

European Emission Trading Scheme & Aviation

‘How is the airline industry affected by the EU ETS?’



Anke Terdu

07018711

Supervisor: Paul Nixon

5th of November, 2012

School of European Studies

The Hague University of Applied Sciences

Executive Summary

This thesis is a graduation project for the bachelor degree European Studies from The Hague University of Applied Science. The objective of this research is to enable its reader to gain comprehension on what the consequences of the European Emission Trading Scheme are for the airline industry. The main research question that is answered by means of this paper is: how is the airline industry affected by the European Emission Trading Scheme?

In order to understand where the European Emission Trading Scheme as a policy instrument stems from, it is important to know what has been happening on the international stage concerning climatic change and the EU policies that evolved from these international developments.

Therefore, chapter 1 gives an overview of the international climate change negotiations and the EU policy regarding climate change. Main points constantly brought forward in these negotiations are that global temperature rise should stay below 2 degrees compared to pre-industrial levels and that a global legally binding agreement is needed in order to keep emission levels acceptable. Also, this chapter points out that a cornerstone of the EU's climate policy is the European Emissions Trading Scheme, also known as the EU ETS or ETS, which deals with emissions from a variety of different industries and activities.

In order to fully comprehend the impacts of the ETS on the airline industry it is important for the reader to know the basic rules of this scheme. Hence, chapter 2 serves as an introduction to the European Emission Trading Scheme. The main idea behind the scheme is that companies and installations receive a specific number of allowances, dependent on their level of greenhouse gas emissions. These allowances enable the company to emit one tonne of CO₂. A company that emits more than the allowances it received can buy extra allowances and a company that has allowances left can sell these to other operators within the scheme. This possibility of selling and buying creates a trading market. In this chapter it is also mentioned that from the beginning of 2012, the airline industry has been added to the scheme.

Chapter 3 looks into the impact of the European Emission Trading Scheme on the airline industry. Firstly, it points out that the airline industry was included because of the fact that, according to the European Commission and some NGO's, negotiations on aviation emissions reduction done by the International Civil Aviation Organization did not lead to specific steps to start reducing these emissions in practice. Moreover, it gives an overview of impacts the European Emission Trading Scheme has on the airline industry.

The conclusion gives an answer to the main research question: 'how is the airline industry affected by the European Emission Trading Scheme?' During the research it becomes clear that the airline industry is affected by the European Emission Trading Scheme in different ways. For example, operating costs will increase for airline companies, ticket prices will become higher and it is becoming more and more challenging for European airlines to maintain their competitive position towards other market operators. However, the severity of these impacts on airlines depends on different factors, such as its business model, fleet composition and position in the market.

In the last chapter recommendations are given, which includes suggestions to the airline industry as to other ways of reducing their emissions. For example, airlines could have a serious look to their frequency of flights in comparison with their load factor. They should ask themselves if they can serve the same amount of passengers with fewer flights. For example, instead of flying 10 times a day with a load factor of 75%, they could maybe also fly around 7 times a day with a load factor of around 100%. This means they would drop 2 flights a day, which reduces emissions and saves money. Also, it is recommended for the international community to boost discussions on a global climate agreement.

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Preface

The first time I started to become interested in the environmental aspects of the airline industry was during my internship in Paris. At the time, I worked at a company called ‘advanced business events’, which specialised in organising B2B events for various industries. I assisted in organising these events for the aerospace industry. Amongst others, I had to sell an event dealing with composite materials in the aerospace industry. The focus of this event was completely on how to make airplanes more environmentally friendly by using composites technology. The idea of green technology and airplanes grew on me. Due to my background as a European Studies student, I started wondering what kind of legislation the European Union has concerning aviation and CO2 emissions. I also started asking myself how this legislation would affect the aviation industry. When it became time to choose a topic for my thesis, I decided to write on the effects of the European Emission Trading Scheme on the airline industry.

I would like to take this opportunity to express some words of appreciation. Firstly, I would like to thank my mother for sticking out with me. She has helped me numerous times to organise my thoughts and motivated me to keep going.

Also, a massive thanks should go to Peter Berghuis, who never refused when I asked him to give feedback on my work and who has been of great help with his impeccable scientific knowledge.

Last, but not least, I would like to thank my supervisor for guiding me through the process of writing and giving feedback on my work.

‘Thank you’.

Anke Terdu

Klaaswaal, November 2012

Introduction

For the past 20 years or so, climate change has been an extensively discussed subject. Research has been and is continuously being done to investigate the reasons for the climate to change and the consequences this will have in the long run. If the temperature on earth keeps rising lower parts of the earth, for example The Netherlands could end up disappearing under the rising sea levels. Other parts of the world there could potentially have to deal with serious droughts. Extreme weather, like tsunami's and hurricanes would also occur more often (European Commission, 2007¹, p. 3). Research has shown that the greenhouse effect is not merely a natural process. Human activities play an important role in this as well, for example through deforestation and burning fossil fuels (European Commission, 2007¹, p. 4). The European Union has put the issue of climate change on top of its agenda. The cornerstone to the EU's climate change policy is the European Emission Trading Scheme (ETS), which is a market-based mechanism dealing with the greenhouse gas emissions of industrial activities in the EU. Since 2012, the aviation industry has been added to this list of activities as well (European Commission, 2012²). Therefore, the main research question of this thesis is: 'how is the airline industry affected by the European Emission Trading Scheme?'

Purpose

The purpose of this research is to give an overview of the impact the European Emission Trading Scheme has on the airline industry.

Research methodology

For this paper extensive desk research has been conducted, through reading, amongst others, research reports and legislative documents from institutions such as the European Commission and the International Emissions Trading Association.

Also, field research was conducted in the form of interviews with three professionals. Firstly, Mr. Michael Lunter was interviewed, a senior policy advisor working for the Dutch Ministry of Infrastructure and Environment. Besides that, an interview was held with Mrs. Simone Ruiz, who is an EU policy director at the International Emissions Trading Association. Last, but not definitely not least, an interview was conducted with Mr. Maurizio Di Lullo, administrator in the unit climate change, coordination and horizontal affairs for the Council of the European Union. Numerous attempts were made to arrange interviews with professionals from the aviation industry, in order to include their point of view in the field research as well. Unfortunately, they were not willing to cooperate.

