Paweł	Poland
VELOSO Joana	Portugal
Gómez Benedí, Cristina	Spain
BEDNARZ Louise	Sweden
SINTON Mark	United Kingdom
WESTON Liz	United Kingdom
Name	**Company/Organisation**
CORDES Rick	Aviation Emissions Solutions Ltd
JOHNSON Chris	Aviation Emissions Solutions Ltd
POZNIAK Andrew	AVOCET
CHEYNE Steve	Clean Energy
ERDMANN Stefanie	Deutsche Lufthansa AG
DESTREMAUT Gabriel	EBAA
VICENTE AZUA Pedro	EBAA
VISELE Guy	EBAA
CARLISLE David	ETS Aviation Ltd
HARLING Guido	ETSVerification GmbH
DAVEY Brian	GAMA
McSTRAVICK	Gulfstream Aerospace
FEUCHTINGER Stefan	IETA
DOLAN Jeff	JetAviation
CLEVEN Gary	VerifAvia
DUFOUR Julien	VerifAvia
KONIK Tobias	VerifAvia
MAYER Roland Cpt.	Volkswagen AirService
DEKKERS Chris	EU ETS Compliance Forum
ASTORINO Antonio	EUROCONTROL
Dennis Mes	PWC
Jeroen Krujd	PWC
MEADOWS Damien	Comission
SCHMIDT Yvonne	Comission

Introduction

The EU ETS Directive foresees in Article 30 (4) that the Commission shall review the functioning of the Directive in relation to aviation activities and may make proposals to the European Parliament and the Council as appropriate. The Commission should give consideration in particular to the implications and impacts of this Directive as regards the

overall functioning of the Community scheme as well as on-going improvements and refinements.

In 2008, the co-legislators included non-commercial aircraft operators under the EU ETS without a specific exemption threshold similar to that applicable to commercial operators [exemption j)], which means a large number of small non-commercial aircraft operators are covered. Over time, various measures have been developed to facilitate their contribution, including the possibility to mandate actions in the registry and simplified procedures for monitoring and reporting of emissions by small aircraft operators. Since 1 January 2013 the threshold level for emissions for use of simplified procedures has been increased from 10 000 to 25 000 t CO2 per year.

The European Commission launched a study in early 2013 to analyse if further measures might be appropriate, what these might be, and to obtain an accurate and detailed understanding and empirical evidence on the coverage of small aircraft operators emitting less than 25 000 tonnes of CO2 per year. This assesses, in particular:

- the costs for aircraft operators that are small emitters to comply with EU ETS, the fuel savings made, and the cost for Member States to administer aviation small emitters,
- options for further simplification related to MRV and registry compliance,
- the impact of exclusion thresholds and potential alternative means of regulating emissions for aviation small emitters.

PwC engaged with stakeholders, including Member States, aircraft operators, aviation industry associations (NBAA, EBAA), service companies, consultants and verifiers through online surveys, bilateral meetings and stakeholder meetings (Aviation Carbon Conference in London on 19/20 February 2013, meeting with Member States on 26 February 2013, meeting with aircraft operators and EBAA on 6 March 2013, discussion with Member States in the Taskforce Aviation on 10 April 2013 and the Climate Change Committee's Working Group III meeting on 17 April 2013). To present the results of the study and to give stakeholders the opportunity to further comment and provide input, the Commission organised a stakeholder meeting on 30 July 2013. The meeting did not aim to conclude on simplifications or changes to the legislation.

3,557 aircraft operators operated flights in the EU in 2012. Out of these, 2,866 aircraft operators operated covered flights covered by the EU ETS. 89% of this group is small emitters. These small emitters represent 0.8% of the total aviation emissions (1.9 $MtCO_2$).

I. Cost Assessment

Cost assessments are being developed taking into account the results of online surveys filled in by Member States (15 responses from Member States administering approximately 85-90% of aircraft operators) and aircraft operators and service companies (65 replies representing 150 aircraft operators out of which 138 are small emitters). The information requested included the time spent per process and per year, and out-of-pocket costs. Based on the information so far received,

- costs for Member States to administer small aviation emitters are mainly driven by helpdesk functions (64% for 2011 and 62% for 2012),
- administration of small emitters takes more time in comparison to large aviation emitters (71% to 29%),

- large differences exist between Member States for costs relating to administration of small aviation emitters,

- costs for small aviation emitters incurred in all steps of the compliance cycle but in 2012 the costs for compliance with the requirements of the Union registry had the highest share of total costs (41%),

- costs incurred so far were to a large extend starting costs,

- where aircraft operators are aware of and choose to use them, management/ service companies seems to be more cost effective,

- no particular method of fuel consumption calculation seems to be more cost-efficient than others,

- increasing the focus on emissions leads to fuel savings. One participant suggested these may be in the order of 3%,

- the Eurocontrol ETS Support Facility has not been used much by aircraft operators due to the late availability of the facility as of February 2011 when many operators had already set up their MRV system and the fee of €400 is perceived to be too high. In discussion, the timing of availability was considered to be the main factor, and it was noted that greater use of the ETS Support Facility would lead to a reduction in its fee payable per operator.

II. Options for Simplification

The German Emissions Trading Authority (DEHSt) presented a proposal for simplification for small aviation emitters, by removing verification for small emitters who are using the Eurocontrol ETS Support Facility in combination with the competent authority taking necessary actions as concern registry actions and compliance, with the small aircraft operator simply paying the relevant amount in respect of its emissions by credit card. This proposal was welcomed by a number of aircraft operators and Member States, who encouraged it to be developed. Others have expressed concerns about potential conflicts of interest and additional burden for competent authorities.

PwC explained that they have assessed the environmental impact, financial impact and competitive distortion of possible simplifications. 30 options were identified with most options less likely leading to significant cost improvements (those are mainly related to communication, tools and templates). Discussed options were:

- Centralised communication desk,

- Communication in English in addition to local language,

- Allowing delegation/grouping of operators for MRV purposes in combination with attribution to Member States,

- More use of the Eurocontrol ETS Support Facility and no verification needed where the Facility is used,

- Attribution of management/service companies to Member States

- Creation of a virtual Member State for small emitters

- Concentrating the attribution of small emitters to some larger Member States

In the discussion, the importance of improving awareness has been emphasised. Participants of the stakeholder meeting were very supportive of simplifications for small emitters and a number of people spoke in favour of the following two options:

- Simplification to remove separate verification for those small emitters who are using the Eurocontrol ETS Support Facility combined with either credit card payment for allowances bought by the administering Member State or some other organization on behalf of the aircraft operator or CRCO-billing

- Allowing grouping for MRV (noting that concerns were raised regarding the amount of necessary changes to allow for this).

In discussion it was noted that not all already available means of simplification are being used for a variety of reasons. These include a lack of awareness of assistance that is available, an increased need for Member State guidance, and not all Member States allowing small non-commercial operators to use the simplifications that are already provided for in the legislation.

Potential Exclusion Thresholds

PwC presented its analysis on exclusion thresholds:

- Current coverage includes 2,533 small non-commercial aircraft operators.

- On the exemption for PSO flights, no significant impact has been assessed due to the very limited number of flights and the low number of routes.

- Relating to the exemption on the basis of Maximum Take Off Weight (MTOW), exempted flights would be easy to determine. Taking the case of the UK, as an example presented at the meeting, raising the threshold to 20t would lead to an exemption of 17% of operators administered by the UK. Further assessment would be needed to draw conclusions on whether such a scenario would be similar in other EU Member States.

- Considering an exemption for non-commercial aircraft operators based on annual emissions, a 100t threshold would exempt 1002 non-commercial small emitters. A 1,000t threshold would exempt 2201 non-commercial small emitters, while 99% of non-commercial operators would be excluded under a 10,000t threshold.

- An exclusion threshold based on a limit of 52 flights per annum for non-commercial aircraft operators would exempt 1967 non-commercial aircraft operators (77%).

The meeting confirmed the need to know facts before deciding on possible changes to thresholds. While the majority of participants of the stakeholder meeting did not express any preference for specific thresholds, there was considerable interest in this and for a tiered approach combining other simplifications with any threshold, rather than just a threshold-based approach alone. However, some participants did not consider there should be any threshold proposed for small non-commercial aviation emitters.

Alternative Means of Regulating Emissions

PwC presented the following options:

- Regulation of CO2 via route charging: determination of CO2 by Eurocontrol based on ETS Support Facility data and emission-related compliance charge notified and payable through the Eurocontrol route-charging mechanism;

- Climate fund: collecting financial contributions from operators based on CO2 emissions, with funds dedicated for CO2 reductions such as through retirement of allowances (MRV would be still required);

- Upstream regulation (e.g. regulation of fuel providers);

- Off-setting from other sectors;

- Opt-out from the EU ETS combined with an alternative and simpler regulatory approach.

Participants discussed the options, and the combination of an opt-out to a simpler approach with administration of this through the existing route charging infrastructure has been received the most interest. There was not much interest in an upstream approach, and the linkages between an 'opt out' and the DEHSt proposal were noted.

Next steps

Once finalised, the study will provide an empirical basis for further consideration of possible simplifications. Some simplifications can be made without legislative activity and these could be taken into effect relatively early. The feedback received during the stakeholder meeting as well as feedback received until 9 August 2013 will be taken into account in the study finalisation. Participants of the stakeholder meeting will receive the presentation from PwC and a short meeting summary.

ANNEX III – PUBLIC ON-LINE CONSULTATION

1. Summary of the received contributions

43 contributions were submitted to the functional mailbox CLIMA-CONSULTATION-AVIATION-2013@ec.europa.eu. The most represented contributors were airlines and professional associations (61%), followed by non-governmental organizations (16%), EU public authorities (9%), individuals (7%), professional consultations (5%) and non-EU public authorities (2%).

11 contributions were marked confidential or sent by e-mail that included a standard confidentiality disclaimer, 1 contribution authorized publication. The table below gives an overview of the contributors, grouped in accordance to their field of competency:

	Total number of contributions	**Of which answered to F1**	**Of which answered to F2**
Airlines and professional associations	26 (61%)	24	22
EU public authorities	4 (9%)	4	4
Individuals[46]	3 (7%)	1	2
NGOs	7 (16%)	7	4
Non-EU public authorities[47]	1 (2%)	0	0
Professional consultations (verifiers)	2 (5%)	0	2
	43	**36**	**34**

2. F1. ICAO Framework for Market-Based Measures (MBM) and Global MBM scheme

The public consultation confirms the strong support for MBMs from the aviation industry, public authorities, and NGOs. All respondents support MBMs for the aviation sector. Only one professional organization opposes the continuation of the EU ETS as a regional scheme pending the implementation of a global MBM in 2020.

2. 1. Major considerations to assess the different geographical scope options for MBM Framework

What should be the major considerations to assess the different geographical scope options for the MBM Framework (as discussed in the HGCC)?

- Arriving and departing flights within national airspace
- Flights arriving in, departing from and flying over national airspace
- Flights within the Flight Information Regions (FIRs), including oceanic FIRs
- Flights departing from an aerodrome in a State

From the contributions by airlines and professional associations, 50 % mention the political acceptability and administrative complexity of an MBM as an important criterion. 23 % of

[46] One contribution did not respond to any of the questions listed in the consultation

[47] Contribution stated that responses to the questions for the consultation will be provided after the ICAO Assembly in September 2013

the contributions are in favour of the largest possible coverage because of environmental effectiveness or to avoid discrimination between different routes.

The EU public authorities consider the coverage of emissions as the priority, followed by administrative burden, and political acceptability.

The NGOs put a clear priority on the environmental effectiveness and a full coverage of global emissions by regional MBMs. 86% of NGOs insist on 50-50 option as the only feasible way forward due to its environmental integrity. The other NGOs advocate the departing flights approach. Most NGOs consider the airspace approach not feasible due to enforcement (lack of clarity) and MRV problems.

