

Costs and Benefits of Stopping the Clock

How Airlines Profit from Changes in the EU ETS

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Summary

All flights arriving at or departing from EU airports have been included in the EU ETS from the beginning of 2012. Airlines have to surrender allowances for emissions on flights to and from EU airports. A share of the allowances has been issued to the airlines for free, the remainder needs to be acquired at an auction or from the market.

In November 2012, the European Commission proposed to exempt intercontinental flights from the EU ETS for 2012, an initiative branded as ‘Stopping the Clock’. As a result of this change, airlines on intercontinental routes are likely to experience additional windfall profit, since they have probably anticipated ETS-related expenditures on these routes, which they will now not incur. In addition, all airlines have a windfall profit since they are likely to pass on the value of the free allowances, as has been demonstrated to happen in all other sectors that have received free allowances. This note estimates the windfall profits.

The report distinguishes two types of windfall profits:

1. Profits that occur because the opportunity costs of free allowances received for intercontinental flights have been passed on. These windfall profits would also have occurred without the “stop the clock” exemption. We call them ETS Windfall.
2. Profits that occur because airlines have raised their revenues on intercontinental flights, but will not need to buy allowances either at the auction or from other actors because of the exemption. We call them Stopping the Clock Windfall.

Depending on the cost pass through, the total windfall profits range from € 679 million to € 1,358 million (see Table 1). About a third of these windfall profits arise from the exemption of intercontinental flights. EU airlines are expected to reap the largest share of the windfall due to the change in regulation (55%), followed by US airlines (13%).

Table 1 Estimation of windfall profits related to flights to and from aerodromes outside the 30 EU ETS countries for all airlines and by nationality of operators

Estimated ETS Windfall in 2012 (million €)	Estimated Stopping the Clock Windfall in 2012 (million €)	Total Estimated Windfall in 2012 (million €)
436 - 872	243 - 486	679 - 1,358

Note: The lower value corresponds to a pass through rate of 50%, the upper value to a full cost pass through.





1 Introduction

According to the ETS Directive (EC, 2008) CO₂ emissions from all domestic and international flights that arrive at or depart from an airport in the EU territory or an EEA-EFTA country (Iceland, Liechtenstein, Norway) are covered by the EU Emissions Trading System from the start of 2012. This means that after each year, aircraft operators must surrender a number of allowances equal to their actual emissions on these routes in that year.

In November 2012, the European Commission proposed to temporarily derogate from the ETS Directive. No action will be taken against aircraft operators that do not meet the ETS Directive's reporting and compliance obligations arising before 1 January 2014 regarding flights to and from aerodromes outside the 30 European countries in the EU ETS. Airlines applying for the exemption need to return all free allowances granted for these flights (EC, 2012). (2012 emissions were required to be reported in February 2013 and allowances surrendered in April 2013 so the stop the clock derogation effectively delays the scheme for intercontinental¹ flights by one year).

It is very probable to assume that the airlines that are active in the geographic scope of the EU ETS have passed their anticipated extra costs due to EU ETS on to their clients at least until November 2012. Some airlines did this explicitly: in January 2012, major U.S. airlines introduced a surcharge on passenger tickets for European flights of USD 3 per passenger, and Lufthansa announced that it would use fuel surcharges for passing on its extra costs (CRS, 2012). Other airlines, e.g. Chinese airlines, have been officially prohibited from raising ticket prices, although lacking public information on prices it is not clear whether this has indeed not occurred (CRS, 2012). All other sectors which had been included in the EU ETS have passed through at least a share of the costs (CE Delft 2010).

Airlines which have raised prices or added surcharges on flights which under the 'stop the clock' proposal are exempted, have raised revenues but not incurred costs. As a result, they have made an unexpected profit, or windfall profit. The aim of this note is to quantify the windfall profits made by airlines on the routes that are temporarily exempted from the ETS Directive.

¹ The term 'intercontinental' is used in this report to identify the flights which are exempted, i.e. flights that either are destined for an EEA airport but have not departed from an EEA airport, or flights that are destined to a non EEA airport.





