

## **Aviation and the environment: using economic instruments**

### **Key points made by stakeholders at discussion workshops**

*HM Treasury and the Department for Transport recently organised a series of discussion workshops with stakeholder groups to take views on the possible role of economic instruments in encouraging the aviation industry to take account of, and where appropriate reduce, its contribution to climate change, local air and noise pollution. Stakeholders were allocated to one of four broad groups: environmental groups, the expert community, public bodies, and industry. A final discussion workshop brought together representatives of each of these groups.*

*This note summarises the points made by stakeholders at these workshops. These points appear in no particular order of precedence, and do not represent the views of all invitees present (though in many cases there was broad agreement), nor do they represent the views of the Government.*

*The Government will set out its views on economic instruments in its White Paper on Air Transport.*

### **Final workshop involving all stakeholder groups**

#### **Climate change**

##### *Approach to use of economic instruments*

- Some concern that the damage costs in the discussion document were undervalued. For example, the costs of climate catastrophe were not included.
- Belief that more research into aviation's impacts on radiative forcing and contrails was desirable and that economic instruments should be flexible to accommodate new knowledge on these phenomena.
- Belief that when designing instruments or regulations, the competitiveness of UK aviation and tourism should be considered.
- Belief that supply-side improvements alone would not reduce emissions sufficiently.
- Agreement that action at an international level was preferable. Some support for the view that action at an EU or domestic level was an important precursor to action at an international level.
- Belief that progress in the International Civil Aviation Organisation (ICAO) would be too slow to tackle aviation's environmental impacts in the near term.

##### *Views on different economic instruments*

- Preference for a globally-agreed quantitative target for CO<sub>2</sub> emissions and climate change impact, which implied a link to a global emissions trading regime. However, some belief that it would be easier to continue and expand the existing small carbon offset schemes than to introduce global CO<sub>2</sub> trading.
- A variety of views about how permits should be allocated to sectors were an open CO<sub>2</sub> trading regime to be introduced, including auctioning and grandfathering.
- Belief that a separate instrument would be needed to deal with aviation's global warming impact on radiative forcing. Suggestions included an EU-wide emissions charge.
- Belief that international agreements on environmental limits should be reached before additional airport capacity is provided.
- Some concern that although revenue-neutral instruments have supply-side incentives, they have limited demand side effects.

#### *Other points raised*

- A variety of views were expressed about the use of revenues from potential economic instruments. Options suggested included: R&D for more environmentally-friendly technology, mitigation, and general public expenditure.
- Belief that Air Passenger Duty has little impact on supply-side improvements.
- Belief that long term 'signals' and incentives are needed, owing to the long lead times needed to develop new aviation technology.
- There was some support for the economic instruments as they were considered progressive because air travellers tend to have above average incomes, and because controlling climate change impacts would benefit those in poorer countries most.
- Some concern that economic instruments may prevent less well-off people from flying.
- Belief that the price elasticity of demand for air travel may fall over time as people get used to flying.

#### **Local Air Quality and Noise**

- Broad support for quantity-based rather than price-based solutions. Belief that quantity-based mechanisms offered certainty of pollution reduction and greater transparency to the public. However, there were important caveats, including:
  - the need to avoid a 'one size fits all' approach when dealing with variable local effects;
  - the risks of setting the target either too high or too low; and
  - the importance of involving all stakeholders in setting the target.
- More extensive land-use planning around airports should be used to minimise impacts from aviation.

- Broad support for revenue-raising measures, although a preference from some for revenue recycling for R&D and mitigation. Others thought that R&D was better stimulated using other measures.
- Local impacts should be dealt with by decisions made from negotiations conducted involving the relevantly affected local stakeholders. Although again some caveats identified:
  - Important to avoid potential problem of moral hazard for local authorities. Ability to set very tough targets with financial penalties could be used to raise revenue.
  - Important to avoid some airports being placed at a competitive disadvantage, so merit in establishing a common framework for all airports.
  - Instruments tailored to a variety of different local impacts might not encourage the technological changes required on a world-wide scale. In this case, regulation may be necessary.

### **Workshops with individual stakeholder groups: climate change**

#### **Environmental groups**

##### *Approach to use of economic instruments*

- The 'basket' of aviation's emissions should be targeted, not CO<sub>2</sub> alone.
- International aviation emissions should be included in Kyoto targets.
- Delays in progressing action internationally, or at EU level, should not preclude action at the domestic level.

##### *Views on different economic instruments*

- Attempts should be made to include aviation in an open EU trading regime despite the fact that this may be resisted by some Member States. UK should join coalition of willing EU countries.
- There should be a league table illustrating the environmental performance of individual airlines and airports.
- Economic instruments should also be used to manage demand and/or to cap the growth of aviation emissions.
- Air Passenger Duty was not considered to cover external costs; it could be restructured to internalise external costs. The sector as a whole was considered to be under-taxed.

