

Summary

On 1 January 2012 the aviation industry was brought within the European Emissions Trading Scheme (EU ETS) and must now purchase emission allowances for some of its CO₂ emissions.

At a price of 10 euros per emission allowance, model calculations indicate that passenger numbers travelling with EU airlines will decline by on average 0.2% if only the costs of the purchased allowances are passed on to customers. If the airlines also pass on the value of their free emission allowances, passenger numbers will decline by 0.9%. This decline is relative to the expected market growth curve without ETS. A sensitivity analysis shows that at a price of 50 euros the effects are about five times as large. This analysis takes no account of any adjustments the airlines may make to their networks. In practice, the actual costs airlines decide to pass on to customers will depend on what is most favourable for their operating results. The impact on operating result will never be greater than the costs of the purchased allowances.

For Schiphol and KLM the changes in passenger numbers will be two to three times larger than the average. This is because they handle and carry more transfer passengers, who are more sensitive to increases in ticket prices than passengers in the domestic market. Besides this response in demand, there is a risk that parties outside the EU will take generic or specific retaliatory measures, or both. An example of a generic measure is a boycott of the ETS. Specific measures may have a disproportionate impact on the Dutch aviation sector, which could lead to an accumulation of ETS costs and retaliatory measures.

As the aviation market is growing, more allowances will be needed for the flights falling under the ETS than the total available to the airlines. The airlines will therefore have to either reduce their emissions by taking mitigating measures or purchase additional emission allowances from other ETS sectors. The reduction in 2020 will be about 29% of the expected airline emissions in 2020.

Civil aviation in the ETS: Free emission allowances are insufficient

On 1 January 2012 the aviation sector was brought within the existing European Emissions Trading Scheme (EU ETS). This system sets a limit ('cap') on the CO₂ emissions of a large number of market actors, until recently mainly in the industrial and energy sectors. Each year the companies participating in the ETS must surrender a number of emission allowances equivalent to their CO₂ emissions to the emission authorities. The total number of available emission allowances is limited by law.

The emissions trading scheme for aviation covers the CO₂ emissions of all flights arriving and departing at airports in the European Union (plus Iceland, Lichtenstein and Norway). Airlines must possess emission allowances equal to all the CO₂ emissions from their flights (one emission allowance is equivalent to one tonne of

CO₂). To include the emissions of the aviation sector within the current ETS, the existing ETS emissions cap has been increased by about 215 million emission allowances in 2012; for the period 2013 to 2020 the increase will be about 210 million allowances in each year. These numbers correspond with 97% and 95% respectively of the annual average level of emissions for the period 2004 to 2006. This increase is less than the actual emissions from the aviation sector. The total size of the emissions cap for all sectors has therefore become relatively tighter.

For 2012 the aviation sector has been allocated about 183 million free emission allowances, and for 2013–2020 the sector will receive about 173 million allowances each year. These free allowances amount to 85% and 82% of the total number of aviation allowances which have been added to the existing emissions cap.

The allocation of free allowances to the airlines is based on the activity of each operator in 2010 in terms of revenue tonne kilometres. The remaining allowances are allocated by auction. If the free allowances allocated to the airlines are not sufficient to cover their emissions, they can take mitigating measures to reduce emissions, purchase additional allowances at auction, or buy allowances from other ETS participants, especially from those outside the aviation sector who have allowances to spare.

In 2012 the airline sector will have to buy emission allowances worth 0.6 billion euros

As the aviation sector is growing, the number of free emission allowances in 2012 is sufficient to cover on average about 75% of the emissions from flights within the ETS. In subsequent years the proportion of aviation emissions covered by the free allowances will gradually decline to about 58% in 2020 due to a reduction in the number of free allowances and, more significantly, the expected growth in the aviation sector.

At a price of 10 euros per tonne of CO₂, the airlines are expected to make up most of this shortage by purchasing additional allowances. This is because taking measures to reduce emissions in the sector is generally more expensive per avoided tonne of CO₂. If we assume the airlines purchase allowances to cover their entire shortfall, the total cost in 2012 will be about 0.6 billion euros. This sum will increase to about 1.2 billion euros in 2020 because the aviation sector is growing and the number of free allowances will have been reduced. If the price of emission allowances is higher, the costs will be proportionately greater.