2.2. Elements of the "Roadmap for a Global MBM"

Which elements of the "Roadmap for a Global MBM" do you consider a priority, and what would be the optimal timeline for implementation?

For airlines and professional associations, the focus is on common standards for MRV, followed by the assessment of, and agreement to, the most effective means of allocating emissions limits. In general, the majority of the proposed elements for a global MBM are found significant.

2 out of 4 EU public authorities put their emphasis on the need for a strict timetable with implementation by 2020 (without expressing any specific preferences on the priorities). The 2 other public authorities consider the allocation of emissions and the taking-account of special circumstances and respective capabilities as top priorities.

For NGOs, the focus tends to be on agreeing on the global measure as soon as possible. The use of offsets is a big concern as it would not lead to actual emission reductions. The contributions provide detailed assessment of the environmental integrity of different types of offsets (with varying results).

In terms of timing of the implementation of the global MBM, there was a clear difference between NGOs that mostly prefer to start at 2016 and EU public authorities and airlines/professional association that mostly list 2020 as a feasible year to start the implementation.

2.3. Essential requirements for monitoring, reporting, and verification standards

What essential requirements should be taken into account for the development of a common set of monitoring, reporting, and verification standards for measuring greenhouse gas emissions from international aviation?

The contributions were very similar in terms of the requirements for MRV: simplicity, transparency, and consistency, single point of accountability, common methodology, and minimal administrative burden for aircraft operators. 40% of airlines and professional associations found scalability (accommodating both large and small aircraft operators) to be an essential requirement of the MRV system, 17% of them also listed confidentiality as a concern. 2 airlines/professional organizations listed the need to use standard density to decrease administrative burden.

NGOs found it important to collect emission data from each departing flight, using common methodology and having in place assistance for airlines with difficulties.

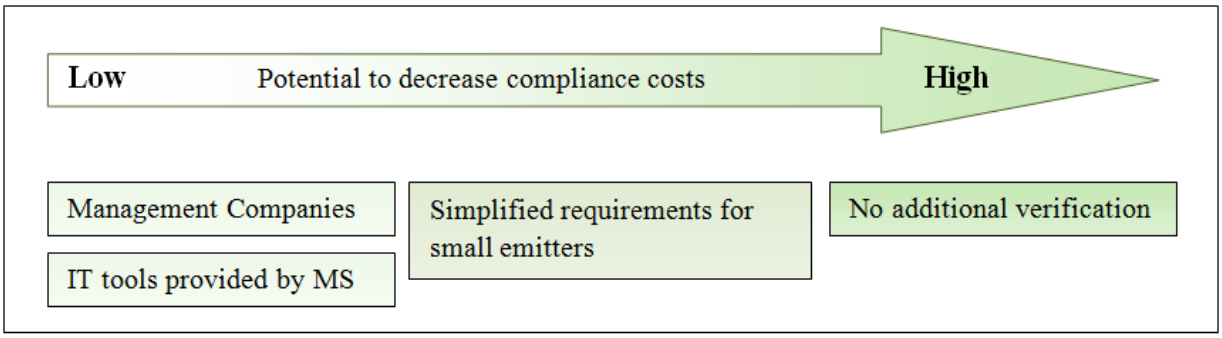
3. F2. Simplifications for small aircraft operators

3.1. Decrease of administrative costs

What could further decrease the compliance cost (cost for monitoring, reporting, verification, and registry) significantly for small aircraft operators? (ranking of the options below)

- Management companies could be attributed to Member States for administration;
- No additional verification would be required in case of using the Eurocontrol Support Facility;
- All Member States would provide IT-tools for reporting;
- Simplified requirements to open an aircraft operator holding account in the Union Registry for small emitters (only for receiving and surrendering allowances).

The contributions to the question above were similar throughout: 70% of contributors found no additional verification to be the most promising way to cut compliance costs. Simplified requirements to open an aircraft operator holding account in the Union Registry for small emitters was considered second best in its potential to help decreasing the compliance costs. IT-tools to be provided by the Member States and the use of management companies were considered to have the least impact as the both are already available on the market while the use of IT tools provided by the Member States has the scope to be increased.



3.2. Exemption of non-commercial aircraft operators from the scope of EU ETS

Would you be in favour of exempting non-commercial aircraft operators altogether from the scope of EU ETS (similar to the de minimis exemption of commercial operators)?

	Yes	**No**	**Cannot decide**
Airlines and professional associations	59%	23%	14%
EU public authorities	100%	-	-
Individuals	-	50%	50%
NGOs	25%	75%	-
Professional consultations (verifiers)	-	100%	-
All contributors	**53%**	**32%**	**12%**

The main argument for introducing the exemption was the balance between environmental integrity and related costs to the aircraft operators. The main arguments against an exemption were the consistent application of the rules to achieve the broadest coverage of emissions.

NGOs were mostly against the exemption with only one of them being open to the idea, but requesting to keep the exemption to minimum by including only the airlines with negligible share of emissions. The EU public authorities were in favour of the exemption, one of them requesting the de minimis arrangements to be the same for both commercial and non-commercial aircraft operators.

3.3. De minimis threshold for small aircraft operators

Which consideration is the most important when choosing a *de minimis* threshold for small aircraft operators?

For NGOs and EU public authorities, the most important considerations listed were the overall environmental effectiveness and the administrative burden for operators, often suggested to be considered in combination. In addition to that, several airlines and professional associations proposed competitive distortion as an equally important consideration.

Professional consultations (verifiers) preferred not to introduce the *de minimis* threshold for small aircraft operator, one of them proposing to remove it also from commercial aircraft operators.

ANNEX IV – SUPPORTING ANALYSIS ON ENVIRONMENTAL IMPACTS

Limited technological possibilities for emission reductions (section 2.1.2)

The industry's preferred approach to tackling emissions has been to rely on technology. However, despite technological progress, growth in aviation demand has outstripped CO_2 emissions reductions through technological and operational improvements (IPCC, 1999) leading to a steady increase in emissions.

Reductions in emissions of CO_2 have been driven historically by demands of airlines on manufacturers to make aircraft more fuel-efficient, since fuel costs are a major fraction of airlines' operating costs. By increasing the cost of fuel burn (by putting a value on CO_2 emissions), the EU ETS strengthens the economic incentive for airlines (and thus aircraft and engine manufacturers whose clients are airlines) to implement cost-effective fuel saving measures which will reduce their emissions and the associated cost of compliance with the EU ETS.

In the **short to medium term**, aircraft operators have a range of means for optimising their operations and fleets taking into account the additional price signal provided by the EU ETS. Abatement options available to directly reduce GHGs from existing aircraft are mostly operational or Air Traffic Management (ATM) strategies. It is thought that operational and ATM improvements could result in around 10-15% abatement in the current system[48] (CCC, 2008) as illustrated in the table below. These include, for example: increasing load factors (up to 9% savings); optimum routing (up to 7% savings); reducing dead weight (<1% savings); improved air traffic management (3-8% savings). On the ground, pilots can taxi their aircraft on a single engine or a tug can tow the aircraft out to a taxiway close to the runway before engine start (up to 2% savings).

Technical measures for existing aircraft are rather limited. Retrofitting new, efficient engines to an existing airframe can reduce fuel consumption by around 5% to 7.5%[49] but this is usually difficult to justify economically.

In the longer term, investment in new aircraft, composite lightweight materials, new engine designs and aviation biofuels could help achieve more important reductions in emissions and noise although this will be a relatively slow process because aircraft life cycles are long (around 30 years on average). An overview of potential technical measures for aircraft efficiency and engine development carried out in 2008 by the UK Committee on Climate Change is provided in Annex 4. It found that new airframe technologies have the potential to lower fuel consumption by up to 20-30% by 2025 if fully implemented in new aircraft. Engine technology developments have the potential to reduce fuel consumption by 15-20% by 2025.

[48] Committee on Climate Change (CCC), 2008, Aviation CO2 Emissions: Abatement Potential from Technology Innovation, http://www.theccc.org.uk/pdfs/QinetiQ%20aviation%20report%20for%20the%20CCC.pdf

[49] ibid

Energy savings and year of introduction for aircraft efficiency measures

Airframe Measure	**Metric**	**Small Turbofan**	**Large Turbofan**
Composites. Composite materials are usually stronger and lighter than conventional aerospace materials	*Year*	*2012*	*2012*
	Saving, %	10% - 20%	10% - 20%
Winglets. upturned structures attached to the end of modern aircraft wings, designed to increase the wing's effective aspect ratio	*Year*	*2013*	*2013*
	Saving, %	1% - 2%	1% - 2%
Riblets. small ridges which cover an aircraft skin, which reduce skin friction	*Year*	*2015 – 2020*	*2015 – 2020*
	Saving, %	1% - 2%	1% - 2%
Laminar Flow Wings. A laminar (or smooth) flow of air over the surface of an aircraft results in lower drag than a turbulent flow of air	*Year*	*2020*	*2020*
	Saving, %	10% - 20%	10% - 20%
Average New Airframe Potential	*Year*	*By 2025*	*By 2025*
	Saving, %	20% - 30%	20% - 30%
Average Retrofit Airframe Potential	*Year*	*2015 – 2020*	*2015 – 2020*
	Saving, %	2% - 5%	2% - 5%
Engine Measure	**Metric**	**Small Turbofan**	**Large Turbofan**
Pressure Ratio, Materials & Cooling. enabling higher hot end temperatures and hence thermodynamic efficiency gains	*Year*	*Now – 2025*	*Now – 2025*
	Saving, %	3% - 5%	3% - 5%
Compressor & Turbine Aerodynamics. Further advances in the aerodynamic design of the rotating components may also be possible	*Year*	*Now – 2025*	*Now – 2025*
	Saving, %	3% - 5%	3% - 5%
Geared Turbofans. Introducing a gear train into the system allows each component to work closer to its optimal speed, although there is a penalty in engine weight from the gearbox.	*Year*	*Now – 2025*	
	Saving, %	8% - 10%	
Ultra High Bypass. Current high bypass ratio engines are approaching optimum fuel efficiency. Even higher ratios may be possible in larger engines	*Year*		*2013 - 2025*
	Saving, %		8% - 10%
Unducted Fans. Ducted fans are restricted by the trade-off between increased diameter, weight and drag.	*Year*	*2015*	*2015*
	Saving, %	15%	15%
Average New Engine Potential	*Year*	*By 2025*	*By 2025*
	Saving, %	15% - 20%	15% - 20%
Average Retrofit Engine Potential	*Year*	*Now*	*Now*
	Saving, %	5% - 7.5%	5% - 7.5%

Source: CCC (2008). Aviation CO2 Emissions: Abatement Potential from Technology Innovation, The Committee on Climate Change

Some technical measures are incremental improvements that are already being deployed in new aircraft. However, more radical airframe and engine technologies may involve a major departure from current aircraft designs (for example mounting open rotor engines on top of the wing), or major changes to the layout of airports (in the case of new designs such as blended wing body aircraft). Barriers to the uptake of more radical designs include delays in gaining certification, the cautious nature of the industry (due to the need to maintain high safety levels) and the lack of designs that can be retrofitted to existing aircraft[50].