Research Scope

The first and the second chapter of this research are intended to give the reader essential background information needed to fully comprehend the analysis of impacts from the ETS on the airline industry. These chapters are not meant to be a detailed analysis on the topics covered. The first chapter gives an overview of international climate negotiations and EU policy to ensure the reader gets a general idea of what has been discussed and decided on internationally. Therefore, not all negotiations, policies and institutions have been included. The second chapter explains what the ETS is and how it functions. An entire thesis could be written solely on this topic. The objective of this chapter is to help the reader understand the basics of the scheme. Therefore, not every single topic and area of the scheme is explained in great detail.

Structure

The first chapter of this thesis will give an overview of the international negotiations on climate change so far and will give an insight into some of the European policy regarding climate change. Then, in the second chapter, a detailed explanation will be given of the cornerstone of the EU's climate policy: the European Emission Trading Scheme. After that, chapter 3 will take a closer look into what the effects of this scheme are on the airline industry, followed by an answer to the main research question 'how is the airline industry affected by the European Emission Trading Scheme?' in the conclusion. Last, chapter 5 will provide the reader with recommendations.

1. What does the European Union do to tackle climate change?

As mentioned in the introduction, climate change has far-reaching consequences for the environment, human health and the economy. The EU Council of Environment Ministers recognises the threat it is posing on global welfare and acknowledges the fact that further action needs to be taken on an international, as well as Community level, in order to reduce the dangerous effects of climate change (European Commission, 2010³). This chapter will give an answer to the question: ‘what does the European Union do to tackle climate change?’

In order to understand where the European Climate policy stems from, one needs to know what is being done against climate change on an international level. Therefore, paragraph 1.1 gives a general overview of the international climate negotiations. Then, paragraph 1.2 explains how the EU is translating these international agreements into EU climate policy.

1.1. International Climate Negotiations

The EU is very much involved in the major international negotiations dealing with climate change. This paragraph gives an overview of the most important negotiations the European Union took/is taking part in.

1.1.1 The United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) was established in 1992 by the United Nations and is the main international treaty in the combat against climate change. It came into force in 1994 (United Nations Framework Convention on Climate Change, 2012¹). Almost all countries in the world, including the EU Member States are taking part in this treaty (European Commission, 2010⁴). According to the United Nations, “the main goal of the Convention is to stabilize greenhouse gas concentrations in such a way that it will prevent dangerous human interference with the climate system” (United Nations, 1992, article 2, p. 4).

The concept behind the UNFCCC is that industrialised countries should do the most to cut emissions, because of the fact that they are the biggest source of most past and current greenhouse gas emissions. When signing the UNFCCC, the industrialised nations agreed to help developing countries in their fight against climate change, by supporting climate change activities and by providing financial assistance, on top of any other financial aid they already give to these countries (United Nations Framework Convention on Climate Change, 2012¹).

Moreover, Article 4 of the UNFCCC (United Nations, 1992, p.5) states that:

“Each of these parties shall communicate within six months of the entry into force of the Convention for it and periodically thereafter, and in accordance with Article 12, detailed information on its policies and measures (...) with the aim of returning individually or jointly to their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases (...)”.

Critics towards the UNFCCC argue that the main goal of the Convention is not specific enough, because it does not define exactly how it wants to stabilize these greenhouse gases (Kopp, R.J. 2011, p. 3). Moreover, the actions that have to be taken by the signatories are nowhere defined and are completely voluntary, as there is no punishment for nonconformity. Also, the Convention mentions that developed nations should take the lead in fighting climate change. However, the point at which developing nations will be called upon to reduce emissions is not clearly defined. Finally, there are no specific implementing policies and measures for returning to 1990 emission levels included in the Convention (Kopp, R.J. 2011, p.3).

1.1.2 The Kyoto Protocol

Another agreement in which the European Union played an important part is the Kyoto Protocol. By signing this agreement in 1997, most of the countries that are taking part in the UNFCCC took a next step towards reducing emissions. It took force in 2005. Through the first commitment period of this Protocol (2008-2012), industrialised countries commit themselves to reducing six greenhouse gases with 5% below 1990 levels. These six greenhouse gases are the following: carbon dioxide, methane, nitrous oxide, hydro fluorocarbons, per fluorocarbons and sulphur hexafluoride (European Commission 2012⁵). To help countries meet their targets three market-based mechanisms were set up, namely: Emissions Trading, the Clean Development Mechanism and Joint Implementation (UNFCCC, n.d.) The next chapter gives detailed information on European Emissions Trading.

In a report of the European Commission on the EU Emissions Trading Scheme (European Commission, 2009⁶, p. 23) it is stated that : “the Clean Development Mechanism and Joint Implementations are both instruments that enable developed countries that have binding emission reduction or limitation targets under the Kyoto Protocol to invest in emission-saving projects in third countries.”

Through these emission-saving projects in third countries, Member States receive Certified Emission Reduction (CER) credits, which they are allowed to use in order to offset a part of their

emissions. This will help them meet their emission reduction targets under the Kyoto Protocol. These credits are valued at one tonne of CO₂ each (UNFCCC, n.d.⁵)

A downside to the Kyoto protocol is that its impact is limited, because it only requires industrialised countries to cut their emissions, leaving out the undeveloped countries (European Commission, 2010⁴). Also, the United States never ratified the Protocol and Canada, Japan and Russia announced that they were not willing to participate in a second commitment period, as long as there is no agreement that also counts for larger polluters as the United States and China (Volkskrant, 2012). Therefore, the European Union holds the opinion that the Kyoto Protocol should be followed up by a global framework, which demands action from all industrialised countries, as well as from the developing countries with strongly emerging economies (European Commission, 2010⁴).

1.1.3 The Copenhagen Accord

The Copenhagen Accord was agreed upon in 2009 at the 15th session of the Conference of the Parties, which is a periodic meeting of the governing body of the UNFCCC (Convention on Biological Diversity, n.d.) The Copenhagen Accord was not accepted as a UN decision, therefore it is not binding. However, it was recognised by 114 UNFCCC Parties. The intention of the Accord is to create an outline for the forthcoming UN climate change negotiations (Carbon Planet, 2012).

The key points of the Copenhagen Accord are amongst others:

- To limit global temperatures rising to no more than 2 degrees above preindustrial levels;
- To deliver \$30bn financial aid for developing nations in the coming three years;
- To provide \$100 billion a year by 2020 to help poor countries deal with the consequences of climate change;

Creating a 'Green Climate Fund', which will support activities in developing countries with regards to mitigation, adaptation, "capacity building" and technology transfer. (United Nations Framework Convention on Climate Change 2009²).