The calculations in this report do not take account of any variations in price, but work with constant high and low prices. As the price of emission allowances rises, reduction measures within the sector will become more financially attractive, in turn reducing the number of emission allowances that have to be purchased. On the other hand, these measures also involve certain costs.

The number of allowances that have to be bought is not the same for all airlines. Those airlines with high fuel efficiency will have to purchase relatively fewer emission allowances than other airlines. The same is true for airlines that have grown less rapidly in recent years. The biggest European airlines will have to buy a higher than average number: the estimate for Air France-KLM is 30% of their requirement, for British Airways 34% and for Lufthansa 38%. Low-cost airlines like

Ryanair and easyJet will have to buy a lower than average number; the estimates are 24% and 21% of their requirement respectively. The method for allocating free allowances is favourable for Emirates, which in 2012 will probably not have to buy any, or just a small number, of emission allowances.

How ETS costs are passed on is a strategic choice

Airlines will only pass on the costs of purchased allowances to passengers if this is more beneficial for their operating result than absorbing the costs. If they absorb the costs, ticket prices, passenger numbers and turnover will remain unchanged. Furthermore, the free emission allowances also have a value; the opportunity costs. The airlines can choose to pass on all or some of these costs to passengers. They will do this only if it improves their operating result compared with passing on only the costs of the purchased allowances. The maximum negative effect on the operating result is therefore equal to the costs of absorbing the cost of the allowances.

Whether airlines will pass on the costs of emission allowances, and if so how much, will in practice vary between specific routes and customer groups. This is a strategic choice to be made by the individual airlines themselves. Factors that can influence this choice are:

- the degree of competition with other airlines;
- the price sensitivity of the customer groups in different market segments;
- the possibilities for passing on costs to passengers on routes falling outside the ETS (if the airline in question operates on these routes).

If airlines raise ticket prices in direct proportion to the costs of purchased allowances (one-on-one), irrespective of the route or customer group, most return tickets will be just a few euros more expensive if the price of emission allowances is 10 euros. The price of a return flight from Amsterdam to London will increase by almost 20 euro cents, a return flight from Amsterdam to New York will rise by about 3 euros and a return flight from Amsterdam to Jakarta by about 5 euros. If the value of the free emission allowances is passed on as well, these prices will rise by about 1 euro, 11 euros and 21 euros respectively.

Slight drop in passenger numbers in the total market

The increase in ticket prices is expected to lead to a fall in passenger numbers in all markets from, to and within Europe. If the airlines only pass on the costs of the purchased emission allowances, the number of passengers flying with EU airlines will fall by 0.2%. If they also pass on the value of the free emission allowances, passenger numbers will fall by 0.9%. These are the expected effects at a price of 10 euros per emission allowance.

The effect on passenger numbers may be greater in certain geographical market segments. The largest decline will be in transfer passengers from and to destinations outside the European Union (EU) via a European airport, for example from New York via Schiphol to Mumbai. These passengers have a relatively large number of transfer options to choose from outside the EU, for example via Zurich, or Dubai. For this reason the number of transfer passengers flying via an airport outside the EU will increase. This increase is reflected in a similar decline in the numbers of these transfer passengers flying via an EU airport: 1% to 5% in the relevant market segment, depending on which costs are passed on. However, these

markets are small compared with the size of the total aviation market affected by the emissions trading scheme.

This calculation takes no account of any second-order effects on the number of passengers resulting from changes made to the network. The reduction in the number of passengers may make certain routes unprofitable, leading to lower frequencies or the abolishment of some routes. The chance of the network eroding as a result of this second-order effect increases as the ETS induced cost increase rises. However, it is not possible to estimate the likelihood of this occurring in advance. This requires accurate information about the margins on each route and the contribution each route makes to the whole network, and only the airlines have that information. The analyses in this report do not therefore include an estimate of the likelihood of this happening.