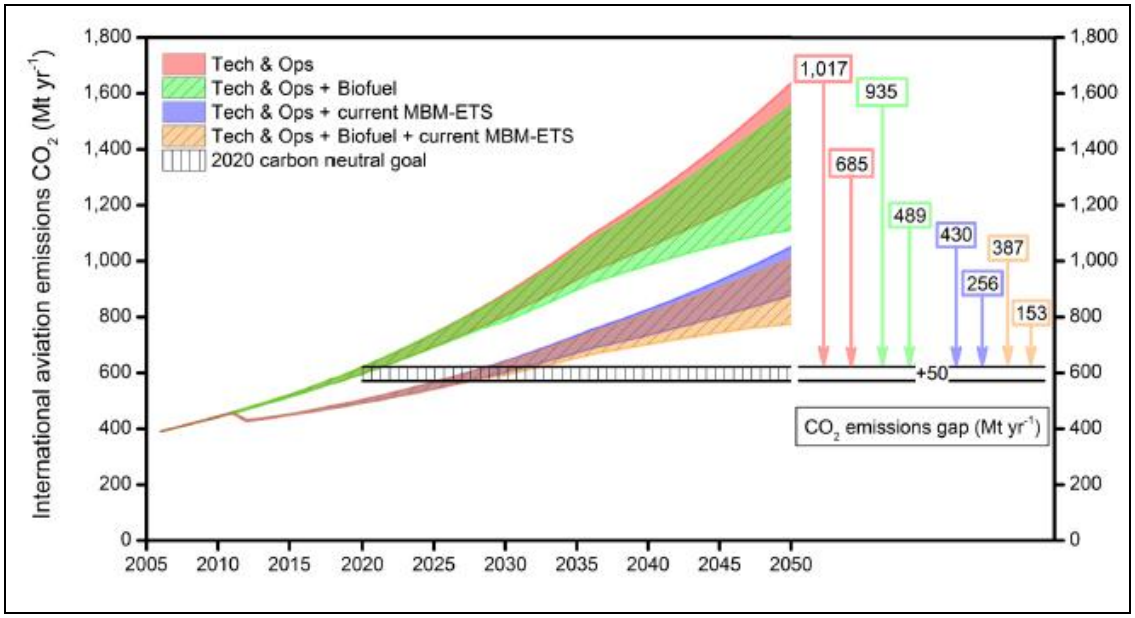
[50] IEA (2011) ETSAP technology brief T11. Energy technology systems analysis program

In combination with the technological measures described above, the use of sustainable **biofuels** could be a source of GHG reductions. There are two main biofuel production processes being considered by the industry: hydrotreated renewable jet (HRJ) fuel – also known as hydrotreated vegetable oil (HVO) with vegetable oil feedstocks - and biomass-to-liquids (BTL) fuels. Unlike the more common biofuels currently being deployed in the road transport sector (e.g. fatty acid methyl ether - FAME, bioethanol etc.), aviation biofuels are expected to be drop-in replacements for aviation kerosene[51]. Corresponding savings in greenhouse gas emissions will depend on the performance of the biofuels themselves. For HRJ biofuels the savings are currently estimated to range from around 20 - 50% for conventional vegetable oil feedstocks, from 66 - 89% for newer alternative feedstocks, and up to 98% for algae feedstocks. For BTL biofuels the savings are estimated to be 92 - 95%[52]. However, one of the most significant barriers to the widespread deployment of biofuels in aviation is the uncertainty over the sustainability and lifecycle GHG reductions of the fuels.

"Emission gap" (see also section 2.1.3)

A recent study by Manchester Metropolitan University explored the gap between policy ambitions with regards to aviation emissions and the impact of technological, operational and market-based measures on the industry's emissions[53].

International aviation emission projections, 2006 – 2050 for central growth scenario vs 2020 carbon neutral goal



Source: David S. Lee (2013) Bridging the aviation CO2 emissions gap: why emissions trading is needed

It found that technology and operational improvements alone (even the most ambitious options) will not meet the 2020 carbon-neutral goal for international aviation at any point in time to 2050 (see graph below). Even assuming the most effective technological and

[51] IEA (2011) ETSAP technology brief T11. Energy technology systems analysis program

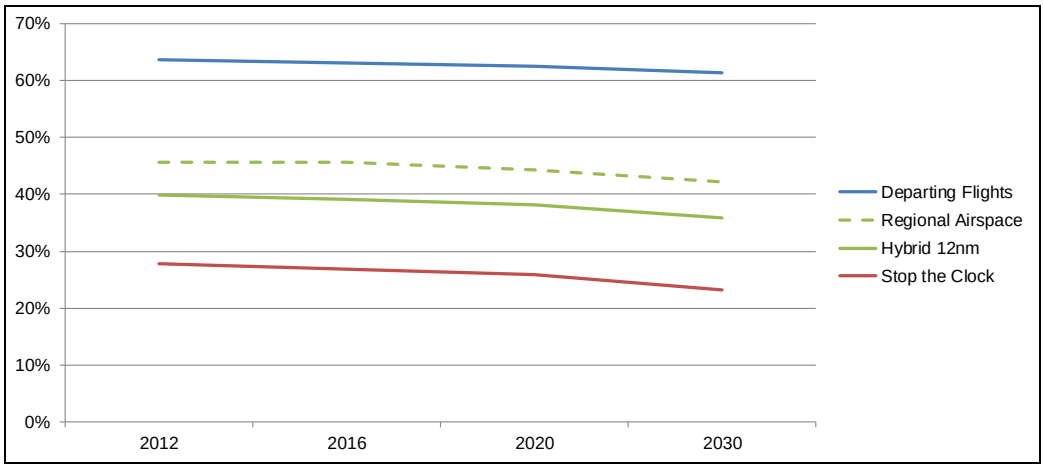
[52] CCC (2009). Meeting the UK Aviation target – options for reducing emissions to 2050 Chapter 6: Non-CO2 climate effects of aviation

[53] D.S. Lee, L.L. Lim and B. Owen (2013) Bridging the aviation CO2 emissions gap: why emissions trading is needed

operational improvement reductions combined with “speculative” levels of biofuels, a "gap" in the range between 489 and 935 tons CO2 would be left in 2050 that could only be covered by MBMs (i.e. funding of emission reductions in other sectors). It further shows that the EU ETS alone is not sufficient to close this gap because 153 to 430 million tons of global CO2 emissions would still remain uncovered in 2050 (depending on assumed scenarios).

Emissions coverage over time (section 5.1)

Percentage of EU ETS emissions covered by policy options over time



Percentage of EU ETS emissions covered by policy options in 2030, by global region

Departure/Arrival Region	Full Scope	Hybrid – 12nm	Hybrid – 200nm	Departing Flights	Stop the Clock
EEA	100.0%	100.0%	100.0%	100.0%	100.0%
AFRICA	100.0%	22.6%	37.4%	50.2%	0.0%
EUROPE (NON-EEA)	100.0%	63.7%	72.0%	49.3%	0.0%
FAR EAST	100.0%	14.8%	19.4%	51.2%	0.0%
MIDDLE AMERICA	100.0%	7.0%	15.4%	49.5%	0.0%
MIDDLE EAST	100.0%	31.1%	53.7%	50.4%	0.0%
NORTH AMERICA	100.0%	9.1%	20.9%	48.0%	0.0%
SOUTH AMERICA	100.0%	7.6%	15.2%	48.9%	0.0%
TOTAL	**100.0%**	**36.3%**	**44.5%**	**61.1%**	**22.7%**

Percentage of EU ETS emissions covered by policy options in 2012, by global region

Departure/Arrival Region	Full Scope	Hybrid – 12nm	Hybrid – 200nm	Departing Flights	Stop the Clock
EEA	100.0%	100.0%	100.0%	100.0%	100.0%
AFRICA	100.0%	22.7%	37.6%	50.2%	0.0%
EUROPE (NON-EEA)	100.0%	63.6%	72.1%	49.4%	0.0%
FAR EAST	100.0%	14.7%	19.3%	51.0%	0.0%
MIDDLE AMERICA	100.0%	6.9%	15.4%	49.6%	0.0%
MIDDLE EAST	100.0%	31.2%	54.0%	49.8%	0.0%
NORTH AMERICA	100.0%	9.0%	20.9%	48.7%	0.0%
SOUTH AMERICA	100.0%	7.7%	15.4%	49.2%	0.0%
TOTAL	**100.0%**	**40.1%**	**47.9%**	**63.4%**	**27.2%**

Impact on NOx emissions (section 5.1)

The emissions of NOx are of concern with regards to local air quality and with regard to climate change as they are strong precursors for the formation of ozone at altitude (itself a greenhouse gas). From a Local Air Quality (LAQ) point of view, the most relevant results are those for NOx emissions on all flights departing from or arriving at EEA countries, though it should be noted that this captures the full flight emissions, not just those below 1,000m, as are usually considered in a LAQ assessment.

The reductions seen in global NOx emissions are very closely aligned with the reductions in CO_2 emissions, though the reductions are slightly smaller for NOx than CO_2.

Change of NOx emissions compared to full-scope EU ETS

	2016	2020	2030
Departing Flights	+0.13%	+0.25%	+1.02%
Stop the Clock	+0.26%	+0.48%	+2.03%
Hybrid	+0.22%	+0.41%	+1.71%
Upstream	-0.16%	-0.16%	+0.21%

ANNEX V – MODELLING METHODOLOGY

The impact of the EU ETS on GHG emissions from aviation is modelled with the AERO Modelling System (AERO-MS)[54]. The results of this model also feed into the economic impact assessment.

The AERO-MS model uses a baseline year of 2006. The air traffic for that baseline year is used together with assumptions for growth from that year to provide forecasts of traffic in the future year in a scenario without any additional policies. The effects of the policies to be considered are then added to provide forecasts.

The traffic data for the baseline year of 2006 are based on over 33 million flights between approximately 123,000 airport pairs. This number of flights is greater than that used by ICAO in the CAEP/8 analysis work (by about 24%), which was based on the same baseline year of 2006; this increased number of flights has been attributed to the AERO-MS Unified Database containing a more complete definition of global air traffic (particularly short-haul flights and smaller aircraft types). The revenue tonne kilometres (RTK) in the AERO-MS baseline is much closer to the ICAO data (only approximately 4% higher), supporting the idea that the difference in the number of flights is largely due to small aircraft and short-haul flights.

The base case against which the impacts of the EU ETS for aviation are compared is the Central Forecast (Most Likely Scenario) scenario from the ICAO-CAEP/8 studies. This growth scenario was produced by the Forecasting and Economics Support Group (FESG) of CAEP for application in the work programme leading to the CAEP/8 meeting in 2010. This scenario has been reported widely and used as the basis for a number of studies, including the recent EU TEAM_Play project. In this latter project, amongst other model applications, the CAEP/8 scenario was implemented as scenario definition files in the AERO model, which provided a well-defined and tested basis for developing the modelling approach in the current study.

The CAEP/8 traffic growth forecasts were produced by FESG for application in the analyses for the CAEP/8 meeting and were reported to the CAEP Steering Group meeting in September 2008[55]. As such, they do not include the effects of the recent global recession and may, therefore, over-estimate the future air traffic and their emissions. The global growth rates in air traffic resulting from this forecast (using the Central Forecast (Most Likely Scenario)) are shown in Table III-1.

[54] EASA (2010) Research Project EASA.2009/OP15 Study on Aviation and Economic modelling (SAVE). In 2009, a programme to update the model was launched: aircraft operations were updated using data from the Eurocontrol WISDOM database; airline costs and fare data were updated using information from ICAO and IATA; and the definition of aircraft performance characteristics was changed to use the Eurocontrol BADA data.