The main critique on the Copenhagen Accord is that it is not legally binding. Also, it does not contain an agreement on long-term goals for emission reduction and does not include an arrangement on how much each country will contribute to the funds (Thomson Reuters, 2009).

All the key points from the Copenhagen Accord were made into an official UN decision during the United Nations Climate Change Conference 2010, held in Cancun (European Commission, 2010⁷).

1.1.4 The Cancun Agreements

The Cancun Agreements were reached in 2010 at the United Nations Climate Change Conference in Mexico. These agreements enact essential steps towards establishing plans for the reduction of greenhouse gas emissions and to help poor countries to deal with the impacts resulting from climate change (UNFCCC, 2012³).

The main objectives of the Cancun Agreements are partly stemming from the Copenhagen Accord and can be found in appendix 1.

By establishing a cap for global temperatures, countries show that they are aiming for a low-carbon global economy. However, all the promises on emission cuts made by governments add up to a total of 60% of emission cuts needed for a 50% chance of countries achieving the goal of limiting global temperatures rising to no more than 2 degrees above preindustrial levels. Clearly, the promises made are insufficient (UNFCCC, 2012⁴).

1.1.5 Durban Climate Change Conference

At the Durban Climate Conference in 2011 it was agreed to start negotiations on an international legally binding framework for climate action, comprising all countries. It will be adopted by 2015 and implemented from 2020. In the past, attempts had been made to create a global framework against climate change through the Kyoto Protocol, but, because of the fact that this agreement was not legally binding, some of the largest emitters decided to not comply with this Protocol (European Commission, 2010⁷). An overview of what this international framework should contain can be found in appendix 2.

During the negotiations in Durban, it was also agreed that the second commitment period of the Kyoto Protocol will start in 2013 and will run until 2017 or 2020 (European Commission, 2010⁷).

The main arguments critics hold against the so-called 'Durban Agreements' is that during the negotiations countries mostly agreed about plans to come to a future global agreement, legally binding for all countries. There were no goals for immediate action. Also, it was agreed that developed countries would raise \$100bn to help developing countries fight climate change, but there were no plans on how this money is going to be raised (Europa-Nu, 2011).

1.1.6 International climate regime until 2020

The decisions made at the Durban Climate Conference mean that, until the global framework is carried out in 2020, the strategy for global climate action will consist of two principal elements (additionally to the current rules of the UNFCCC):

- The agreements made at the conferences in Copenhagen, Cancun, Durban and Qatar (which will take place November 2012);
- The second commitment period of the Kyoto Protocol. The EU has announced that it will join the second commitment period of the Kyoto Protocol, even though Japan and Russia decided to not take part and Canada will pull out from the Protocol entirely (European Commission, 2010⁷).

1.2 European Climate Change Policy

The agreements which are made on an international level have to be transformed into EU policy to ensure that the European Union is taking appropriate action to cut its emissions. This paragraph gives an outline of some of the EU's interdepartmental bodies, working groups and action plans.

1.2.1 The Directorate General for Climate Action

As mentioned in the introduction, it needs to be ensured that global warming stays below 2 degrees Celsius compared to preindustrial levels. In order to do so, action is needed on an international stage to make sure global emissions will reduce. In February 2010 the European Commission therefore launched the 'Directorate General for Climate Action', from now on referred to as 'DG CLIMA', which is on the leading edge of international attempts to fight climate change.

DG CLIMA has a wide range of responsibilities, one of which is to lead international negotiations on climate change and ozone diminishing substances. Moreover, it helps the EU to meet its 2020 targets (more on this in paragraph 1.2.3) through the development and implementation of worthwhile EU climate policies, strategies and legislation, for instance the European Emission Trading Scheme (European Commission Directorate General for Climate Action, 2012).

According to its 2012 Management Plan DG CLIMA (European Commission Directorate General for Climate Action, 2012) has two main objectives, which are: 'to keep the rising global average temperature below 2 degrees Celsius set against pre-industrial levels and to recover the ozone layer.'

An overview of DG CLIMA's methods to achieve these objectives can be found in appendix 3.

1.2.2 The European Climate Change Programme

The European Climate Change Programme (ECCP) was launched in 2000 by the European Commission. It is an inter-departmental body with the overall goal of helping to determine what the most environmentally efficient and most profitable policies and measures are which the EU can

take at European level to reduce greenhouse gas emissions and to reach the targets set by the Kyoto Protocol (Europa.eu, 2007). A Steering Committee is in charge of managing and coordinating the ECCP. One of this Committee's main tasks is to create working groups on particular subjects related to climate change. These working groups gather stakeholders from particular economic fields. Thanks to this structure, stakeholders are enabled to participate in preliminary work on the policy and measures which are being established by the ECCP (Europa.eu, 2007).

A distinction can be made between a first and a second European Climate Change Programme.

1.2.2.1 The first European Climate Change Programme:

The first European Climate Change Programme ran from 2000 to 2004 and examined a wide scope of policy areas and mechanisms and instruments with potential for cutting greenhouse gas emissions. During the first ECCP 11 working groups were brought to life, dealing with for instance flexible mechanisms: emissions trading, energy supply, energy demand, energy efficiency, agriculture and transport. One of the most essential and ingenious initiatives that came into being through the first European Climate Change Programme is the EU Emissions Trading System (EETS). This scheme deals with carbon dioxide (CO₂) emissions from approximately 11.500 heavy polluters from the power generation and manufacturing sectors (European Commission, 2010⁸).

1.2.2.2 The second European Climate Change Programme:

The second European Climate Change Programme was launched in 2005 at a stakeholder conference in Brussels. This second programme has examined further cost-effective alternatives for the reduction of greenhouse gas emissions. Furthermore, new working groups have been created, for instance: review of working groups from ECCP1, aviation, CO₂ and cars, carbon capture and storage, adaptation and reducing greenhouse gas emissions from ships (European Commission, 2010⁹). Based on the reports annually presented by the ECCP, the European Commission will make concrete propositions (Europa.eu, 2007).

1.2.3 The EU Climate and Energy Package

The EU Climate and Energy Package is a structured approach to climate and energy policy, intending to fight climate change and improve the EU's energy security, while strengthening its competitive position. It was ratified by the EU leaders in 2007.