2 Definition of airlines' windfall profits

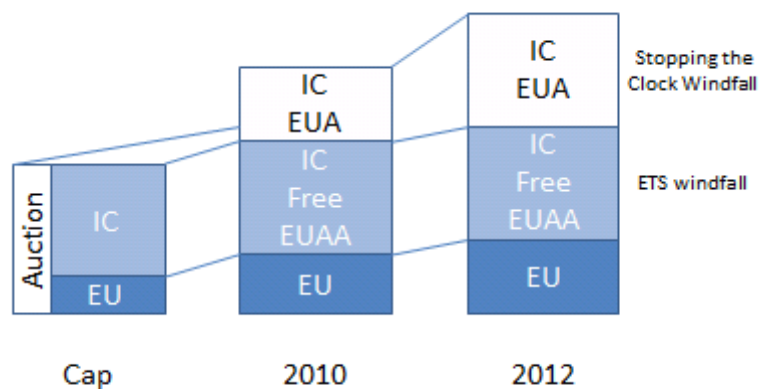
In principle, two kinds of windfall profits have to be distinguished:

1. Airlines anticipated that they would incur costs for purchasing allowances for that share of their CO₂ emissions not covered by free European Union Aviation Allowances (EUAAAs). They have passed these costs on to their clients, but on the routes that are temporarily exempted, these costs will actually not accrue, giving the airlines the opportunity to reap a windfall profit ('Lower expenditures windfall').
2. Airlines that have received free EUAAAs are likely to have passed on the opportunity costs of these free allowances, which occur because, in principle, they could sell these EUAAAs on the market. Even though they have to hand in these allowances when opting for the exemption, they have raised revenues through higher fares or surcharges, thus generating a windfall profit ('Opportunity cost windfall').

Both types of windfall profits are shown graphically in Figure 1. The emissions cap, based on average 2004 - 2006 emissions, is divided into a 15% share that will be auctioned, and 85% freely allocated allowances. This report is concerned only with intercontinental flights, which are exempted from the EU ETS in 2012.

Although aircraft operators may have received free allowances for intercontinental flights, they have to return them in case they apply for the exemption. But since airlines have probably passed through the opportunity costs, they have an opportunity cost windfall. Since emissions on intercontinental flights have grown since 2004-2006, free allowances do not suffice to cover emissions in 2012. Hence, airlines need to acquire additional allowances from the auction, other sectors in the EU ETS or JI/CDM credits. It is almost certain that airlines have passed through these additional (anticipated) expenditures. Because of the exemption of intercontinental flights, airlines can sell the allowances or credits or not buy them if they have not bought them, thus generating a windfall profit. This is indicated in the white rectangles.

Figure 1 Windfall profits arising from the exemption of intercontinental flights



Source: CE Delft.



3 Estimated windfall profits

This chapter presents the estimated windfall profits.

In the first row of Table 2 the estimated windfall profits related to flights to and from aerodromes outside the 30 EU ETS countries is given for all relevant airlines in total.

If 50% (100%) of the opportunity costs related to the EUAs that airlines expected to receive for the compliance with EU ETS on their intercontinental routes for free have been passed through onto the airlines' clients, then all relevant airlines taken together have made a windfall profit of approximately € 436 (€ 872) million in the period January-October 2012.

However, airlines would have made this windfall profit even if intercontinental flights had not been temporarily exempted from the EU ETS. The nature of the windfall profit thereby differs as follows: without a change of the regulation the windfall profit would consist of a pass through of the opportunity costs for the use of free allowances for compliance with EU ETS, whereas the windfall profit after the adjustment of the regulation consists of a pass through of opportunity costs that do not accrue since for the intercontinental routes free allowances are no longer issued.

As a consequence the ETS Windfall cannot, in quantitative terms, be considered an additional windfall profit due the change of the ETS regulation.

If 50% (100%) of the additional costs that airlines expected to have to incur for buying allowances for the compliance with EU ETS on their intercontinental routes have been passed through to the airlines' clients, then all relevant airlines taken together have made a windfall profit of approximately € 243 (€ 486) million.

From EC (2011) we know the distribution of the aviation emissions covered by the EU ETS over the nationalities of the airline operators. This allows us to distribute total windfall profits over the nationalities of airline operators as given in Table 2.



Table 2 Estimation of windfall profits related to flights to and from aerodromes outside the 30 EU ETS countries for all airlines and by nationality of operators

Cost pass through	Estimated ETS Windfall (million €)		Estimated Stopping the Clock Windfall (million €)	
	50%	100%	50%	100%
Airline				
All airlines	436	872	243	486
All EU and EEA-EFTA airlines with intercontinental operations	243.4	486.8	135.8	271.6
All US airlines	56.3	112.6	31.4	62.8
All Chinese airlines	15.6	31.2	8.7	17.4
All United Arab Emirates airlines	10.6	21.2	5.9	11.8
All Singaporean airlines	8.4	16.7	4.7	9.3
All Turkish airlines	7.2	14.5	4.0	8.1
All Korean airlines	6.7	13.4	3.7	7.5
All Canadian airlines	6.7	13.4	3.7	7.5
All Japanese airlines	6.7	13.4	3.7	7.5
All Indian airlines	6.1	12.3	3.4	6.8
All Russian airlines	6.1	12.3	3.4	6.8
All Thai airlines	5.6	11.1	3.1	6.2

Source: This note.