##### *Other points raised*

- R&D into more environmentally-friendly technology should be encouraged.
- Slot auctioning could be used to manage load factors on planes more efficiently.
- Belief that the zero-rating of VAT did not create a 'level playing field' – VAT should be charged on domestic flights/within domestic airspace.

## **Expert community**

### *Approach to use of economic instruments*

- There is difficulty in quantifying the damage costs of climate change because of the significant scientific uncertainty.
- The radiative forcing index figure of 2.7 is an illustrative figure due to the large scientific uncertainty associated with this phenomenon.
- One commentator stated that once account is taken of the radiative forcing effect of aircraft emissions, aviation would be responsible for a substantial share of climate change impact.
- All greenhouse gas emissions should be tackled (CO<sub>2</sub>, NO<sub>x</sub>, etc) but there should be specific instruments to tackle each.

### *Views on different economic instruments*

- There is scope for some form of charge at national level as an intermediate measure ahead of any permanent arrangements at EU and global level.
- Any agreed permit trading system should be global, but a national and/or EU scheme could lead-up to that as a learning exercise.
- The effectiveness of an emissions trading regime depends on the extent of geographical and industry coverage.
- An EU-wide charge on emissions would incentivise the industry to improve environmental performance but action at national level alone would damage competitiveness.

### *Other points raised*

- Any revenues raised from emissions charges should be hypothecated for carbon offset projects.
- There is thought to be scope for reducing emissions through changes in aircraft operational procedures.
- Given the doubt that technological change will be insufficient to reduce environmental impacts in the near term, the Government should adopt a long-term (50 year) plan to make aviation sustainable.

## **Public bodies**

### *Approach to use of economic instruments*

- Need to make the public recognise that aviation causes environmental damage. Suggestion that climate change costs should be shown separately on airline tickets.

- Due to the difficult legal and political issues afflicting any international agreement over aviation's contribution to climate change, interim economic instruments should be introduced.
- It was thought best to sort at the EU level first, then later work on international agreements.

#### *Views on different economic instruments*

- There was no preferred economic instrument to deal with climate change, although there was support for an EU wide emission charge. Open permit trading was also considered as it would give businesses more flexibility in the long term to control costs, but there were some worries over the instability of permit prices.
- Acknowledged the need to develop economic instruments which give manufacturers incentives to develop more fuel efficient aircraft. It was thought that open permit trading offered lesser incentives as aviation would be able to purchase permits from other sectors rather than take abatement action itself.
- It was thought that there was a need to consider both CO<sub>2</sub> emissions and wider issues such as contrail formation and radiative forcing. It was acknowledged that there were recognised problems of expanding an open trading system beyond CO<sub>2</sub> emissions, thus an emissions charge could be a better option to deal with the wider issues. Some though thought that there was a possible need for a combination of instruments to deal with radiative forcing.

#### *Other points raised*

- But there would be competitive problems for EU airlines particularly on trans-atlantic flights, if economic instruments were only EU-based.

## **Industry**

#### *Approach to use of economic instruments*

- There was general consensus that long-term international agreement was the way forward, and that unilateral action in the interim could have significant adverse impacts on UK competitiveness.
- CO<sub>2</sub> was identified as the main emission to be reduced. Measures to reduce other emissions and their radiative forcing effect may actually increase fuel burn (eg flying at lower altitudes).

#### *Views on different economic instruments*

- Emissions trading was felt to be the way forward, but real costs of trading to aviation need to be considered carefully. A revenue neutral emissions charge also looks promising.

- Voluntary agreements were seen as beneficial interim measures before any solid internationally agreed economic instruments are introduced.
- Air Passenger Duty was not a favoured economic instrument for environmental purposes; it lacks the necessary incentives required for the industry to reduce its environmental impacts.

#### *Other points raised*

- There were queries over the future role of Air Passenger Duty. If new economic instruments were introduced, would they replace Air Passenger Duty or work alongside it?
- Efficiency gains from operational improvements and from more imaginative use of tax incentives for environmental investment were identified as possible emission reducing solutions. For example, improvements in airspace management could yield between 6 – 18% improvement in fuel burn and CO<sub>2</sub> emissions.
- There was little agreement concerning the UK stance for the 2<sup>nd</sup> Kyoto commitment period.
- There were worries that including international CO<sub>2</sub> emissions in UK domestic totals would probably raise competitive issues for UK aviation.
- There were concerns that raising air fares to reduce environmental impacts, through demand management solutions, could lead to social exclusion.