Through this Climate and Energy Package Europe is committed to alter itself into a low carbon economy with high energy efficiency. In order to start the process of turning Europe into a highly energy-efficient, low carbon economy, the EU leaders established a number of challenging climate

and energy targets, which are to be met by 2020. These objectives are also known as the '20-20-20' targets.

According to the European Commission website (European Commission, 2010¹⁰), the '20-20-20' targets are the following:

- “A reduction in EU greenhouse gas emissions of at least 20% below 1990 levels;
- 20% of EU energy consumption to come from renewable resources;
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency. “

The Climate and Energy Package includes four pieces of interrelated legislation, which can be found in appendix 4.

1.3. Conclusion

From this chapter, it can be concluded that the focus of governments worldwide is shifting towards climate change more and more. This becomes visible through the negotiations that have taken and are taking place in order for agreements to be established on how this issue should be addressed appropriately. Progress has been made so far, but there is still a lot left undone. One of the issues of these negotiations is that governments often fail to agree on the policies and measures that should be implemented. Sometimes, this has caused the agreements to be somewhat vague with undefined objectives, measures and policies which the participants have to apply to. Also, most of the agreements made so far have not been legally binding. As a result, countries are left out because they simply do not wish to participate and therefore it has been hard to address the issue of climate change globally in an effective way.

The European Union is working actively to reduce its greenhouse gas emissions and to limit the negative effects of climate change. It is doing this through actively participating in international negotiations, by setting up various departments and bodies which are to identify appropriate measures and policies to reduce EU emissions and by setting itself challenging goals for 2020 in order to combat climate change. One of the policies the EU has introduced through the European Climate Change Programme is the European Emission Trading Scheme. The next chapter explains thoroughly what the EU ETS exactly is and how it exactly functions.

2. What is the European Emission Trading Scheme?

In the previous chapter an overview has been given of the action taken against climate change on an international, as well as European level. As we know now, the Kyoto Protocol set the objective of reducing greenhouse gas emissions with 5% compared to 1990 levels (European Commission, 2012⁵). By signing the Kyoto Protocol, the European Union has committed itself to reaching this target. In order for the European Union to do so, the European Emission Trading Scheme was launched in 2005 (European Commission, 2012²). This chapter focuses on the European Emission Trading Scheme and will explain how it functions, how it evolved over the years and what can be expected for the near future.

2.1 How does the EU ETS function?

The European Emission Trading Scheme, also known as the EU ETS, plays a central role in the EU's climate policy and is its most important market-based mechanism for the reduction of greenhouse gas emissions in a cost-effective way (European Commission, 2012²). It operates in 30 countries and covers the emissions of a variety of industrial sectors, concentrating on the emissions which can be measured, reported and verified very precisely (European Commission, 2009⁶, p. 13). The Scheme is supposed to keep the European Union's cost of meeting the Kyoto Protocol's emission reductions targets below 0,1% of GDP (European Commission, 2009⁶, p. 5) The first part of this chapter takes a closer look into the concept behind the EU ETS, allowances, trade of allowances, National Allocation Plans, linkage of the Scheme and monitoring, verification and compliance measures.

2.2. The Concept

The concept behind the European Emission Trading Scheme is based on the 'cap and trade principle'. Basically, this means that sectors, companies, power plants and so on which are covered by the Scheme face a limit or 'cap' on the amount of greenhouse gases they are allowed to emit (European Commission, 2012²).

Within this limit or 'cap' companies receive emission allowances. An allowance can be seen as an authorization to emit certain amounts of greenhouse gases (European Commission, 2012²). In the case of the European Emission Trading Scheme one allowance counts for one tonne of CO₂ or an amount of another greenhouse gas which contributes equally to climate change as one tonne (1000 kg) of CO₂. The limited number of emission allowances on the market ensures their value (European Commission, 2009⁶, p. 9).

2.2.1 Allowances and trading

Companies that achieve to emit less than their allocations allow them to can sell their spare allowances on the market. As mentioned previously, the European Emission Trading Scheme is a market-based mechanism. Therefore, the price for these allowances will be determined by supply and demand at the given time (European Commission, 2009⁶, p.9).

The companies that fail to emit less than their allocations can fix this problem by choosing between different options.

- They can make an effort to cut back on their emissions, for example through using more efficient technology or by using other energy sources which use less carbon;
- They can purchase extra allowances and or CDM/JI credits. More information on the latter in chapter 1.1.2;
- They can combine the two options mentioned above (European Commission, 2009⁶, p.9).

The advantage of this flexible system is that it gives companies the opportunity to cut emissions in the most cost-effective way. It gives them the opportunity to assess for themselves which option suits them best. From 2005-2007 around 95% of the allowances were given to the companies and installations free of charge. In the years following, 2008-2012, this percentage dropped to 90% (European Commission, 2009⁶, p.9). The remaining 5% (2005-2007) and 10% (2008-2012) of allowances were auctioned (European Commission, 2009⁶, p.9). Allowances were partially allocated for free to help certain industries that face strong international competition maintain their competitive position (European Commission 2012¹¹). From 2013 the allocation of allowances will undergo substantial changes. More on this in paragraph 2.4.

Appendix 5 contains a table that gives an idea of how the allowance market has expanded during from its initial years up to 2008. The information in this table shows that the allowances market has experiences strong growth over the period of 2005-2008.

2.2.2 National Allocation Plans

The amount of allowances installations within the Scheme will receive each trading period is determined through a process by which each Member State is asked to create an installations-specific emission proposal. These proposals are also known as 'national allocation plans' and are based on a number of different criteria, such as:

- The proposal has to display the targets the Member State has under the Kyoto Protocol, as well as its actual and expected progress towards achieving these targets;
- The allowances allocated to the installations or companies within the Scheme cannot exceed the number of allowances the participant is expected to need.

If a national allocation plan does not meet the criteria, Member States are asked to make adjustments. Once the European Commission affirms the proposal, the total number of allowances and the total amount of allowances allocated to each installation cannot be amended. As from 2013, important changes will be made as to how Member States receive allowances for covering the emissions from their installations. More on this in paragraph 2.4 (European Commission, 2009⁶, p.15-16).

2.2.3 Linkage

The European Union believes that one of the most efficient methods of reducing greenhouse gas emissions is through improving and advancing the international carbon market. It believes that this is done best through linking congruent cap-and-trade systems to one another.