Under the assumption that 67% of the operations of EU and EEA-EFTA airlines are on intercontinental routes, EU and EEA-EFTA airlines (as a group) can be expected to have profited most from the temporary exemption of intercontinental flights from EU ETS (56%), followed by the US (13%), the Chinese (3.6%) and the United Arab Emirates (2.4%) airlines. The share of the other airline groups is lower than 2% respectively. The European non-EU ETS countries Turkey (1.7%) and Russia (1.4%) naturally play a role in this context, too.

Note that this distribution is associated with the following uncertainties:

1. We do not know the source that has been used by EC (2011) to determine this distribution.
2. The year of the distribution is not known to us. If the data is relatively old it could be the case that the shares could have changed significantly in the meantime.

As mentioned above, the ETS Windfall could also have been reaped by the airlines if the temporary exemption of intercontinental flights had not been set in place. We nevertheless show the results for the ETS Windfall per airline to demonstrate how the distribution of windfall profits over individual airlines can deviate from the distribution over the airline groups as given in Table 2.



Table 3 Estimation of the ETS Windfall of different airlines related to flights to and from aerodromes outside the 30 EU ETS countries

Airline	Estimated ETS Windfall (million €)	
	50%	100%
Cost pass through		
Airline		
EU Airlines		
Deutsche Lufthansa	26.8	53.6
Air France	25.7	51.5
British Airways	22.1	44.1
KLM and KLM City Hopper	16.8	33.7
US Airlines		
Delta Air Lines	14.9	29.7
United Air Lines	14.6	29.2
American Airlines	8.7	17.5
US Airways	4.0	8.0
Other non-EU Airlines		
Emirates	13.8	27.6
Cathay Pacific	7.6	15.1
Singapore Airlines	7.1	14.3
Korean Air Lines	6.5	13.1
Thai Airways	6.4	12.9
Air Canada	5.8	11.7
Qatar Airways	4.9	9.8
Malaysia Airlines	3.9	7.8
Air China	3.7	7.4
Tam Linhas Aereas	3.7	7.5
Jet Airways (India)	3.3	6.6
Japan Airlines	3.2	6.5
Qantas Airways	3.2	6.5
Etihad Airways	3.1	6.5

Source: This note.

From Table 3 it becomes clear that in some nationality groups a few airlines are dominant, whereas in others the windfall profits are distributed over many airlines, resulting in a different ranking of airlines than the ranking by nationality group: The big EU and US airlines as well as the airlines serving the hubs in the Middle East still account for a big share, whereas Air China that is flanked by other big airlines in the group 'all Chinese airlines' takes a lower position than one could expect from Table 2. A single Turkish airline does not seem to be able to reap a relative significant windfall profit whereas this is well the case for all Turkish airlines taken together.

For the calculation of the Stopping the Clock Windfall per airline, the 2012 CO₂ emissions on the intercontinental routes falling under EU ETS have to be known per airline. We have tried to estimate these emissions for the four US airlines as given in Table 3 by estimating the available seat kilometres and by using an emission factor per seat kilometre for the relevant routes. It turned out that the Stopping the Clock Windfall is very sensitive to the emission factor (gCO₂/ASK) and, since the uncertainty regarding this emission factor is quite high, the estimated windfall profit cannot be estimated reliably. Note that for a low emission factor windfall profits could turn out to be negative for some airlines. In this case, the airlines would make a 'windfall loss' in the sense that they expected to get more free allowances than necessary for compliance with ETS and that they expected to be able to sell these allowance



but that they can no longer do so under the adjusted regulation since they do no longer get free allowances for the intercontinental routes.

What can be estimated with much more certainty is the income of the four US airlines from their passenger surcharge. For a surcharge of USD 3/passenger the respective windfall profit of four US airlines is given in Table 4.

Table 4 Estimation of windfall profits of different US airlines due to a passenger surcharge on flights to and from the 30 EU ETS countries (assumed surcharge: 3 USD/passenger)

US Airlines	Passenger surcharge US airlines (million €)
Delta Air Lines	15.5
United Air Lines	14.1
American Airlines	9.1
US Airways	5.0

Source: This note.

The estimated income from a passenger surcharge of USD 3/passenger ranges from € 5 million for US Airways to € 15.5 million for Delta Air Lines for the period January-October 2012. The uncertainty here lies in the surcharge as such. A surcharge of USD 3/passenger could consist of an under- or over-estimation of the actual surcharge.