### **Workshops with individual stakeholder groups: local air quality and noise**

#### **Environmental groups**

##### *Approach to use of economic instruments*

- There were concerns with the hedonic pricing methodology used for estimating the external costs of noise.
- It was suggested that simply putting a value on environmental costs, and introducing economic instruments to reflect these costs, was a difficult task due to the danger of underestimating the costs.
- It was stated that any valuation of the cost of noise should reflect the assumed higher impact [per QC point] of night noise.
- Some were Concerned that the noise contour methodology and its application understates the number of people affected – (onset of annoyance lower than 57 dBA L<sub>eq</sub>).
- There was general support for the principle of charging airlines & airports for the environmental damage they cause.
- Some believed that a minimum environmental standard should be set for noise as well as local air quality, and charges should apply to any airport/airline that falls below that standard.
- Others though thought relief from noise should be seen not simply as an external cost but as a basic human right.

### *Views on different economic instruments*

- Any charge levied on local air quality and noise impacts should form part of a mutually reinforcing 'package' of measures to be used to manage demand.
- It was thought that there needed to be a significant increase in the level of charges to incentivise industry to improve environmental performance.
- It was felt that all charges should be transparent to the passenger. One suggested solution was printing the charge on air tickets.
- Economic instruments should be applied to meet mandatory EU air quality standards and/or used to incentivise alternatives to flying. For example, rail travel.
- Economic instruments should also be used to compensate local communities eg to reduce Council Tax to reflect effect on house prices.
- A proposed charge on all cars in a designated area around any airport, with the revenue then recycled and used as subsidies for public transport links to that airport.

### *Other points raised*

- Some felt the examples of practice in Sweden, Switzerland, and Netherlands were not ideal, as they did not go far enough. Swedish and Swiss airports differentiate landing charges by noise and air quality emission standard of aircraft, whereas Schiphol airport has adopted a noise contour limit.

## **Expert community**

### *Approach to use of economic instruments*

- The local environmental effects/costs were considered small compared to climate change issues.
- There was a concern over the validity of the estimates for the external cost of noise. It was debated whether individual noise events or increased frequency of air traffic movements was the more annoying factor for the public. It was also unclear whether all of the factors of annoyance were captured by the hedonic pricing methodology.
- The noise problems were considered to be significantly different to local air quality problems and should therefore be addressed separately with alternative economic instruments.
- However it was acknowledged that there were trade-offs between measures to reduce noise and NO<sub>x</sub>, especially in terms of technological advances.
- It was highlighted that the good design of economic instruments is vital, and stressed that supply-side effects would be more beneficial than demand management.
- It was suggested that economic instruments based on quantity controls might be more appropriate than ones based on prices. This would also be consistent with impending EU regulations for NO<sub>x</sub> and PM<sub>10</sub>.

### *Views on different economic instruments*

- There were suggestions that noise impacts on the local community could be compensated by modifications to the council tax regime.
- Another suggested solution for reducing the noise impact at airports was the introduction of a cap on the total level of noise at individual airports and then trading permits.
- Some examples of noise related charges already in operation were identified. BAA at Heathrow, Gatwick and Stansted (and some other airports) operate a revenue-neutral scheme that differentiates the charge according to the noise of the aircraft; and some larger UK airports have implemented sound insulation schemes, grant aided and funded by the industry, and reflected in charges.
- It was felt that any proceeds from noise charges should be re-channelled into research into noise reducing technologies.
- A major source of local air quality deterioration was due to ground movements at and around the airport. Improvements could have a significant effect on environmental impacts.
- However, it was considered difficult to measure the environmental impacts from aviation on local air quality as some impacts were due to local traffic *etc.*
- The European Civil Aviation Conference has recently produced a classification of aircraft by emissions, which could provide a basis on which airports could charge airlines for exceeding agreed emission limits.

### *Other points raised*

- A further idea suggested was the introduction of rigorous land-use planning constraints around airports to reduce the impact of noise and local air quality pollutants on the local community.

## **Public bodies**

### *Approach to use of economic instruments*

- It was thought that the estimated external costs for both noise and local air pollutants are far too low. There is a belief that more money is required to mitigate the effects of noise.
- There were concerns that the hedonic pricing model is an inappropriate method for valuing external costs of noise – in terms of valuing lost sleep, although doubts were expressed surrounding people's perception of sleep disturbance.
- It was identified that it is legally easier to charge planes differently based on noise certification values rather than to ban certain aircraft types outright.
- Given this, it was felt that individual aircraft should be fined (more stringently than current departure limits surcharges) for exceeding specified levels of noise.

### *Views on different economic instruments*

- It was suggested that the desired economic instrument devised should include landing charges for noise made by individual aircraft, varied by the time of day the noise is made, the level of noise made and by number of people affected around airports.
- Any money collected from noise charges should be used to fund either research and development, or measures to mitigate the noise, such as double glazing *etc.*
- It was identified that reducing noise in engines may lead to increases in NO<sub>x</sub> emissions.
- With EU mandatory limits for NO<sub>x</sub>, it could make sense to cap and trade NO<sub>x</sub> permits at airports.
- Most agreed that there was difficulty in controlling and regulating NO<sub>x</sub> emissions around airports and in the local area due to the multitude of emission sources.