Connecting such systems carries various advantages. For example, it creates the possibility for market operators to buy or sell greenhouse gas emission units outside the EU. Moreover, the increased scale of the market should promote cost reduction and market stability. In addition, it may provide a stimulus for world-wide cooperation on climate change (European Commission, 2012¹²).

2.2.4 Monitoring, verification and compliance

Each year, installations and companies covered by the European Emission Trading Scheme have to keep track of and report their emissions of that specific year. These reports have to be verified by a certified verifier. Specific rules set by the European Commission apply to this monitoring, reporting and verification process. This ensures the quality and credibility of the annual reported emissions data (European Commission, 2012¹³).

The European Union has also put measures into place to ensure companies and installations comply with the European Emission Trading Scheme. At the end of each year, participants have to submit the number of allowances equal to their level of CO₂ emissions in that year. These allowances cannot be used again. If companies fail to submit enough allowances, they will be fined. This means that they have to pay for each over-emitted tonne of CO₂ (European Commission 2009⁶, p. 19). For the first trading period, this fine was fixed on €40 per over-emitted tonne of CO₂.

However, during the second phase (2008-2012) this fine was raised to €100 per tonne (Icecap, 2005). It can be expected that for the next trading period the penalty will be raised even more.

To get an idea of the level of the fine and the amount of work that can be done with an engine, one might consider the hypothetical situation that cars would be fined for their CO₂ output. In such a situation, the €100 fine would take a driver of a highly efficient Toyota Yaris 12800 kilometres and a gas guzzling Hummer H2 2400 km. In any case, not a large fine considering the other costs of car driving.

In addition to a penalty, companies will have to purchase extra allowances in the next year to make up for their shortage and their names will be made public. At a national level some Member States have also created their own measures for violation of rules set through the European Emission Trading Scheme (European Commission, 2009⁶, p. 19).

2.3 Evolution of the European Emission Trading Scheme

The European Emission Trading Scheme has evolved over the years. In 2005, at the starting point of the Scheme, it was not the same as it is now in 2012. So far, it has been a way of trial and error to get the Scheme to the point at which it is now and it will, in the future, probably still be subject to change and adaptation.

The Scheme is being implemented in phases, also known as ‘trading periods’.

- *The first phase* of the Scheme ran from the 1st of January 2005 until the 31st of December 2007. This phase was a trial period in preparation for the essential next phase. This first trading period established the following: a price for carbon emission allowances, EU-wide trade in allowances and the necessary infrastructure for monitoring, reporting and verifying emissions of the companies covered by the Scheme. This first pilot phase was needed to make sure that the European Emission Trading Scheme would run effectively during the second trading period in order to successfully help the European Union to achieve the emissions targets set by the Kyoto Protocol. During this initial phase of the ETS, only selected major fuel consuming installations were covered by the scheme, such as for example power plants, oil refineries and factories producing cement, glass, bricks and paper (European Commission, 2009⁶, p.8).
- *The second phase* runs from the 1st of January 2008 until the 31st of December 2012, so it will not be long until this trading period comes to an end. This phase runs together with the first commitment period of the Kyoto Protocol mentioned in chapter 1.1.2. During this first

commitment period the European Union must meet the emissions targets that were set under the Protocol. Based on emission reports from phase 1, the European Commission has brought the amount of allowances permitted in this phase down to 6.5% below the level of 2005. This ensures that emission reductions will take place. Moreover, Iceland, Liechtenstein and Norway joined the ETS extending the geographical coverage of the scheme. Furthermore, emissions of nitrous oxide and emissions from the aviation industry were also added to the scheme. The latter implies that all airlines need CO₂ emission allowances whenever they use European airspace. More on this in chapter 3 (European Commission, 2009⁶, p.8).

- *The third phase* will start the 1st of January 2013 and will finish on the 31st of December 2020. During this trading period the European Emission Trading Scheme will undergo substantial changes. As of 2013, it will be extended and strengthened allowing it to be a vital attribute for the European Union to achieve its climate and energy targets for 2020 (European Commission, 2009⁶, p.8). For more information on the latter, see chapter 1.2.3. The changes that will be made to the European Emission Trading Scheme aim to better harmonise the rules of the scheme. Also, it is expected that the Scheme will become more predictable to the market operators and will be more credible on the international stage (European Commission, 2009⁶, p.8).

2.4 Future (from 2013)

So how will the European Emission Trading Scheme change from 2013? An overview of the main changes that will be made to the scheme can be found in appendix 6.

The adjustments that will take place from 2013 result in an expansion of the Scheme's scope, from 40% to 43% of total CO₂ emissions of around 4 billion tonnes per year within the European Union (European Commission, 2009⁶, p.11-12).

2.5 Problems encountered so far with the ETS

So far, it might seem that the process of integrating the European Emission Trading Scheme into EU policy and implementing the rules at a national level has been smooth. However, that is not the case. This paragraph gives some examples of problems experienced with the ETS so far.

One of the problems is the so-called 'carbon leakage'. Carbon leakage occurs when companies, due to the costs of emissions trading, replace their production outside of the EU where they do not

have to pay for their emissions. This is undesirable, because it means the emissions from these companies are not regulated anymore. Also, it has a negative impact on the EU economy. Carbon leakage is one of the reasons why it was decided to allocate all allowances for free until 2020 to companies with for activities that are likely to replace their production. For the activities that are not so likely to undergo this leakage it was decided to allocate 80% of allowances for free from 2013 with an amount of free allowances of 30% in 2020 (Dutch Emissions Authority, 2012). Another issue is that at the moment of writing, prices for emission allowances are very low, namely €7, 50. Allowance prices are determined by supply and demand. Appendix 7 gives a good overview of the drop in prices from 2008-2012. The reason for this lowering of prices is that industrial activities are lower due to the economic recession, which means less emission resulting in less demand for allowances (M. Lunter, interview, September 27th, 2012 – see appendix 8). This low price lowers the economic incentive for reduction of emissions, because a company can buy more allowances for less money, and if they have allowances left and want to sell them, they do not get as much money for them as before.

2.6 Conclusion

The information discussed in this chapter shows that the European Emission Trading Scheme has made significant progress throughout the years and that a solid framework for emissions trading has been integrated in EU policy. This chapter already mentioned briefly that emissions from aviation were included within the Scheme as from 2012. The next chapter will take a closer look into what the effects of this inclusion are for the airline industry.