Overall effects on KLM are greater

If KLM passes on the full costs of its purchased emission allowances to all customer groups, the total number of KLM passengers in 2012 is expected to fall by 0.6%, with this decline increasing to 0.9% in 2020 due to the higher costs of emission allowances per passenger. This is related to the reduction in the number of free allowances the airline will receive and the expected growth in the aviation sector. If KLM chooses to pass on the value of their free emission allowances as well, passenger numbers will decline by 2.2%. To illustrate: KLM had 25.1 million passengers in 2011; the above mentioned percentages would mean a reduction in passenger numbers of 150,000 to 550,000.

KLM will only pass on the value of its free allowances if the effect on its operating result is more beneficial than passing on the costs of its purchased allowances, and will only pass on the costs of purchased allowances if this gives a more favourable outcome than absorbing the purchase costs. These costs therefore represent the upper limit of the economic effects. For the period from 2012 to 2020, the costs to KLM of purchasing emission allowances are estimated to be about 30 million euros per year.

Lufthansa and British Airways will also experience greater reductions in passenger numbers in 2012 than the average reduction across all airlines. Depending on the scenario, their passenger numbers will fall by 0.3–1.3% and 0.7–2.9% respectively. Their home airports are also more vulnerable to the effects of the emissions trading scheme than the average EU airport. The effects on Air France will be about the same as the average.

Airlines with a favourably located home airport in relation to the EU, such as Emirates, Swiss Airlines and Turkish Airlines, will profit from the emissions trading scheme. In the scenarios discussed above, the numbers of passengers carried by these airlines will rise as follows: Emirates, by 0.7% to 2.7%; Swiss Airlines, by 0.5% to 1.9%; Turkish Airlines, by 0.1% to 0.6%. The upper limits of these percentages are roughly equivalent to a rise of 220,000, 190,000 and 65,000 passengers respectively.

The emissions trading scheme will generally have a greater effect on network airlines than on low-cost airlines. This is because low-cost airlines do not normally operate on transfer markets and because as ticket prices rise passengers will be

more inclined to choose to fly with a low-cost airline, such as easyJet, than a full service airline like KLM.

Effects on and around Schiphol airport: Lower turnover and employment

In 2012 the number of passengers passing through Schiphol will fall by 0.4% to 1.6%. Compared with the passenger numbers in 2011, this represents a fall of 0.2 to 0.8 million passengers in 2012.

The drop in passenger numbers will result mainly in a loss of income from passenger fees, car parking charges and passenger spending at the airport. This loss of income for the Schiphol Group is estimated to be in the order of 4 to 14 million euros in 2012, rising in future as the number of passengers rises.

The fall in passenger numbers may also lead to a temporary drop in employment levels at and around Schiphol airport compared with the previous growth curve. A rough estimate of this drop in employment levels is about 200 to 800 jobs, depending on which costs airlines pass on to their customers. The degree to which the drop in passenger numbers will actually result in unemployment depends on the proportion of unskilled labour and the displacement effects in other sectors under current labour market conditions. This will be influenced by the further growth of the aviation market.

Airlines will not avoid European airports

Although the demand for flights both in and via the EU will decline, it is expected that airlines will make only limited adjustments to their routes or destinations. A distinction must be made between low-cost airlines and network airlines based in the EU and between network airlines based within and outside the EU.

Owing to their business model, it is easier for low-cost airlines to adjust flight frequencies and scrap destinations. Because they generally operate only within Europe, they are not affected by the restrictions imposed by aviation policies (a free market operates within the EU).

Network airlines based within the EU are tied to their home base because of their business model and aviation policy restrictions, and for practical reasons cannot operate outside the EU. Landing rights are needed for destinations outside the EU, for which aviation policies play a decisive role. These airlines could choose to introduce 'operational' stopovers (where no passengers board or deplane) on their intercontinental flights at airports just outside the EU. No landing rights are needed for these stopovers and so aviation policy restrictions do not apply. However, such operational stopovers entail considerable disadvantages, such as a loss of service quality for passengers and extra take-off and landing fees and fuel costs. For these reasons, this option will only become interesting for EU network airlines if the price of emission allowances reach very high levels. This option was not investigated further within the scope of this study.