### *Other points raised*

- It was identified that the number of air traffic movements needs controlling as current landing charges do not efficiently price them. There is possible scope for the use of an 'environmental envelope'.
- One commentator identified the problem of odour around airports.
- There was general agreement for the need to involve local communities alongside Government when setting the framework within which they should take action, rather than the government introducing economic instruments itself.

## **Industry**

### *Approach to use of economic instruments*

- It was thought that due to the low external cost of local air quality and noise, there is limited evidence of market failure for these pollutants. This is supported by evidence by a CAA report showing reduction in noise contours for the South East airports. Thus there is need for a proportionate response in these areas.
- Local air quality and noise need specific and local solutions. Industry was the preferred body to administer any introduced revenue neutral scheme or solutions, although the need to involve local communities, airports and airlines in consensus building of such solutions was stressed.

### *Views on different economic instruments*

- An example of a proposed noise related charge was suggested. Differential noise charges could be set based on noise certificate levels for aircraft types with the revenue hypothecated to mitigate its effects. Such instruments more effective for noise than Local air quality pollutants.

- The favoured measure to mitigate the impact of local air quality pollutants was to deal with the surface transport around airports by promoting and providing better public transport links. Schemes should be revenue neutral or hypothecated into mitigation locally or improving surface access provision.

#### *Other points raised*

- It was thought preferable to harmonise EU and international action on economic instruments. Unilateral solutions were seen as problematic as any international harmonisation of economic instruments could potentially be different to agreed domestic regulations or instruments. This would mean any business decisions taken based on domestic regulations would be risky should these domestic regulations then later change to the new and differing international regulations.
- Some believed that the Government and not industry should be responsible for better land use regulation and planning. It was suggested that disclosure notices be given to residents moving into a new area to make them more aware of potential adverse environmental impacts.

#### **Workshops with individual stakeholder groups: supply side effects**

##### **Industry**

- Industry has a good track record on noise and fuel efficiency, but NO<sub>x</sub> is a relatively new factor in the equation. There was feeling in some quarters that noise has an overly high priority as an external cost due to the political situation. This has compromised the effort to improve fuel efficiency in engines.
- The trade off between fuel efficiency and NO<sub>x</sub> was recognised and further R&D into the effect of other emissions at altitude was supported.
- It was identified that there are long lead times for industry to develop new technology and replace older parts of fleet. Thus any new economic instruments need to be designed with this in mind.
- Aspirational EU research targets were recognised and needed to spur further improvements, though these are recognised as stretch goals.
- It was thought that any charges based on noise or local air quality, which affect the local community around airports, should be ring-fenced to mitigate impacts at the local level.
- It was felt that there was a requirement for accompanying planning regulation/restrictions alongside supply side incentives to tackle the problems of local air quality pollutants and noise.
- The sensitivity of the freight market to competitiveness impacts, particularly where measures are introduced unilaterally, was highlighted.
- It was identified that incentives are required to tackle consumer behaviour and to increase consumer awareness of aviation's environmental impact.

**Appendix:** An alphabetical list of all organisations invited to the Stakeholder Meetings.

Advisory Committee on Business & the Environment  
Aircraft Owners & Pilots Association  
Airports Council International  
Airport Operators Association  
Airport Watch  
Air Transport Users Council  
Association of British Tour Operators  
Aviation Environment Federation  
Board of Airline Representatives in the UK  
British Air Transport Association  
British Chamber of Commerce  
British International Freight Association  
Charter Airline Group of UK  
Civil Aviation Authority  
Climate Care  
Commission for Integrated Transport  
Confederation of British Industry  
Council for the Protection of Rural England  
Countryside Agency  
Cranfield University  
English Nature  
Environment Agency  
European Express Association  
Federation of Tour Operators  
Forum for the Future  
Freedom to Fly  
Freight Transport Association  
Friends of the Earth  
General Aviation Manufacturers & Traders Association  
Greater London Authority  
Green Alliance  
Greener by Design  
Institute of Public Policy Research  
International Air Transport Association  
Liason Group of Consultative Committees  
Local Government Association  
Manchester University  
National Air Traffic Services  
Northern Ireland Department of Regional Development  
Parliamentary Office of Science & Technology  
Royal Aeronautical Society  
Royal Commission on Environmental Pollution  
Royal Society for the Protection of Birds  
Scottish Executive  
Socialist Environment and Resource Association  
Society of British Aerospace Companies  
Stockholm Environment Institute

Strategic Aviation Special Interest Group  
Sustainable Development Commission  
Trades Union Council  
Transport 2000  
UK Petroleum Industry Association  
Welsh Assembly