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Annex A Methodology for calculating windfall profits

To quantify these windfall profits precisely for specific airlines on the routes temporarily exempted, the following data/information is necessary:

1. Actual 2012 emissions of airlines on the routes exempted in the period January-October.
2. Amount of free EUAs that airlines planned to use for covering these emissions.
3. Amount of allowances that airlines had to buy for covering the emissions in excess of the amount of free allowances.
4. The allowance price anticipated by the airlines.
5. Degree to which airlines have passed through the anticipated costs on the routes temporarily exempted.

Since none of this data is publicly available we estimated the windfall profits as follows:

1. Stopping the Clock Windfall

This windfall profit is equal to the product of the anticipated costs for purchasing allowances and the cost pass through rate.

Since the actual cost pass through rate is not known, two scenarios are differentiated: a 50% and 100% cost pass through rate.

The amount of allowances that would probably have been purchased to cover the January-October 2012 emissions on the routes that are temporarily exempted is estimated as follows:

- a Total aviation windfall profits:** the amount of allowances that have been purchased is equal to the difference between total emissions and the free EUAs used.

We thereby estimate total 2012 aviation CO₂ emissions falling under ETS (original regulation) to be 237 Mt CO₂. This is an average of the estimation that can be found in the literature (see Table 1).

Under the assumption of an equal distribution of the emissions over the months we allocate 10/12 of these emissions, i.e. 197.5 Mt CO₂, to the period January-October 2012 (hereby assuming that airlines will stop charging for the ETS once the proposed derogation was announced).

According to the projection made with the AERO model for the Impact Assessment, about 75% of these emissions, i.e. 178 Mt CO₂ are related to flights to and from aerodromes outside the 30 European countries in the EU ETS. Subtracting 10/12 * 75% of the total amount of EUAs that were planned to be allocated for free, i.e. 182.6 million EUAs, leaves us with allowances for 64 Mt CO₂ that airlines would have needed to buy if the intercontinental flights would not have been exempted.



- b **Windfall profits per airline:** the windfall profits per airline are the emissions on intercontinental flights, minus the free allowances received for these flights, times the allowance price.
- i. **Windfall profits of US airlines.** For US airlines, detailed figures are available for the available seat kilometres (ASKs) on routes to and from the EU (US DoT, 2012). On long haul flights, emissions per ASK range from about 65 g CO₂ to 75 g CO₂ (ICCT 2009)². Using these figures, we estimate the total emissions on flights to and from the EU, estimate the shortfall (or overallocation) of allowances, and the windfall profit (or loss) per airline.
 - ii. **Windfall profits of other airlines.** A 2011 presentation of the European Commission contains a division of emissions over countries according to the nationality of their airlines (EC, 2011). Assuming that 25% of total emissions are on intra-EU flights, and that these flights are executed by EU airlines, we calculate the share of emissions of intercontinental flights and divide the total windfall profits over the nationalities of the airlines.

Table 1 Estimated aviation emissions in EU ETS, 2012 (Mt CO₂)

Source	Total 2012 aviation CO ₂ emissions falling under ETS (before revision)
DLR (2010)	223.6
CDC Climat Reasearch (2012)	231.4
Altmedes (2012)	241
Bloomberg (2011)	252
Average value	237
10/12 of average value	197.5

The value of an allowance is taken to be the average EUA price in the period January till October 2012. Using the EUA price data from BlueNext (BlueNext, 2012) we estimated this average price to amount to 7.60 €/EUA.³

2. ETS Windfall

This windfall profit is equal to the opportunity costs that have been passed through to the consumer.

Since the actual cost pass through rate is not known, again two scenarios are differentiated: a 50% and 100% cost pass through rate.

The opportunity costs for using free EUAs for compliance is equal to the market value of these EUAs.

² Note that other reports have different figures. *Greenhouse gas emissions from international aviation and allocation options* reports values of 75-107 G/ASK for B747-400 and 57-115 g/ASK for a B777-200 (http://www2.mst.dk/common/Udgivramme/Frame.asp?http://www2.mst.dk/udgiv/publications/2003/87-7972-489-2/html/helepubl_eng.htm). For long haul flights in general, a graph in the report indicates that fuel burn varies between 20 and 40 g/ASK, corresponding to CO₂ emissions of 63-126 g/ASK. These are considerably higher than the figures reported by the ICCT. One possible explanation is that the figures in this report refer to older aircraft types.