At first sight, network airlines based outside the EU do appear to have the choice of avoiding EU destinations. However, they have chosen these destinations because of the numbers of passengers they allow them to serve. The airlines concerned would only choose other destinations outside the EU simply to avoid the costs of the emissions trading scheme if they could find destinations outside the EU that

generate just as many yield. In addition, landing rights and slots must be available for these destinations. Only airlines that call at a European airport en route between two non-EU airports for paying passengers or cargo might be inclined to switch to non-stop flights (without a stopover). However, these airlines are few in number, especially at Schiphol. Moreover, the flights without stopovers must still carry sufficient paying passengers or cargo.

Lower CO₂ emissions, but primarily in non-aviation sectors

With the growth in the aviation sector of 3.5% per year and fuel efficiency improvements of 1% per year assumed in this report, airline emissions from flights falling under the ETS in 2020 will be about 296 megatonnes of CO₂. However, the increase in the overall ETS cap resulting from the inclusion of the aviation sector is 214 megatonnes in 2012 and will be 210 megatonnes in the years 2013 to 2020. The inclusion of the aviation sector in the ETS therefore means that a total emissions reduction of almost 86 megatonnes has to be achieved by 2020. Given the expected growth in the market, this is equivalent to an emissions reduction of about 29%. This reduction may be achieved within the aviation sector or in other ETS sectors, because the ETS mechanism leads to reduction measures being taken where they are cheapest.

An effect of the ETS is that more passengers than before will choose flights falling wholly or partly outside the ETS, leading to an increase in CO₂ emissions outside the ETS area. At a price of 10 euros per emission allowance, this increase will be 0.5 to 1.1 megatonnes of CO₂ in 2020, depending on whether only the costs of purchased allowances are passed on to the passengers, or whether the value of the free emission allowances is also passed on.

Retaliatory measures may have a disproportionate effect on the Netherlands

The European Emissions Trading Scheme has met with much resistance among airline companies and governments outside the EU. As a consequence, various legal, economic and policy measures are being prepared, and some have been implemented. Among these are threats to renegotiate aviation rights, increase tariffs for flyover rights, boycott participation in the emissions trading scheme and hold off orders from European aircraft manufacturers. There is no way to objectively determine at what point these threats may be put into effect. Looking back to previous conflicts, it is not inconceivable that retaliatory measures will be taken and that these will disproportionately affect the Dutch aviation sector. Accumulation of these retaliatory measures could have greater effects on the competitive position of European airlines than the emissions trading scheme itself.

The effects of one of the possible retaliatory measures were investigated by calculating a boycott scenario in which all non-EU airlines refuse to participate in the ETS and therefore do not pass on any costs to their passengers. The outcome was that the negative consequences for European airlines become greater because more passengers will fly with non-European airlines. For KLM the reduction in passenger numbers is 1.5 times larger than without the boycott. In the above scenarios for calculating certain types of costs, and with a price per emission allowance of 10 euros, this leads to a reduction of 0.9% to 3.7%. On the other hand, non-European airlines, such as Emirates, actually gain additional benefits. When both the value of the free emission allowances and the purchased allowances are passed on to the

customer, the number of Emirates passengers rises by 2.9% instead of 2.7% in the scenario in which they do participate in the ETS.

Range of outcomes

In the report a model and various scenarios are used to investigate the range and order of magnitude of possible effects of the ETS. The summary discusses only those effects for the scenario in which the price of emission allowances is set at 10 euros. If the price of emission allowances rises in future, the effects will change roughly in proportion to the change in price. The scenarios in the report are not accompanied by any statement about their probability, but additional calculations were made with an arbitrary price of 50 euros to analyse the sensitivity of the effects to large price increases. At a price of 50 euros, the effects on passenger numbers are almost five times larger than for a price of 10 euros.

The effects described in this report should be interpreted as changes in relation to the expected market growth curve without ETS. In the report an average annual growth of 3.5% is assumed. The calculations take no account of any second-order effects on demand resulting from adjustments made to airline networks. The likelihood of such effects is small when the price of emission allowances is low, but increases as the price of emission allowances rises.