[55] FESG CAEP/8 Traffic and Fleet Forecasts, presented by FESG Rapporteurs to the CAEP Steering Group meeting in September 2008, paper number CAEP-SG/20082-IP/02

Annual global growth rates for air traffic from FESG CAEP/8 Forecast; Central Forecast

Years	Passenger Traffic Annual Growth	Freight Traffic Annual Growth
2006-2016	5.1%	6.0%
2016-2026	4.8%	6.0%
2026-2036	4.4%	6.0%

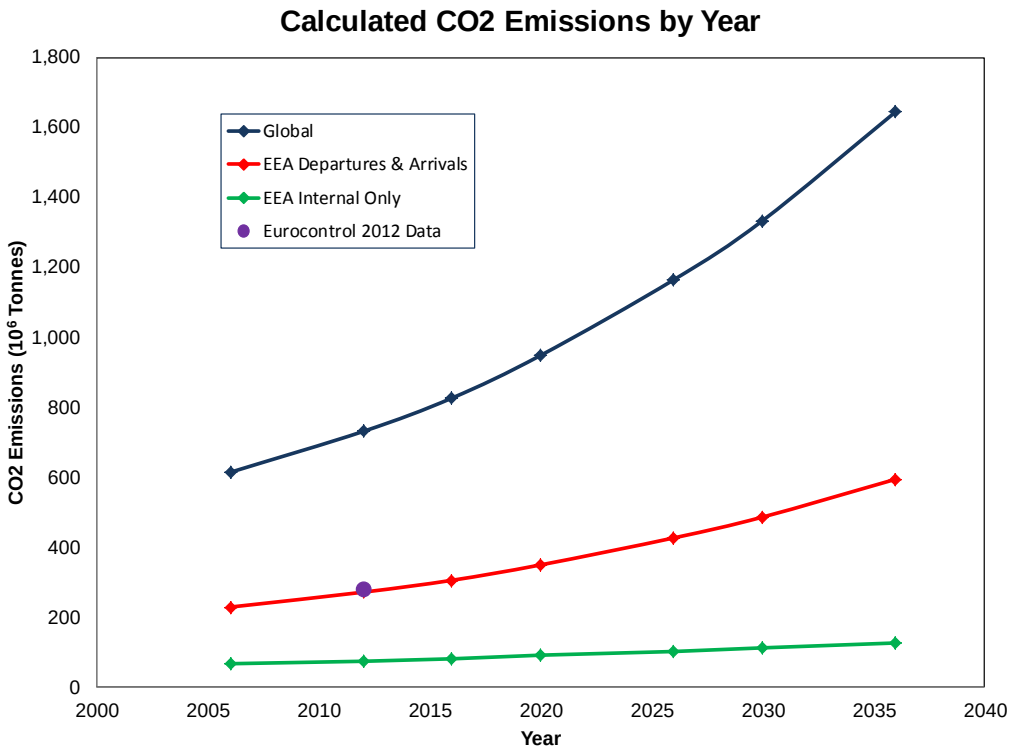
Since the CAEP/8 meeting, the FESG has produced an updated forecast of the future evolution of air traffic growth, based on a baseline year of 2010 (the CAEP/8 forecast was based on a baseline year of 2006, as is AERO-MS). Whilst this updated forecast would provide a more up-to-date view of the future traffic (and would take account of the effects of the recent global recession), it has not been published outside of CAEP and would have presented some difficulties in integrating in AERO-MS in the timescales of this project, due to the effort involved in defining a completely new scenario for the model and the different baseline year. Therefore, and bearing in mind that the key aim of the modelling is to provide comparisons of the effects of the different policies, it was decided to retain the use of the CAEP/8-based scenarios.

Other key features of the use of AERO-MS in this study are:

- For the purposes of this study, there was a need to consider different analysis years to those used in CAEP/8 and for which scenario definitions had been created in AERO-MS (2016, 2026 and 2036). It was recognised that the creation of fully established scenario definitions for the additional future years (2020 and 2030) would be impractical in the timescale of the project. Therefore, the approach adopted for the study was to create the scenario definitions for the extra years by simple linear interpolation in the parameters for the existing definitions and then to model all years (2016, 2020, 2026, 2030 and 2036) to ensure that the results obtained for 2020 and 2030 fitted a smooth variation through the results for the other three years. This approach was considered to provide confidence that the results obtained (and reported here) were sufficiently accurate and reliable for the purposes of the study.
- A further year for which environmental output was required is 2012. It is important to recognise that the output obtained from a model such as AERO-MS for a past year is a forecast based on a baseline year of 2006 and an overall scenario which is intended to provide forecasts of traffic growth out into the future. It is not intended to be an accurate model of what actually happened in 2012. However, it does provide a reasonable baseline against which to compare the modelled future scenarios. In attempting to generate a scenario definition for 2012 for AERO-MS, significant difficulties were encountered in producing a set of self-consistent data. Therefore, considering the timescale for this project, it was decided to calculate the required outputs (fuel burn and emissions) by interpolation between the base data for 2006 and the calculated forecast for 2016. The interpolation was performed on the basis of a constant annual percentage growth rates between the two years.
- The results of the total CO_2 emissions calculated (global, plus EEA Departures and Arrivals and EEA-Internal only) are shown below. This shows that the intention of having smooth variations of calculated parameters through the full set of years calculated

(2006, 2016, 2026 and 2036 for the pre-defined CAEP/8 scenarios plus 2020 and 2030 calculated plus 2012 interpolated) has been achieved.

Annual CO_2 emissions from AERO-MS Calculations using the Default policy



ANNEX VI – ESTIMATION OF EU-ETS COSTS UNDER DIFFERENT OPTIONS IN 2020

The following table shows the expected impact of the different options on the absolute levels of EU ETS costs in 2020:

- 82 % of the total aviation allowances are allocated for free and 15 % of aviation allowances are auctioned under the EU ETS for aviation. These relative proportions are kept unchanged under all options (except for the upstream option which goes to 100 % auctioning). The absolute numbers of free allowances and allowances to be auctioned will therefore be reduced in proportion to the scaled-down coverage.
- International credits can be used for 1.5 % of the total emissions.
- The remaining emissions (= total emissions less free and auctioned aviation allowances and international credits) are off-set by general EU allowances.

Impact of policy options on auction revenues in 2020

	A	*B*	*C*	*D=1.5%*A*	*E = A-B-C-D*	*F= (C+D)*€10+D*€1*
	Total emissions (mT)	**Free allowances (m)**	**Aviation allowances to be auctioned (m)**	**International credits (m)**	**Demand for general EU allowances (m)**	**Total EU ETS costs (€)**
EU ETS full scope	340	173	32	5	131	1,633
Departing Flights	213	108	20	3	83	1,025
Hybrid 200nm	159	80	15	2	62	766
Hybrid 12nm	132	66	12	2	51	634
"Stop-the-Clock"	86	44	8	1	33	414
Upstream	212	0	128	3	81	2,091

N.B.: Carbon price = €10; price for international credits = €1

The number of free allowances has been adjusted in proportion with the reduced scope but without re-benchmarking free allocations. With the "stop-the-clock" decision, some stakeholders have said they would prefer re-benchmarking free allocations. As intra-EEA flights are less efficient than extra-EEA flights, airlines that operate a higher number of intra-EEA flights receive currently a relatively smaller number of free allowances. A reduction in the coverage of extra-EEA flights would increase the benchmark and consequently the free allocations for all airlines. Re-benchmarking would therefore lead to a diminished environmental outcome by giving relatively more free allowances to operators than they currently have for activities on the same routes. Re-benchmarking would lead to an increase of free allowance by 5 to 10 percentage points, with a commensurate increase in greenhouse gas emissions.

However, it is important to note that aircraft operators do not have any legal expectations with regard to a recalculation of the benchmark because they do not suffer a loss from maintaining existing allocations of free allowances for these routes. Their situation is either improved because of the lower coverage or remains unchanged (e.g. if they only operate intra-EEA flights). Furthermore, re-benchmarking all free allocations would introduce considerable complexity and thereby strengthen the argument of those who are likely to claim that the EU should delay the EU ETS until 2020 or such later time as a single global measure might be in place.

ANNEX VII – IMPACT ON TOURISM

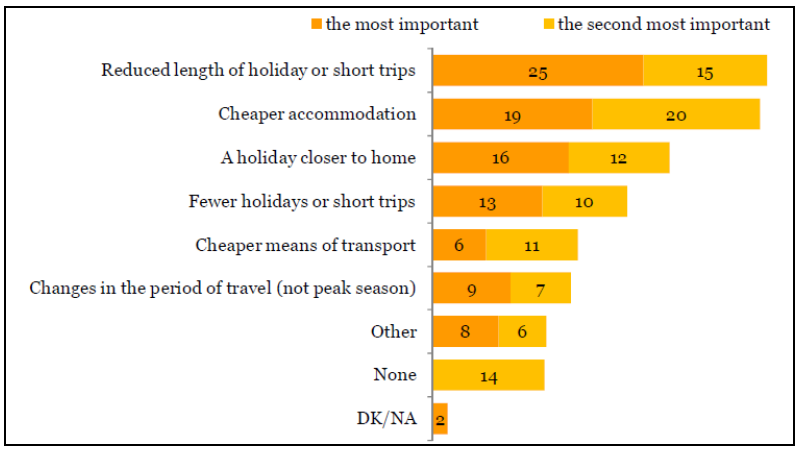
Tourism is a large and dynamic sector and the economic importance of international tourism can be measured by looking at the ratio of international travel receipts relative to GDP (these data are from balance of payments statistics and include business travel, as well as travel for pleasure). According to the Eurostat 2012 Yearbook, in 2011 the ratio of travel receipts to GDP was highest in Malta (14.0 %) and Cyprus (10.2 %), confirming the importance of tourism to these island nations; an even higher ratio was observed in Croatia (14.7 %). In absolute terms, the highest international travel receipts in 2011 were recorded in Spain (€43,026 million) and France (€38,682 million), followed by Italy, Germany and the United Kingdom.

Air transport is critical in enabling tourism, especially when it involves international travel and travel to islands. Tourists may respond to higher prices in air travel in a number of ways of which some, but not all, will entail a reduction in overall tourism receipts:

- they may switch to other modes of transport where this is possible. This will be most relevant for intra-EEA travel but it is bound to be very limited as the additional time taken to travel by train, boat or road will in most cases exceed the small increase in ticket prices as a result of the options under the current carbon prices. For those destinations where mode switch is a cost and time effective option, there will be no impact on the overall spend on tourism.
- they may choose to spend less on accommodation or other expenditures to make up for the change in travel costs which means lower tourism revenues for the destinations served.
- they may take fewer trips which may benefit some destinations over others.

Responses of European tourists to the recession and the need to reduce holiday spend can provide some idea of their preferred response to an increase in price (equivalent to a reduction in disposable income).

Ways of cutting back on holiday budget



Source: EC (2009) Europeans and tourism

As seen above, mode switch is not amongst the most popular responses. On the other hand, reallocating spend and changing the number or duration of holidays are popular. The third choice i.e. 'a holiday closer to home' provides some indication that a change in travel patterns, by choosing cheaper destinations, is also possible.

However, as presented in the Section 5.2.1.2 on passenger market demand, none of the policy options are expected to result in significant increases in the price of tickets or reductions in travel demand, whether at aggregated or world-region level. The impact on tourism at current prices is therefore unlikely to be sizeable.

The 2006 IA reached the same conclusion and pointed out that historical experiences from past oil price shocks indicate that an increase corresponding to €30 per tonne of CO_2 is unlikely to have a significant impact on international tourism demand, which depends much more on the general economic situation and purchasing power than on fuel costs.

ANNEX VIII – ADMINISTRATIVE EFFORT AND FEASIBILITY

Full-scope EU ETS

The guidelines for the monitoring, reporting and verification of aviation activities under the current EU ETS are set out in Annexes XIV and XV of the Commission Decision of 16 April 2009 amending Decision 2007/589/EC as regards the inclusion of monitoring and reporting guidelines for emissions and tonne-kilometre data from aviation activities.

The main components are summarised below. They relate to the monitoring and reporting of CO^2 emissions (as the basis for compliance) and activity (as the basis for the allocations).

CO_2 emissions are calculated by multiplying fuel consumption by an emission factor. Fuel consumption can be estimated through two methods, A or B described below.