3. What are the consequences of the ETS for the airline industry?

The implementation and execution of the European Emission Trading Scheme inevitably carries consequences for the parties involved. This chapter will look into what these consequences are, focusing on the airline industry in order to find an answer to the main research question: how is the airline industry affected by the European Emission Trading Scheme?

3.1 Why was the airline industry included in the first place?

As mentioned briefly in the introduction, as of 2012 the airline industry has been included into the European Emission Trading Scheme. This means that market operators within the industry have to follow and comply with specific rules set through the ETS.

In order to understand the consequences of the European Emission Trading Scheme for the airline industry, it might be interesting to know why this industry was included to the Scheme in the first place. Actually, the Kyoto Protocol envisioned another route to achieve emission reductions within the aviation industry, as discussed in article 2.2 of the protocol:

'The Parties included in Annex 1 shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization (ICAO) and the International Maritime Organization respectively (IMO).' (United Nations, 1998, p. 2)

In other words, within the Kyoto Protocol framework, ICAO is responsible for regulations concerning CO₂ reductions in the aviation industry (M. Lunter, interview, September 27th, 2012 – see appendix 8). Since the Kyoto agreements, research has been conducted within the airline industry and ICAO as to how emissions can be reduced in the most effective way (M. Lunter, interview, September 27th, 2012 – see appendix 8). However, according to various NGO's and the European Commission this whole process of researching emissions reduction was consuming too much time and, in their opinion, did not lead to effective steps leading towards reduction in the way it was thought to be necessary. In the period of 2005-2006 the European Commission was working on their goals for 2020. More on these goals in chapter 1.2.3. In short these goals are to reduce emissions with 20% by 2020. The European Commission decided that the airline industry had to contribute to these emission reductions as well (M. Lunter, interview, September 27th, 2012 – see appendix 8). This was decided not because the airline industry is a major contributing industry; the emissions from the airline industry only accounted for 3% of global emission in 2009. However, its carbon footprint has grown with 98% between 1990 and 2006 (International Emissions Trading Association, 2012, p.1). This growth in footprint translates to an annual rate of 4.3% and the slightly

larger expected future rate of 4.7% renders a very substantial growth of 667% from 2006 to 2050 (International Emissions Trading Association, 2012, p.1). Needless to say such growth rates will result in a strong increase in emissions.

Moreover, the European Commission worried that the future increase in emission within the airline industry would nullify the profits made regarding emissions reductions by the other industries (M. Lunter, interview, September 27th, 2012 – see appendix 8). Connie Hedegaard, European Commissioner for Climate Action stated that: *"Emissions from aviation are growing faster than from any other sector, and all forecasts indicate they will continue to do so under business as usual conditions. Firm action is needed (..)"* (Library House of Commons, 2011) The European Commission decided to consider including the airline industry in the European Emission Trading Scheme (M. Lunter, interview, September 27th, 2012 – see appendix 8).

As a result of this decision, the Aviation Working Group (AWG) was set up under the second European Climate Change Programme by the European Commission. More information on this programme can be found in chapter 1.2.2. The task of this Aviation Working Group was to examine the various ways in which the aviation industry could be included in the European Emission Trading Scheme (European Climate Change programme, aviation working group, final report). As stated in the Aviation Working Group Final Report (2006), 'The Aviation Working Group decided that, in view of the likely future growth in air traffic, further policy action is needed to prevent this from leading to continued growth in its climate impact. Having analysed a number of options, the Commission considered that the best way forward is to include the aviation sector in the EU Greenhouse Gas Emissions Trading Scheme' (European Climate Change Programme II, 2006). In 2006, a final proposal was written to include the airline industry in the European Emission Trading Scheme (M. Lunter, interview, September 27th, 2012 – see appendix 8).

3.2 ETS rules for airlines

Overall, the aviation industry has to follow the same ETS rules as industrial installations and other companies which are covered by the scheme. However, there are some minor differences concerning allowances and their allocation. Therefore, next to understanding why the airline industry was included in the European Emission Trading Scheme it might also be interesting to find out how many allowances are allocated to the industry and which other rules market operators have to comply with in order to fully understand the implications for the airline industry.

To start, all flights going to or leaving from airports within the European Union are subject to the rules of the ETS (Library House of Commons, 2011, p.2). The total amount of allowances allocated to

the airline industry is calculated based on the historic aviation emissions. Historic aviation emissions are the average of airline emissions of the years 2004-2006, which was 219,475,343 tonnes of CO₂ (Library House of Commons, 2011, p. 8). In 2012 the amount is set at 97% of historic aviation emissions, which is 212,892,052 tonnes of CO₂. In the third trading period this amount will be reduced to 95%, which is 208,502,525 tonnes of CO₂ (European Commission, 2011⁴).

A part of the allowances mentioned above will be allocated to the aircraft operators free of charge. The amount of allowances that will be allocated for free is based on the so-called 'benchmark'. The benchmark for 2012 is 0.6797 allowances per 1000 tonne kilometres, where the tonne kilometres refer to a "transportation effort" of an airline. In the next trading period, 2013-2020, this amount will decrease to 0.6422 allowances per 1000 tonne kilometres. Aircraft operators had to apply for free allocation by handing over information on their tonne-km of 2010. These tonne kilometres from 2010 are multiplied with the benchmark of that year. The outcome of this is the amount of allowances airline operators receive free of charge (European Commission, 2011⁴).

So, for example, if an airline company flies 500 km with an airplane that weighs 23 tonnes, the company will receive $500 \times 23 \times 0,000642 = 7,38$ allowances, with which a company is allowed to emit 7,38 tonnes of CO₂.

In 2012, it is expected that 85% of the allowances are allocated for free to airline operators and thus 15% would be allocated through auctioning. From 2013-2020 82% of the allowances are given for free to airline operators, 15% will be allocated through auctioning and 3% will go to a special reserve which is meant for fast growing airlines and new entrants in the market. Appendix 6 gives a good overview of how allowances will be allocated (European Commission, 2011⁴).

Exemptions from the ETS rules are made for specific activities, flights and airline operators. A full list of exemptions concerning aviation can be found in appendix 10.

3.3 Consequences for the airline industry

So, what are the actual consequences of the European Emission Trading Scheme for the airline industry? The answer to this question totally depends on the person who is asked and the field of business this person represents. Someone working for an environmental NGO for example would give a completely different answer to this question than someone working for the airline industry.