³ There is scarce information about EUAA prices. BlueNext does not report on EUAA prices. EEX reports spot market prices between € 5 and 8, hence very close to EUA prices.



The amount of free EUAAs that probably would have been used for covering the January-October 2012 emissions on the routes that temporarily are exempted is estimated as follows:

- a **Total aviation windfall profits.** Based on the projection made by the AERO model for the Impact Assessment, we assume that 75% of all the emissions covered by the EU ETS system are related to flights to and from aerodromes outside the 30 European countries in the EU ETS. Assuming that the airlines planned to use the same share of their free EUAAs to the routes temporarily exempted then $75\% * 10/12$ of all free EUAAs allocated to the aviation sector, i.e. around 114 million free EUAAs, would have been used for compliance in the period January-October 2012.
- b **Windfall profits of EU airlines.** EU airlines have flights within the EU (which will continue to be included in the EU ETS) and intercontinental flights (which will be exempted). The relative importance of these flights varies per airline.
- c **Windfall profits of non-EU airlines.** Since non-EU airlines have very few intra-EU flights, we assume that all their flights are exempted. Hence, they generate windfall profits from $10/12$ of all free EUAAs allocated to the respective airline.

Again the value of an allowance is taken to be the average EUA price in the period January till October 2012. Using the EUA price data from BlueNext (BlueNext, 2012) we estimated this average price to amount to 7.60 €/EUA.

For the US airlines a third approach to quantify windfall profits is chosen. As mentioned in the introduction, some major U.S. airlines began to impose a surcharge on passenger tickets for European flights of USD 3 per passenger in January 2012 (CRS, 2012). For those US airlines that would have got more than 1 million free EUAAs in 2012 we determine the number of passengers on flights that fall under the geographic scope (BTS, 2012) apply the stated surcharge of USD 3/passenger to this number of passengers. Since we do not know whether US airlines have simultaneously adjusted fares, this method may under- or overestimate the actual change in revenues.

The allocation of free EUAAs under the original ETS regulation is actually as follows:

- The total quantity of allowances to be allocated to the aviation sector is based on the average EEA-wide historical aviation emissions for the years 2004-2006 which amount to 221,420,279 tonnes of CO₂. The 2012 emissions cap is equal to 97% of this amount (214,777,670 tonnes CO₂).
- In 2012 85% of total EUAA allowances (182,561,020) are allocated to the aviation sector free of charge and 15% (32,216,650) are auctioned.
- The EUAA allowances that are allocated free of charge are allocated to the aircraft operators on the basis of EEA-wide benchmarks: for 2012 operators receive 0.6797 EUAA per 1,000 tonne-kilometres (as of 2010).
- Next to EUAAs aircraft operators can submit EUAs to comply with the Directive.

The amount of free allowances that aircraft operators expected to receive for 2012 is based on the 2010 tonne-kilometres (0.6797 EUAA per 1,000 tonne-kilometres) that they have reported for the routes falling under the geographic scope of original ETS regulation.

Per Member State a list has been published with the free allowances that would be allocated to the aircraft operators registered in this country under the original ETS regulation.

In Table 5 the country of registration and the expected total amount of free EUAAs are given for the airlines for which windfall profits are determined in this note.

The airlines considered in this note have been selected on the grounds of the following criteria:

- EU airlines: the four largest network airlines;
- Non-EU airlines: airlines with more than 1 million free EUAAs.

Table 5 Airlines with more than 1 million free EUAAs in 2012

	Administering Member State	Total amount of EUAAs expected to be received for 2012
EU Airlines		
Deutsche Lufthansa	Germany	12,563,128
Air France	France	12,069,402
British Airways	UK	10,343,987
KLM and KLM City Hopper	Netherlands	7,897,037
US Airlines		
Delta Air Lines	Germany	4,668,157
United Air Lines	UK	4,586,700
American Airlines	UK	2,754,318
US Airways	Germany	1,257,505
Non-EU, non-US Airlines		
Emirates	UK	4,327,310
Cathay Pacific	UK	2,377,669
Singapore Airlines	UK	2,240,200
Korean Air Lines	Germany	2,051,522
Thai Airways	Germany	2,023,012
Air Canada	UK	1,832,089
Qatar Airways	UK	1,541,007
Malaysia Airlines	UK	1,224,539
Tam Linhas Aereas	France	1,174,973
Air China	Germany	1,166,194
Jet Airways (India)	UK	1,043,249
Qantas Airways	UK	1,020,117
Japan Airlines	UK	1,019,308
Etihad Airways	UK	1,013,498

Sources: DECC (2011), DEHSt (2011), Legifrance (2011), Staatscourant (2011).