METHOD A	METHOD B
Actual fuel consumption for each flight (tonnes) = Amount of fuel contained in aircraft tanks once fuel uplift for the flight is complete (tonnes) – Amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete (tonnes) + Fuel uplift for that subsequent flight (tonnes). In case there is no fuel uplift for the flight or subsequent flight, the amount of fuel contained in aircraft tanks shall be determined at block-off for the flight or subsequent flight.	*Actual fuel consumption for each flight (tonnes) = Amount of fuel remaining in aircraft tanks at block-on at the end of the previous flight (tonnes) + Fuel uplift for the flight (tonnes) – Amount of fuel contained in tanks at block-on at the end of the flight (tonnes)* The moment of block-on may be considered equivalent to the moment of engine shut down.

Fuel uplift may be determined based on the measurement by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight. Alternatively, fuel uplift may also be determined using aircraft on-board measurement systems and recorded in the mass and balance documentation, in the aircraft technical log or transmitted electronically from the aircraft to the aircraft operator.

The operator shall choose the method which provides for the most complete and timely data combined with the lowest uncertainty without incurring unreasonable costs. Fuel consumed shall be monitored for each flight and for each fuel and shall include fuel consumed by the auxiliary power unit. In the monitoring plan for each aircraft type the operator defines:

- which calculation formula will be used (method A or method B);
- the data source which is used for determining the data on fuel uplift and fuel contained in the tank, and the methods for transmitting, storing and retrieving that data;
- which method is used to determine density, where applicable. When density-temperature correlation tables are used the operator shall specify the source of this data.

A simplified approach is available to small emitters: emissions are calculated using a standardised distance flown based on great circle distance multiplied by an emission factor tCO_2/km flown. The small-emitter approach has a considerably lower accuracy than the approach for non-small emitters, but due to the low share of small-emitters in total emissions (1%) it is considered proportionate and appropriate.

Aircraft operators shall submit their monitoring plan to the competent authority for approval at least four months prior to the start of the first reporting period. The verifier will take into account:

- completeness of flight and emissions data compared to air traffic data such as collected by Eurocontrol,
- consistency between reported data and mass and balance documentation,
- consistency between aggregated fuel consumption data and data on fuel purchased or otherwise supplied to the aircraft performing the aviation activity.

With regards to activity, aircraft operators shall submit a monitoring plan setting out measures to monitor and report tonne-kilometre data to the competent authority at least four months prior to the start of the first reporting period for approval.

Aircraft operators monitor and report tonne-kilometre data using a methodology based on the following formula:

*tonne kilometres (t km) = distance (km) * payload (t)*

Distance is calculated based on Great Circle Distance which is defined as the shortest distance between any two points on the surface of the Earth.

Payload is calculated by adding the mass of freight and mail to the mass of passengers and checked baggage (actual or modelled using weight factors provided by the Commission).

Verification of the reported data takes into account:

- the completeness of flight and tonne-kilometre data compared to air traffic data such as collected by Eurocontrol to ascertain that only eligible flights have been taken into account in the operators report,
- the consistency between reported data and mass and balance documentation

Departing-flights option

Cost implications under the departing-flights, 50/50, and "stop-the-clock" option compared to full-scope EU ETS

Task	Who bears the administrative burden?	Cost implication Departing Flights Option	Cost implication 50/50 Option
Application for monitoring plan	Operator	No change	No change
Notify changes to monitoring plan	Operator	No change	No change
Review and updating of monitoring plan	Competent authority	No change	No change
Initial setting up monitoring and reporting systems	Operator	No change	No change
Collection of monitoring data, QA/QC, data archiving, etc.	Operator	-	No change
Drafting emission report	Operator	-	No change
Verification of monitoring data	Operator	-	No change
Reviewing emission reports and verification reports	Competent authority	-	No change
Implementing enforcement in case of non-compliance	Competent authority	No change	No change
Issuing Guidance and re-allocation of free allowances	EU Commission	+	+
Update aviation operator list	EU Commission	No change	No change

Hybrid option

MRV Option 1 – On-board measurement: Cost implications and timeline

Cost implications of MRV-option 1 (on-board measurement) compared to full EU ETS

Task	Who bears the administrative burden?	Cost implication Option 1
Application for monitoring plan	Operator	No change
Notify changes to monitoring plan	Operator	No change
Review and updating of monitoring plan	Competent authority	No change
Initial setting up monitoring and reporting systems	Operator	++ if equipment not available
Collection of monitoring data, QA/QC, data archiving, etc.	Operator	++ higher costs for post-flight processing due to higher data volume
Drafting emission report	Operator	+
Verification of monitoring data	Operator	+
Reviewing emission reports and verification reports	Competent authority	+
Implementing enforcement in case of non-compliance	Competent authority	No change
Issuing Guidance and re-allocation of free allowances	EU Commission	+++ As on-board measurement cannot be applied to 2010 data on which free allocations are based, it will probably be necessary to additionally use MRV option 2 to recalculate the free allocations for extra-EEA flights.
Update aviation operator list	EU Commission	No change
Application and obtaining registry account	Operator	No change
Costs related to trading (control systems, cost per transaction)	Operator	No change

Timeline for implementation of MRV-option 1 (on-board measurement)

Implementation Steps	Responsible Entity	Duration
Revise MRV requirements	EU Commission	12 months
Potentially provide guidance on the adapted monitoring and reporting requirements	EU Commission	3 months – can partly run in parallel to adapting the monitoring approach
Adapt monitoring and reporting systems to new requirements	Operators	12 -15 months from the issuance of the revised legal requirements
Provide software adapted to new MRV requirements	Software providers	9-12 months from the issuance of the revised legal requirements
Update monitoring plans	Competent authorities	3 months
Train competent authority staff on new MRV requirements, updates of monitoring plans and reviewing of emission reports	Competent authorities	In parallel to setting up of monitoring and reporting systems with operators
Develop verification approaches for the additional data to be verified	Verifiers	In parallel to setting up of monitoring and reporting systems with operators

MRV Option 2 – Approximated fuel consumption

Overview of cost related impacts for the MRV-option 2 (approximated fuel consumption) compared to full scope EU ETS for aviation

Task	Who bears the administrative burden?	Cost implication
Initial setting up monitoring and reporting systems (incl. calculation of distance factors, purchasing updated software, implementing internal processes)	Operator	+
Verification of monitoring data	Operator	+
Reviewing emission reports and verification reports	Competent authority	+
Issuing Guidance and re-allocation of free allowances	EU Commission	+

Timeline for implementation of MRV-option 2

	Responsible Entity	Duration
Revise MRV requirements	EU Commission	8-12 months depending on chosen distance-factor (city-pair vs country-pair)
Potentially provide guidance on the adapted monitoring and reporting requirements	EU Commission	3 months – can partly run in parallel to adapting the monitoring approach
Development of distance factors	Eurocontrol	6-12 months from issuance of revised MRV provisions, depending on specific design options related to distance and fuel consumption chosen – can partly run in parallel to adapting the monitoring approach
Adapt monitoring and reporting systems to new requirements	Operators	3-6 months for internal processes, from issuance of revised MRV provisions
Adapt reporting software	Software providers	6-12 months from issuance of revised MRV provisions depending on chosen distance-factor (city-pair vs country-pair)
Develop verification approaches for the additional data reported	Verifiers	12 months - in parallel to setting up of monitoring and reporting systems with operators

Upstream option

Cost impacts of the upstream option compared to EU ETS

Task	Who bears the administrative burden?	Cost impact
Revise MRV requirements	Commission	++
Provide monitoring plan templates	Commission	+
Capacity building	Operators, competent authorities, verifiers	++
Identification of operators	Competent authorities	+
Application for monitoring plan	Operator	++
Notify changes to monitoring plan	Operator	- Less frequent changes expected (under EU ETS air operators have to provide notification every time there are changes to their fleet)
Review and update of monitoring plan	Competent authority	- Lower number of operators and less frequent updating expected.
Initial setting up monitoring and reporting systems	Operator	++ Completely new system to implement + sunk cost
Set-up of overview system allowing to account for exports	Commission	++
Collection of monitoring data, QA/QC, data archiving, etc.	Operator	Effort similar to stationary installations.
Drafting emission report	Operator	Effort similar to stationary installations.
Accreditation of verifiers for the upstream system	Accreditation body	++ Sunk costs
Verification of monitoring data	Operator	Effort for refineries and importers similar to stationary installations. Higher verification effort assumed regarding exporters.
Reviewing emission reports and verification reports	Competent authority	- Smaller effort than under EU ETS to lower numbers of operators
Operation of overview system allowing to account for exports	Competent authority / Commission	++ Additional task, likely to require dedicated staff.
Issuing Guidance	Commission	+ Dedicated guidance to explain new approach in detail
Update aviation operator list	Commission	- List not required anymore
Application and operator of registry account	Operator	- No change per operator, but lower overall cost due to lower number of operators
Costs related to trading (control systems, cost per transaction)	Operator	- No change per operator, but likely lower overall cost for control systems due to lower number of operators.

Timeline for implementation of upstream option

Tasks	Who	Duration
Revise MRV requirements	Commission	18 -24 months
Set-up of overview system allowing to account for exports	Commission	12-15 months
Provide monitoring plan templates	Commission	3 months from issuance of revised legal requirements
Identify compliance entities	Competent authorities	3 months, from issuance of revised legal requirements
Apply for permit and monitoring plan	Compliance entities	3 months, from issuance of monitoring plan template
Review monitoring plan	Competent authorities	3 months, from submission of monitoring plans
Initial set-up of monitoring system	Compliance entities	6 months from issuance of revised legal requirements
Development of verification approaches	Verifiers	9 months from issuance of revised legal requirements
Accreditation of verifiers	Accreditation body	15 months from issuance of revised legal requirements

ANNEX IX – SUPPORTING LEGAL ANALYSIS

This section provides a more detailed review of the following issues under international law:

A. Geographic scope of a MBM – as derived from customary international law, Chicago Convention and bilateral air service agreements (ASAs)

B. Restrictions on taxes and charges – from Chicago Convention, ASAs and WTO law

C. Non-discrimination of regulated entities – from Chicago Convention, ASAs and WTO law

D. Environmental regulation of international aviation – from UNFCCC texts and decisions and from ICAO resolutions/discussions (as incorporated by ASAs)

E. Overview on possible borders to limit the coverage of a regional MBM

The analysis is based on the review of the following legal acts:

- **Chicago Convention:** In Case C-366/10 the ECJ considered that the validity of the Directive 2008/101 cannot be examined in the light of Chicago Convention as such as the EU is not bound by the Convention, nor has it to date assumed the powers exercised by the Member States in the field of application of the Chicago Convention in their entirety. The provisions of the Convention can however be invoked against the EU member states, as all the member states are parties to the Convention. Also, the substantive issues raised by the relevant provisions of the Chicago Convention are taken into account due to their inclusion in bilateral air service agreements.

  Article 84 of the Convention stipulates a dispute settlement procedure where a disagreement between two or more contracting parties relating to the interpretation or application of the Convention raises. According to the article, if the disagreement cannot be settled by negotiation, it shall be decided by the Council. The unsuccessful party may appeal the decision either to the International Court of Justice or to an ad hoc arbitral tribunal.

- **Customary International Law:** The ECJ in C-366/10 set out the test which needed to be satisfied in order for customary law to be relied upon by an individual to challenge the validity of EU legislation. The tests are that (i) the principles must be capable of calling into question the competence of the EU to adopt that act and (ii) the act in question is liable to affect rights which the individual derives from EU law or create obligations under EU law.

  In respect of these tests, the ECJ found the three principles of customary international law may be relied upon for the purpose of assessing the validity of an act of EU: (1) Each State has complete and exclusive sovereignty over its airspace; (2) No State may validly purport to subject any part of the high seas to its sovereignty; and (3) The principle of freedom to fly over the high seas. These principles have been codified inter alia in Article 1 of the Chicago Convention and Articles 87(1) and 89 of UNCLOS.