For example, Maurizio Di Lullo, administrator in the unit Climate Change, Coordination and Horizontal Affairs of the Council of the European Union mentioned: "I think the effects of the ETS for the aviation industry have been overstated in the press and in some publications. (...) The

system as it is now (...) is quite favourable to the aviation industry, even if the industry is saying the opposite.” (M. Di Lullo, interview, September 19th, 2012 – see appendix 11).

However, Tony Tyler, the chief executive of the International Air Transport Association states the following in an interview: “the emissions trading scheme is not a stepping stone to meeting global environmental targets. It's a polarising obstacle that is preventing real progress” (The Guardian, 2012), with which he refers to the international position to the unilateral implementation of ETS by the European Union, which has induced China, India and the US to adopt legislation forbidding their airlines from to cooperate with the system (Luchtvaartnieuws.nl, 2012).

In addition Johannes Teysen, chief executive of Germany's EON, made some very strong statements to EU policymakers: “Let's talk real: the ETS is bust, it's dead,” and “I don't know a single person in the world that would invest a dime based on ETS signals.” (Financial Times.com, 2012).

At this point in time it is not clear in what way this opposition will affect the future operation of the ETS. In any case some measures will be negotiated that will affect the operation of airlines to some extent irrespective of the precise nature of future changes to the scheme. For the present thesis we will assume the ETS will go ahead as planned and evaluate the consequences accordingly.

3.3.1. Impact on costs

First and foremost, airline operators have to deal with an increase in operating costs. In order for them to reduce their emission output under the European Emission Trading Scheme, airline companies either have to invest in sustainable environmentally efficient technologies or they have to buy extra emission at the European Climate Exchange (ECX), which is the main market for EUAs, or from other installations and companies which are also covered by the scheme. Also, airline operators will have to invest time and money into ensuring their emissions are correctly monitored and reported (S. Ruiz, interview, September 28th, 2012 – see appendix 12).

The extent of these additional costs depends on a variety of factors, such as the composition of the operator's fleet, the fuel efficiency of the airplanes its airplanes, the operational management of the company and how much of these costs can be directed to the customers (M. Lunter, interview, September 27th, 2012 – see appendix 8).

Let's take KLM as an example to give an approximate idea of what the ETS means for this company.

Company info:

- Total annual turnover (2005-2011): approximately 24 billion Euros (Wikipedia, 2012)
- Revenue (2005-2007): 850 million Euros per year (Wikipedia, 2012)
- Revenue (2008): - 800 million Euros (loss) (Wikipedia, 2012).

So, the profits made (3%) are relatively low compared to the turnover. Now, let's take a look at KLM's emissions:

- Total emission of 2008: 12,027,656 tonne of CO₂ (See appendix 13)
- Total emission of 2009: 11,016,567 tonne of CO₂ (See appendix 13)
- Total allocation of free allowances 2012: 7897037 (See appendix 14)
- Total allocation of free allowances 2013-2020 (annually): 7461239 (see appendix 14).

Assuming that the emissions of KLM have remained approximately 11 million tonnes in 2012, it can be concluded that they have to buy around 5 million allowances for this year, because 11 million (total emissions) – 7 million (free allocated allowances) = around 5 million. Last September the price for an allowance was 7 euro 50. Let's presume the price of allowance in 2012 is an average of 10 euro's this would mean that the ETS allowance system would cost KLM 50 million Euros in 2012. Assuming that KLM's revenue for 2012 would be around 800 million Euros, the impact of the ETS is relatively modest.

According to the website of BNR Duurzaam, "KLM expects to need 7 million allowances in 2012' and 'the costs for these allowances will be approximately 50 million up to 100 million Euro and will be directed to the passengers'" (BNR Duurzaam, 2012). Apparently, KLM expected emissions to rise again in 2012. Also, the costs of these allowances will be quite low for KLM as they let their customers pay for it.

3.3.2. Impact from fluctuating allowance prices

As mentioned in chapter 2.5, the price of emission allowances and thus of CO₂ responds to supply and demand. If there is less demand for CO₂ in the market prices drop and if there is more demand prices become higher. This fluctuation in supply and demand is partially influenced by the state of the economy at that certain point in time. For example recently, due to the economic recession, the

price of allowances has dropped to around 8 Euros, way below the pre-crisis price level of 20+ Euros (M. Lunter, interview, September 27th, 2012 – see appendix 8).

This fluctuation in prices causes the airline operators insecurity on future investments. It becomes unclear for them whether they would profit more from investing in greener and more sustainable technologies or from buying extra allowances on top of the free allowances they were allocated. This insecurity makes it hard for them to have a clear plan for the future regarding investments in greener technologies. However, if the growth in passenger numbers and cargo persists at current levels the impact on the industry will become more severe in the long term.

3.3.3. Impact from non-compliance

The fines airline companies will receive if they do not surrender enough allowances to cover their emissions of the past year affect the airlines as well. As can be read in chapter 3.1.4 these fines are 100 euro per excessively emitted tonne of CO₂. Of course the extent to which airlines are affected by this depends on the amount of CO₂ they over-emitted. In case of consistent non-compliance where other enforcement measures also have not succeeded, its EU Member State has the possibility of requesting an operating ban for the particular aircraft operator (International Emissions Trading Association, 2012, p. 4). However, as the price of allowances is much smaller than the penalty airlines would be well advised to buy the emission allowances.

3.3.4. Impact on ticket prices

Increase in costs will very likely result in an increase in ticket prices. Airline companies will decide to higher the ticket prices so a part of the costs can be covered. Of course the amount with which these prices will rise differs per airline and per distance that is flown. Also, the increase in prices depends on the extent as to which airlines can pass on their extra costs to their customers. This is dependent on the company's business model, their exposure to competition and their overall position within the market (International Emissions Trading Association, 2012, p.2).

Several attempts have been made to forecast the impact of the European Emission Trading Scheme on ticket prices and on the demand for tickets. However, it is quite difficult to determine the exact increase in ticket prices, because there are so many factors which this increase is dependent on. One of these factors is for example to which extent the airline operator decides to pass their extra costs on to their customers. However, it is possible to get an indication of what the effects of the European Emission Trading Scheme is on the fare prices (International Emissions Trading Association, 2012, p.2).