  By contrast, the 4th principle asserted by the applicants in C-366/10 – that aircraft flying over the high seas are subject to the exclusive jurisdiction of the State where they are registered – was not accepted by Member States (in particular the UK and Germany). The ECJ found that "insufficient evidence exists to establish that the principle of customary international law, recognised as such, that a vessel on the high seas is in principle

governed only by the law of its flag would apply by analogy to aircraft overflying the high seas."

- **Open Skies Agreement:** International air services between countries operate primarily under the terms of a bilateral air service agreements (ASA) negotiated between two countries. The globe is covered by a network of approximately 5000 ASAs[56], many of which are concluded by EU member states with other countries. In 2007, the EC (and its MS) and the US concluded an air transport agreement which was subsequently amended by a protocol initialled in 2010. The Air Transport Agreement as amended by the Protocol is known as the Open Skies Agreement.

  The ECJ held that the Open Skies Agreement did form an integral part of the EU legal order. It then considered whether the nature and logic of the Agreement permitted the validity of Directive 2008/101 to be examined on its basis and concluded that it did. The ECJ then considered whether the provisions of the Open Skies agreement were unconditional and sufficiently precise so as to enable the Court to examine its validity and concluded that Articles 7, 11(1) and (2)(c) and Article 15(3) did pass that test.

- **ICAO Resolutions.** ICAO Assembly resolutions have been characterised as "soft law". The resolutions however form an important cornerstone of regional and national aviation policy and the states tend to work within ICAO guidance. Moreover, there have been significant discussions recently on both the options for a Global Market Based Measure (MBM) and the so-called Framework on MBMs (intended to outline guiding principles for states and regions that choose to implement MBMs prior to a global measure coming into force). It is therefore worth considering the extent to which the present EU ETS is compatible with the possible options preferred by the ICAO.

- **UNFCCC and Kyoto Protocol:** The EU is a party to both of the instruments. Article 2(2) of the Kyoto Protocol provides that the Parties shall pursue limitation of greenhouse gas emissions from aviation and marine bunker fuels working through ICAO and IMO respectively. However, ECJ in Case C-366/10 rejected the applicability of Article 2(2) KP as it was not considered being unconditional and sufficiently precise so as to confer on individuals the right to rely on it in legal proceedings.

- **WTO law:** The Case C-366/10 did not address the WTO concerns; should other WTO members consider the scheme to be inconsistent with the WTO, these members could challenge the scheme before the WTO dispute settlement body. In the event the WTO found the scheme to be inconsistent with the WTO, the WTO rules would require the scheme to be withdrawn or amended to be consistent with the WTO[57].

  The General Agreement on Tariffs and Trade (GATT) aims at substantial reduction of tariffs and other barriers to trade in goods. The EU ETS for aviation does not directly relate to trade in goods. Consequently, the GATT is not directly relevant to the options reviewed and so there are no grounds to find a violation of this agreement. Trade in services is governed by the General Agreement on Trade in Services (GATS), which covers measures with an effect on trade in services. However, measures affecting air transport services are currently excluded from the GATS and so there are no grounds to find a violation of this agreement. For the upstream option, fuelling could be

[56] Elmar M. Giemulla; Ludwig Weber, "International and EU Aviation Law", Selected Issues, 2011, page 19

[57] Joshua Meltzer, "Climate Change and Trade – The EO Aviation Directive and the WTO", Journal of International Economic Law 15(1), 122

considered a ground-handling service, and measures affecting such services are not necessarily excluded from the coverage of GATS.

Even if the GATT or GATS applied, the EU ETS is designed as non-discriminatory and neutral in the manner it applies to flights arriving to or departing from the EU. Finally, the GATT and GATS have exceptions clauses for environmental measures which would be available, should this be necessary, as justification for the application of the EU ETS to aviation.

Geographic scope of a MBM

Relevant Principles

Article 1 of the Chicago Convention stipulates that every state has complete and exclusive sovereignty over the airspace above its territory. Further, in relation to the geographic scope considerations, there are three relevant principles of customary international law: (1) Each State has complete and exclusive sovereignty over its airspace; (2) No State may validly purport to subject any part of the high seas to its sovereignty; and (3) The principle of freedom to fly over the high seas. These principles have been codified inter alia in Article 1 of the Chicago Convention and Articles 87(1) and 89 of UNCLOS.

Findings of ECJ in Case 366/10

The ECJ found in Case C366/10 that the EU did have competence, in the light of principles of customary international law to adopt Directive 2008/101 in that it extended the ETS to "all flights which arrive or depart from an aerodrome situated in the territory of a Member State". The grounds for this were that:

- Directive 2008/101 did not seek to apply to aircraft registered in 3rd Sates that are flying over third States or the high seas.
- The applicability of the Directive was founded on the fact that the aircraft performed a flight which departs from or arrives at an aerodrome situated in the territory of one of the Member States. The Directive therefore did not infringe the principle of sovereignty because the aircraft to which the Directive applies are physically in the territory of the MS of the EU and subject to the unlimited jurisdiction of the EU.
- Similarly, the application of the Directive cannot affect the principle of freedom to fly over the high seas as an aircraft doing so is not subject to the ETS. Indeed an aircraft can cross the airspace of a Member State without being subject to the ETS.
- It is only the operator of such aircraft which chooses to operate a route arriving at or departing an EU airport which are subject to the EU ETS.
- The ECJ went on to consider the fact that the operator of an aircraft must surrender allowances calculated from the whole of its flight. Taking into account the fact that Article 191(2) TFEU seeks to ensure a high level of protection of the environment, the ECJ concluded that EU legislature may choose to permit a commercial activity only on condition that it complies with criteria established by the EU and designed to fulfil the EU's environmental protection objectives.

In addition, the ECJ concluded that Article 7(1) of the Open Skies Agreement did not preclude the application of the EU ETS since, as established, Directive 2008/101 related to the admission to or departure from the territory of a MS of aircraft engaged in international air navigation.

AG Kokott added in her opinion that there is also no risk of any conflict with Articles 1, 11 and 12 of the Chicago Convention:

- As far as Article 1 is concerned, this merely gives expression to the principle of the sovereignty. Directive 2008/101 does however not contain any extraterritorial provisions.
- Article 11 merely states that the law and regulations of a contracting state are to be complied with upon entering or departing from or while within the territory of that state. It is this and only this compliance with rules upon entering and departing that the EU is requiring from airlines in regards to the EU ETS.
- No rules of air are contained in the EU ETS to make Article 12 of the Convention applicable.

Taxes and charges

Relevant principles

Article 15 of the Chicago Convention relates to airport and similar charges, stipulating that any charges that may be imposed or permitted to be imposed by a contracting state for use of airports and air navigation facilities shall not be higher than those that would be paid by its national aircraft engaged in similar operations. No fees, dues or other charges shall be imposed by any contracting state in respect solely of the right of transit over or entry into or exit from its territory. The similar provision on user charges can also be found from Article 12 of the Open Skies Agreement and the other ASAs.

Article 24(a) of the Chicago Convention stipulates that an aircraft on a flight to, from, or across the territory of another contracting party shall be admitted temporarily free of duty; also fuel, on board an aircraft of a contracting state, on arrival in the territory of another contracting state and retained on board on leaving the territory of that state shall be exempt from customs duty, inspection fees or similar national or local duties and charges. Again, similar exemption from customs duties and charges is stipulated in Article 11(1) of the Open Skies Agreement and other ASAs.

Further, the ASAs also exempt from taxes and charges, with the exception of charges based on the cost of the services provided, fuel that is introduced into or supplied in the territory of a party for use in an aircraft of an airline of the other party, even when these supplies are to be used on a part of the journey performed over the territory of the party in which they are taken on board (Article 11(2) of the Open Skies agreement).

Finding of ECJ in Case 366/10

The ECJ had previously ruled in Case C-346/97 *Braathens* [1999] ECR I-3419 that a Swedish environmental tax on domestic aviation, based on aircraft fuel consumption should be considered an excise duty which was inconsistent with international law. Therefore, there was some precedent for the idea that an ETS might be considered a prohibited tax on fuel.

However, in Case C-366/10, distinguishing *Braathens*[58], both Advocate General Kokott and the ECJ rejected this view for the following reasons:

[58] On the grounds that on the grounds that (a) the offending Swedish provision related to two Directives on the harmonisation of excies duties on mineral oils and needed to be understood in the context of the "political objective of an internal market (which did not apply to the international law provisions) and (b) there was a direct and inseverable link between fuel consumption and the polluting substances by reson of which the Swedish environmental tax was levied (which did not occur here). It is also worth noting that it was clear in

- The price paid for an allowance is not fixed by the state but depends on market forces. A tax is "fixed unilaterally by a public body and laid down according to certain predetermined criteria" whereas the ETS is a market-based measure whereby the purchase price paid is "based on the supply and demand according to free market forces"[59]. The ECJ concluded that unlike in *Braathens* there was "no direct and inseverable link" between the quantity of fuel held or consumed by an aircraft and the cost to the operator.
- The aims of the prohibition differ[60]: international law on duties on fuel stocks carried by airlines aims to avoid them being treated as imports whereas the EU ETS' purpose is environmental and climate protection.
- The substance of the prohibition differ[61]: in international law it relates to the fuel stocks while the ETS relates to the quantity of fuel actually used.
- The ECJ held that the ETS is not intended to generate revenue for public authorities.
- Further, AG Kokott pointed out that if the ICAO were to class emissions trading schemes as falling with the prohibition of fees or other charges within the meaning of Article 15, it would be odd for ICAO to be making recommendations for guiding principles for the introduction of MBMs.

Non-discrimination

Relevant principles

Article 11 of the Chicago Convention prohibits discrimination of airlines on grounds of nationality; therefore any kind of obligation may be imposed on air transport operators provided they apply to air transport operators of all nationalities equally[62].

Similar non-discrimination clause on grounds of nationality is stipulated in Article 2 of the Open Skies Agreement and other ASAs. Article 2 of the Open Skies Agreement requires parties to allow "fair and equal opportunity for the airlines of both Parties to compete"; more traditional ASAs stipulate that the designated airlines of both contracting parties shall have "fair and equal opportunities in operating the agreed services".

Finding of ECJ in Case 366/10

In Case 366/10 the ECJ found that Directive 2008/101 was not invalid in the light of Article 15(3) of the Open Skies Agreement, read in conjunction with Articles 2 and 3(4) thereof, inasmuch as it provided in particular for application of the allowance trading scheme in a non-discriminatory manner to aircraft operators established both in the EU and in third states.

Environmental regulation of international aviation

Relevant principles

According to Article 15(3) of the Open Skies Agreement, when environmental measures are established, the aviation environmental standards adopted by the ICAO in Annexes to the Chicago Convention shall be followed except where differences have been filed. The parties

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Braathens that the offending measure was a tax, therefore a number of the arguments above around the relevance of international law set out above could not apply.

[59] AG opinion paragraph 214-215

[60] AG opinion paragraph 229

[61] AG opinion paragraph 230

[62] http://www.bmu.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/aviation_emission_trading.pdf

shall apply any environmental measures affecting air services under the agreement in accordance with Article 2 and 3(4) of the agreement. Environmental provisions are not contained in any other ASA looked for the study.

Standards and Recommended Practices (SARPS) are adopted by the ICAO Council and its subsidiary bodies and incorporated as Annexes to the Chicago Convention. Annex 16 to the Convention, titled "Environmental Protection" contains two volumes, Volume I on aircraft noise and Volume II on aircraft engine emissions. Volume II however contains standards relating to vented fuel and emissions certification applicable to the classes of aircraft engines, but does not regulate reduction of carbon dioxide. These standards have legal force, unlike Resolutions from ICAO Assemblies which are not legally binding.

ICAO Assembly Resolution A37-19 is dedicated to climate change; also addressing the MBMs. In the resolution the Assembly recognise that some states may take more ambitious actions prior to 2020, which may offset an increase in emissions from the growth of air transport in developing states. The Assembly also requests council to undertake work to develop a framework for MBMs in international aviation and urges states to respect the guiding principles listed in the Annex, when designing new and implementing existing MBMs for international aviation, and to engage in constructive bilateral and/or multilateral consultations and negotiations with other states to reach an agreement. A number of ICAO contracting states however lodged reservations expressly denying that unilateral measures were permitted[63]. Also the EU states lodged a reservation in regards that the MBMs may only be implemented on the basis of mutual agreement between states[64].

Findings of ECJ in Case 366/10

In case 366/10 the ECJ assessed the validity of the Directive 2008/101 in the light of Article 15(3) of the Open Skies Agreement (environment) in conjunction with Articles 2 and 3(4). There were three elements to the applicants' case:

- The Court found that there was no evidence that ETS infringed an environmental standard adopted by ICAO; and furthermore in as much as ICAO Resolution A37-19 laid down guiding principles for the design and implementation of MBMs, it did not indicate that the ETS was contrary to aviation environmental standards adopted by ICAO. In particular, the Annex to Assembly Resolution A37-19 stated that MBMs should support the mitigation of GHGs and should not be duplicative: Directive 2008/101 expressly addressed this point in Article 25a which sought to ensure optimal interaction between the EU ETS and MBMs adopted by others. Such an objective corresponds, moreover, to the objective underlying Article 15(7) of the Open Skies Agreement.
- The ECJ found that Article 15(3) did not prevent parties from adopting the measure that would limit operations when such measures are linked to the protection of the environment (see specific reference to environment in Article 3(4)). The ECJ also noted that ETS did not limit either frequency or regularity of service.

[63] http://legacy.icao.int/icao/en/assembl/A37/Docs/10_reservations_en.pdf

[64] "It is important also to make clear that in no way can paragraph 14 be construed as requiring that market-based measures may only be implemented on the basis of mutual agreement between States. The Chicago Convention contains no provision which might be construed as imposing upon the Contracting Parties the obligation to obtain the consent of other Contracting Parties before applying the market based measures referred to in Resolution A37-17/2 to operators of other States in respect of air services to, from or within their territory." http://legacy.icao.int/icao/en/assembl/A37/Docs/10_reservations_en.pdf

Overview on possible borders to limit the coverage of a regional MBM

Territorial waters/sea (12 nautical miles)

According to Article 1 of the Chicago Convention every state has complete and exclusive sovereignty over the airspace above its territory. For the purposes of the Convention the territory is deemed to be the land areas and territorial waters adjacent thereto under the sovereignty, suzerainty, protection or mandate of such state.

The limits of sovereign airspace under the Chicago Convention are unclear, as the Convention does not define the width of territorial waters. The term "territorial waters" used in the Convention also differs from the term "territorial sea" used in UNCLOS and its predecessors the Convention on Territorial Sea and the Contiguous Zone and the Convention on the High Seas. Determining the width of territorial waters is however of critical importance as it defines the area of which the contracting states have complete and exclusive sovereignty in terms of the Chicago Convention.

It is seems that at the time the Chicago Convention was concluded, the approach towards sovereignty was that it included airspace above the land areas and territorial seas, as enshrined in the Convention on Territorial Sea and the Contiguous Zone 1958[65]. In line with the approach it is likely that the same sovereignty was recognised by the Chicago Convention.

The law of the sea has however significantly developed since the adoption of UNCLOS in 1982 and its entry into force in 1994. In accordance with UNCLOS, there are now different segments of waters that are under the sovereignty of a costal state, namely internal waters, in case of an archipelagic state, its archipelagic waters and territorial sea (which extends up to 12 nm). Thus, international law today provides states with sovereignty over land areas, internal waters, archipelagic waters and territorial sea. As Chicago Convention refers ambiguously to territorial waters, that have not been determined internationally in uniform way, it can be understood, in the light of recent developments in state's sovereignty, that Chicago Convention recognises state's sovereignty extending to archipelagic waters and territorial sea of up to 12 nm. The same was confirmed by a study undertaken by the Secretariat of ICAO in 1984 about UNCLOS. The study concluded in regards to Article 2 of the Chicago Convention that "without any need for a textual amendment of the Chicago Convention, its Article 2 will have to be read as meaning that the territory of a State shall be the land areas, territorial sea adjacent thereto and its archipelagic waters[66].

In the light of above considerations, a State's complete and exclusive sovereignty extends beyond its land territory and internal waters and, in case of an archipelagic state, its archipelagic waters, to territorial sea of not exceeding 12 NM in line with the Chicago Convention and UNCLOS. Nautical mile (nm) is a special unit employed for marine and aerial navigation to express distance. The value of 1NM=1852m was recognized by Annex 5 to the Chicago Convention on Units of Measurement to be used in air and ground operations.

When delineating the boundaries with territorial seas, due regard must however be given to particulars of territorial seas, for example Greece also has a 10-mile territorial sea for the purposes of aviation and the control thereof[67].

Exclusive Economic Zone (200 nautical miles)

[65] The Convention does not limit the territorial sea in miles; it is however understood to extend less than 12 NM. The contiguous zone is limited to 12 NM and is a zone is high seas contiguous to territorial sea.

[66] See http://legacy.icao.int/icao/en/leb/mtgs/2008/lc33/docs/LC33_wp4_7e.pdf

[67] See http://ec.europa.eu/maritimeaffairs/documentation/studies/documents/greece_01_en.pdf

According to Article 57 of UNCLOS, the EEZ shall not extend beyond 200 NM from the baselines from which the breadth of the territorial sea is measured.

According to Article 58 of UNCLOS, all states enjoy the freedom of navigation and overflight and other internationally lawful uses of the sea related to the freedoms, such as those associated with the operation of aircraft in the EEZ. The exclusive economic zone is however subject to a specific legal regime under UNCLOS and therefore coastal states retain some sovereign rights and jurisdiction in the area. According to Article 56(1) of UNCLOS the coastal state has, for example, sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, weather living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and jurisdiction as provided for in the relevant provisions of the Convention with regard to the protection and preservation of the marine environment.

In regards to pollution from or through the atmosphere, Article 212 of UNCLOS requires states to adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, applicable to the air space under their sovereignty or aircraft of their registry. It follows that in EEZ the coastal states clearly have some jurisdiction, as in relation to pollution through the atmosphere, the states' jurisdiction is however limited to aircraft of their registry.

In relation to other forms of pollution, UNCLOS affords the coastal states wider jurisdiction, like Article 211(5) of UNCLOS allowing coastal states to adopt laws and regulations in respect of their EEZ for the prevention, reduction and control of pollution from vessels conforming to and giving effect to generally accepted international rules and standards[68].

According to Article 74 of the UNCLOS, the delimitation of the exclusive economic zone between states with opposite or adjacent coasts shall be effected by agreement on the basis of international law. If no agreement can be reached, the states concerned shall resort to the dispute settlement procedures.[69]

Flight Information Regions

Flight Information Regions are established on the basis of Annex 11 to the Chicago Convention, for provision of flight information service and alerting service to promote safe, orderly and expeditious flow of air traffic. The specific objective of the flight information service is to provide advice and information useful for the safe and efficient conduct of flights and the objective of the alerting service is to notify appropriate organisations regarding aircraft in need of search and rescue aid[70].

According to section 2.1.1. of Annex 11 to the Convention the contracting states determine those portions of airspace for the territories over which they have jurisdiction where air traffic services will be provided. By mutual agreement, a state may also delegate to another state the responsibility for establishing and providing services in flight information regions extending over the territories of the former[71]. Those portions of the airspace over the high seas or in

[68] The Convention does not define "vessels", but the term is used in shipping context. Where the provisions apply to aircraft, separately aircraft is named.

[69] E.g. neither Turkey nor Greece have officially claimed an exclusive economic zone or extended their territorial waters to the full 12 miles in the Aegean. See further, for example, http://www.lgcnews.com/turkey-and-greece-dispute-territorial-waters/ and http://www.setimes.com/cocoon/setimes/xhtml/en_GB/features/setimes/features/2013/01/23/feature-04 and http://www.todayszaman.com/newsDetail_getNewsById.action?load=detay&newsId=265640

[70] See Section 2.3.2. of the Annex 11 to the Chicago Convention

[71] See Section 2.1.1 of the Annex 11 to the Chicago Convention

airspace of undetermined sovereignty are determined on the basis of regional air navigation agreements[72], which are approved by the ICAO Council usually on advice of regional air navigation meetings[73]. It is recommended that the air traffic services airspaces should be established on the basis of technical and operational considerations with the aim of ensuring safety and optimizing efficiency and economy[74], rather delineating along national boundaries[75].

FIRs have been established for the purposes of safety and efficient conduct of flights. FIRs may not follow national boundaries and can be also extended to high seas, where the providing state's responsibilities and rights are limited only to technical and operational functions pertaining to the safety and regularity of the air traffic[76]. FIR are not an extension of the airspace of the involved states, but rather an extension of their air traffic control services to non-sovereign areas[77].

It should be added that in EU law the FIR boundaries are used in legislation relating to Single European Sky that follows the Chicago Convention and its Annexes limitations on states' rights in FIRs.

[72] See section 2.1.2. of the Annex 11
[73] See Appendix M to Resolution A37-15
[74] See section 1 of Appendix M to Resolution A37-15
[75] See 2.10.1 of Annex 11 to the Chicago Convention
[76] See section 5 of Appendix M to Resolution A37-15
[77] Giemulla, Elmar; Weberm Ludwig, International and EU Aviation Law, page 50

ANNEX X – IMPACT OF A POSSIBLE EXEMPTION OF FLIGHTS TO AND FROM "DEVELOPING" STATES FROM THE EU ETS

1. Exemption for "developing States" in 2013 ICAO Assembly Resolution A38-17/2

Article 16.b of the 2013 ICAO Assembly Resolution A38-17/2 reads as follows:

> "*Resolves that States, when designing new and implementing existing MBMs for international aviation should grant exemptions for application of MBMs on routes to and from developing States whose share of international civil aviation activities is below the threshold of 1% of total revenue ton kilometres of international civil aviation activities, until the global scheme is implemented.*"

The paragraph 16.b indicates that exemptions should be granted from national and regional MBMs for "developing" States that have a share of less than 1 % in international aviation activity (measured by revenue tonne kilometres (RTK)). The BRIC countries (Brazil, Russia, India, and China) are also likely to support this indication. The United States (US) expressed strong opposition to the reference to "developing States". This language might lead to calls for an elaboration for the first time in the ICAO context of "developing States" in relation to climate change and could be claimed to import the UNFCCC concept of "common but differentiated responsibilities and respective capabilities" (CBDR) into ICAO.

2. Different options for the exemption from the EU ETS of routes to and from "developing" countries

It is important to note that there exists no universally accepted and consistent definition of "developed" and "developing" country. Economic criteria have tended to dominate discussions. One such criterion is income per capita; countries with high gross domestic product (GDP) per capita would thus be described as "developed" countries. International organizations (e.g. UN, World Bank, or the OECD) publish country listings based on income thresholds which a periodically revised (see e.g. Annex A for the latest statistics from the World Bank). Depending on the economic performance of a country, it may be reclassified into a new income group.

Option 1: Exemption from the EU ETS for broadly defined group of "developing" countries with a share in international aviation activity below 1 %

Some developing countries cite the UNFCCC annexes from 1992, to maintain that the determination of developing states should only include those countries not included in the UNFCCC Annex I. A related but more dynamic definition could be based on all countries, which are not high-income countries (see attached map in Annex A for high-income countries according to the statistics from the World Bank). Using the later definition combined with the

1 % threshold for international activities, the EU ETS would only cover routes to and from the following 18 non-EEA countries:

- Canada, Chile, China (incl. associated territories), India, Israel, Japan, Malaysia, Oman, Qatar, Russia, Saudi Arabia, Singapore, South Korea, Switzerland, Thailand, Turkey, UAE, US.

Such a widely defined exemption would have a substantial impact on the environmental effectiveness of the EU ETS. It would reduce the coverage of emissions from the extra-EEA flights by around one third under the hybrid options. The total coverage – relative to the full-scope EU ETS – would be reduced by almost 7 percentage points (for 200nm) or by about 4 percentage points (for 12nm).

Major countries and EU trading partners[78] just below the threshold would include e.g. Brazil, Mexico, and South Africa. It is also notable that flights to/from States in the common European aviation area (e.g. Western Balkans, Moldova) and where we have an open skies approach (pioneered with Morocco) would also be exempt, which may undermine attempts to build a wider aviation market.

With regard to the discussion on fair competition between tourist destinations (see section 5.2.2. of the Impact Assessment), arguments could be raised about distortions in the Mediterranean area because flights to the EU Member States and Turkey are covered but not to the other Mediterranean States. In particular the tourist destinations in North Africa could potentially benefit from a comparative advantage by being exempted from the EU ETS.

Table 15 Impact on coverage from exemptions for "developing" countries

Total CO2 coverage relative to full EU ETS scope	Hybrid option with 200 nm	Hybrid option with 12 nm
Without any exemptions for developing countries	46.5%	38.5%
Option 2: Exempting flights to/from LDCs	46.1%	38.2%
Option 3: Exemption for intermediate group of "developing" countries (low and lower-middle income countries) with a share in international aviation activity below 1 %	44.1%	37.0%
Option 1: Exemption for broadly defined group of "developing" countries with a share in international aviation activity below 1 %	39.8%	34.4%

[78] See for a list of EU's 50 main trading partners: EUROSTAT, External and intra-EU trade - A statistical yearbook - Data 1958 – 2010, section 2, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-GI-11-001/EN/KS-GI-11-001-EN.PDF.

Option 2: Exemption from the EU ETS for narrowly defined group of "developing" countries (Least Developed Countries (LDC))

As the broadest common defintion of "developing" countries includes a large number of economically advanced countries and some of the EU's main trading partners, it could be considered to alternatively grant the exemption to the 48 Least Developed Countries (LDCs), as defined by the United Nations.[79] An exemption limited to LDCs would only slightly reduce the environmental effectiveness of the EU ETS and not raise any discrimination issues.

Option 3: Exemption from the EU ETS for intermediate group of "developing" countries (low and lower-middle income countries) with a share in international aviation activity below 1 %

To achieve a compromise between environmental effectiveness and support for a lower effort by developing countries, the exemption could be limited to routes to and from low and lower-middle income countries that have a share in international aviation activity below 1 %. This option would keep the routes to and from the majority of the EU's main trading partners covered under the EU ETS. However, from the EU's neighbourhood countries, major countries like Morocco, Egypt, and Ukraine – which are lower-middle income countries – would still remain exempted under this option.

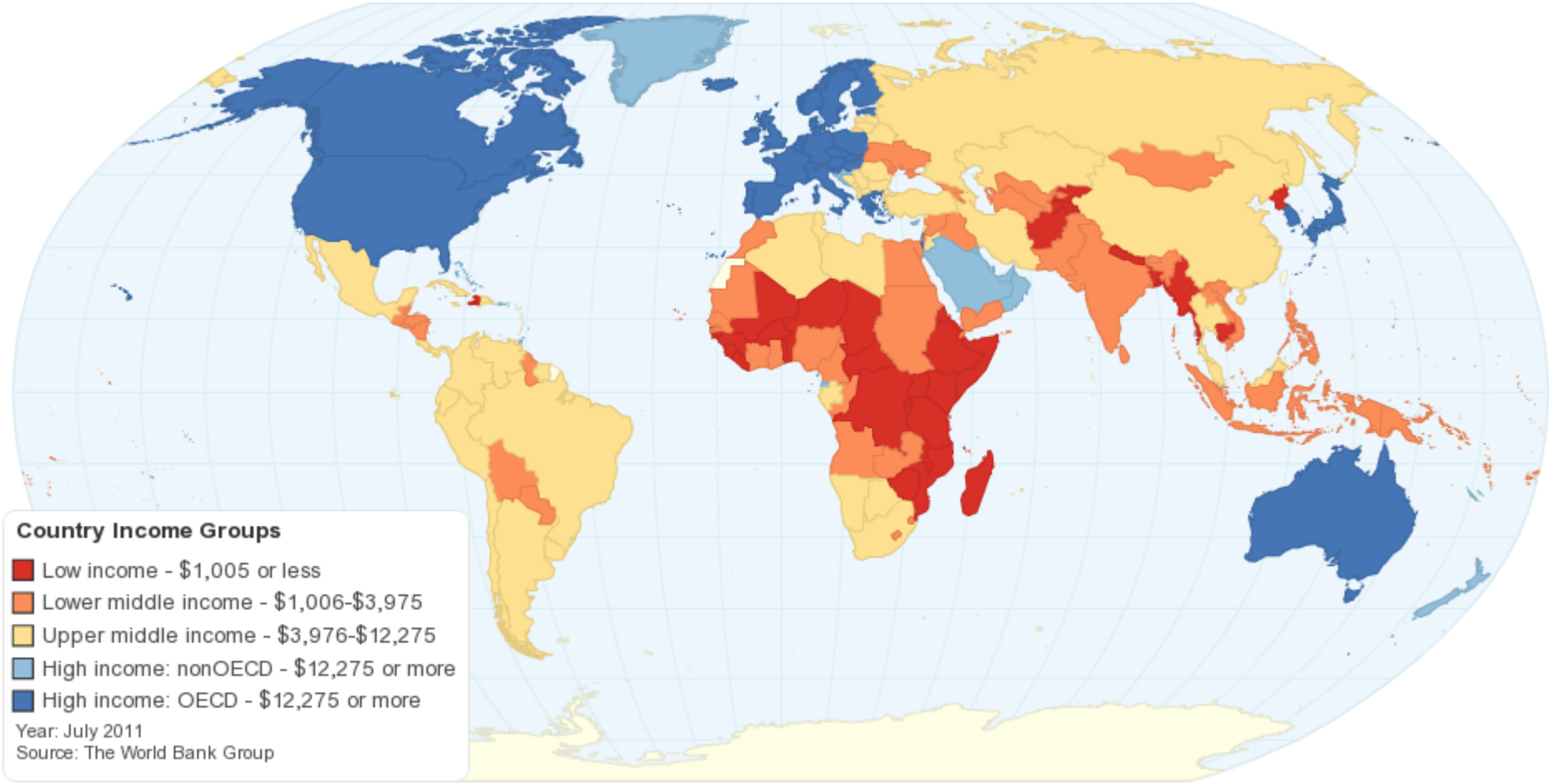
The loss in environmental effectiveness would be limited to about 1.5 to 2 percentage points.

Furthermore, the limitation to low and lower-middle income countries would be in line with the recent redesign of the EU's *Generalised Scheme of Preferences (GSP)* for trade in goods with developing countries[80]. The new GSP rules, which will apply from 1 January 2014, exclude upper-middle and high income countries from reduced tariffs under the GSP to focus on those countries most in need.

[79] http://unctad.org/en/Pages/ALDC/Least%20Developed%20Countries/UN-list-of-Least-Developed-Countries.aspx

[80] The EU's Generalised Scheme of Preferences (GSP), created following UNCTAD recommendations, helps developing countries by making it easier for them to export their products to the EU. This is done in the form of reduced tariffs for their goods when entering the EU market. The GSP is subject to WTO law, in particular to the GATT and the so-called "Enabling Clause" which allows for an exception to the WTO "most-favoured nation" principle (i.e. equal treatment should be accorded to all WTO Members). See http://trade.ec.europa.eu/doclib/docs/2012/october/tradoc_150028.pdf.

Annex A: World Bank classification of Country Income Groups



ANNEX XI – RESOLUTION A38-17/2 OF THE 2013 ICAO ASSEMBLY WITH REGARD TO MBMS

1. Resolution text

Framework for regional and national MBMs

16. Resolves that States, when designing new and implementing existing MBMs for international aviation should:

a) engage in constructive bilateral and/or multilateral consultations and negotiations with other States to reach an agreement,

b) grant exemptions for application of MBMs on routes to and from developing States whose share of international civil aviation activities is below the threshold of 1% of total revenue ton kilometres of international civil aviation activities, until the global scheme is implemented;

17. Requests the Council to review the *de minimis*, including the *de minimis* threshold of MBMs mentioned in paragraph 16 b) above, taking into account the specific circumstances of States and to be presented for consideration by the 39th Session of the Assembly in 2016;

Global MBM

18. Decides to develop a global MBM scheme for international aviation, taking into account the work called for in paragraph 19;

19. Requests the Council, with the support of member States, to:

a) finalize the work on the technical aspects, environmental and economic impacts and modalities of the possible options for a global MBM scheme, including on its feasibility and practicability;

b) organize seminars, workshops on a global scheme for international aviation participated by officials and experts of member States as well as relevant organizations;

c) identify the major issues and problems, including for member States, and make a recommendation on a global MBM scheme that appropriately addresses them and key design elements, including a means to take into account special circumstances and respective capabilities as provided for in paragraphs 20 to 24 below;

d) report the results of the work in sub-paragraphs a), b) and c) above, for decision by the 39th Session of the Assembly;

20. Resolves that an MBM should take into account the special circumstances and respective capabilities of States, in particular developing States, while minimizing market distortion;

21. Also resolves that special circumstances and respective capabilities of developing States could be accommodated through de minimis exemptions from, or phased implementation for, the application of an MBM to particular routes or markets with low levels of international aviation activity, particularly those serving developing States;

22. Also resolves that, the administrative burden associated with the implementation of an MBM to States or aircraft operators with very low levels of international aviation activity should not exceed the benefits from their participation in the MBM, and that exemptions

from the application of the MBM to such States or aircraft operators should be considered, while maintaining the environmental integrity of the MBM;

23. Also resolves that adjustments to MBM requirements for aircraft operators could be on the basis of fast growth, early action to improve fuel efficiency, and provisions for new entrants;

24. Further resolves that, to the extent that the implementation of an MBM generates revenues, it should be used in consistency with guiding principle n) in the Annex;

New guiding principle p) for MBMs added to the Annex

p) MBMs should take into account the principle of common but differentiated responsibilities and respective capabilities, the special circumstances and respective capabilities, and the principle of non-discrimination and equal and fair opportunities.

2. Votes and reservations stated at the Assembly

Vote on Article 16:

Article 16, proposed by Russia in association with several other States (including Brazil, China India and South Africa), passed by a vote of 97 to 39. A substantial minority of countries voted against Article 16 (including EU Member States and other major aviation countries like US, Australia, Canada, and Japan).

Reservations on Article 16.a:

Singapore (fearing the mutual agreement formulation could result in different types of agreements between states and airlines of different nationalities not being treated equally and unequal enforcement of national laws), **Iran**.

Reservations on Article 16.b:

US, Japan, New Zealand, Australia, Canada, South Korea, Iran; concerns expressed by **UAE and Qatar**.

Reservations on entire Article16:

Lithuania on behalf of 44 European States (regretting that no consensus was found on market based measures that are applied prior to a global MBM taking effect and that no agreement could be found on how States should be able exercise their sovereignty to take early action to reduce aviation emissions).

Reservations on guiding principle p)

Lithuania on behalf of 44 European States (whilst fully endorsing the ICAO principles of non-discrimination and equal and fair opportunities, as well as special circumstances and respective capabilities of States, serious reservations were expressed about the reference to CBDR); **US, Japan, New Zealand, Australia, Canada and South Korea** (on the inclusion of CBDR); **Mexico** (concerned about putting non-discriminatory first).