The table below shows an indication of price levels in three different situations. In their calculation the KIM start from an estimate of the total EU wide number of allowances which have to be bought, which is 60.4 million tonnes in 2012. Assuming that only passengers have to pay for the EUAs and a price of 10 euro per allowance and then dividing by the total EU wide RPKs results in a price of 0,225 euro per 1000 RPK. The second column in the table shows the increased ticket price on certain routes compensating the airlines for their out of pocket costs. The third column shows the amounts if also the freely received allocations were charged to the customer (opportunity costs), resulting in a fourfold increase. The fourth column displays a potential CO₂ charge should the price of EUAs rise to 50 euro per tonne (Kennisinstituut voor mobiliteitsbeleid, 2012).

	Distance (return)	Price €10/tonne Out-of- pocket	Price €10/tonne Total costs	Price €50/tonne Total costs
Amsterdam – London	740 km	€0.2	€0.8	€4
Amsterdam – Barcelona	2,480 km	€0.6	€2.4	€12
Amsterdam – New York	11,730 km	€2.7	€10.8	€54
Amsterdam – Jakarta	22,730 km	€5.2	€20.8	€104

Source: Kennisinstituut voor mobiliteitsbeleid(2012).

This increase in prices shown in this table obviously affects consumers, especially on long-distance flights. Flying will basically become more expensive. A side effect of this is that it could be possible that people would choose another means of transportation to travel somewhere, which could potentially lead to less demand for flights. Overall, it is quite difficult to predict how consumers will respond to this increase in prices.

3.3.5. Impact on competitive position of airlines

Next to an impact on costs and ticket prices, the European Emission Trading Scheme also has an impact on the competitive position of European airlines. Airlines that mainly operate within the EU have to buy more allowances to cover for their emissions than airlines that operate more internationally (Lufthansa, 2012¹). Appendix 15 shows the lack of balance in burden sharing. This lack of balance has an effect on the competitive position of airlines. As mentioned before, EU airlines have to buy more allowances to cover for their emissions. This results in extra costs, which they most probably will have to pass on to their customers. As a result of that their ticket prices

will become more expensive, thus making them a less attractive option in comparison to their competitors (Lufthansa, 2012¹).

A potential consequence of this is that airline companies would decide to make stops in between in order to reduce the distance for which they have to buy allowances, as the carbon tax is not an international one. A good example of this can be found in appendix 16.

If a European airline, say Lufthansa, would have to fly from Frankfurt to Hong Kong, they would have to buy allowances for the full length of the flight. However, if Lufthansa would make a stop in Dubai, it would only have to buy allowances for the flight from Frankfurt to Dubai. The flight from Dubai to Hong Kong would not be covered by the European Emission Trading Scheme. By doing this Lufthansa saves money.

3.4 Conclusion

This chapter shows that opinions differ on how far-stretching the consequences of the European Emission Trading Scheme are. The impact on airlines all depends on the airline companies themselves, for example how environmentally friendly they were before the EU ETS, the composition and fuel efficiency of their fleets and its position in the market. If an airline company, such as KLM, has a strong competitive position in the market, it means that they can direct most of the costs towards customers as they do not have to compete strongly against others. It is clear though that if actually a reduction in CO₂ emission can be forced upon the aviation industry, proceeding in a business as usual fashion cannot be maintained in the long run with the expected 6 fold increase of output in 2050.

4. Conclusions

This conclusion gives an answer to the main question of this research: how is the airline industry affected by the European Emission Trading Scheme?

During the research it became obvious that organisations and institutions often do not agree on the extent as to which the airline industry actually is affected by the European Emission Trading Scheme. Some think that the effects of the ETS are overstated in the press, publications etcetera and that the scheme is actually really favourable for the airline industry. Others however do not see the ETS as favourable for the airlines at all. Some countries take it even further by adopting legislation which forbids their airlines to cooperate with the European Emission Trading Scheme.

Irrespective of which party is right in this debate, it cannot be denied that the European Emission Trading Scheme does hold consequences for the airline industry. In this research, three main impacts can be identified.

Firstly, airlines have to deal with an increase in operating costs. This is due to the fact that under the European Emission Trading Scheme airlines will have to either invest in for example airplanes with increased fuel efficiency to reduce their emissions or buy extra allowances to cover their emissions. These additional costs are influenced by a number of different factors. The composition of the fleet and the fuel efficiency of the airplanes with which the company operates is a good example of such a factor. Due to the fact that these factors vary per airplane, it is difficult to predict the exact impact of these additional operating costs.

Besides that, ticket prices will increase. The amount with which prices will go up depends on the extent to which airline operators can pass on their extra costs to customers. This increase in ticket prices affects customers; they will have to pay more in order to fly somewhere. For this impact also counts that it is hard to predict how much ticket prices will actually increase, as this depends on the business model of the airline and the position in the market. Moreover, it is difficult to forecast how consumers will react to this development. One scenario could be that they would decide to use another means of transport instead of the plane, which could potentially result in a decrease of demand for flights.

Last, the European Emission Trading Scheme potentially has an impact on the competitive position of European airlines. Airline companies operating mainly within the EU have to buy more allowances to cover their emissions than operators mainly with activities outside of the EU. As a result, European airlines will have more additional costs. Assuming they will pass these costs on to

their customers, this will then result in higher ticket prices, which makes these airlines less attractive to travel with compared to international competitors.

From this information, it can be concluded that the European Emission Trading Scheme affects the airline industry in different ways. In this research three main consequences were put forward, namely the impact on operating costs, impact on ticket prices and impact on competitive position of the European airlines. However, due to the fact that the airline industry has not been included in the EU ETS for that long, so the full impacts have not established themselves yet and because of the numerous factors that influence the extent to which the airlines are impacted, it is hard to precisely predict how severe these consequences are.

5. Recommendations

As mentioned in chapter 4, different factors have an influence on the impact of the additional operation costs for the airline industry. One of the most important of these factors is the composition of the airlines fleet and the fuel efficiency of the airplanes it flies with. After all, if an airline operator flies with airplanes that use less fuel this will result in less CO₂ emissions. Less emission means that this same airline operator will have to buy less extra allowances which would save the operator money. Maybe the amount of allowances it gets allocated for free would be enough to cover for its emissions, which results in the airline not having to buy any extra allowances at all. This would save the company even more money.

These fuel efficient airplanes and green technologies are great, but at some point there will be no further enhancement of the technology possible. At some point airplanes will be as green and efficient as they can possibly be. This will leave airline operators with a specific level of emissions which will be very hard to reduce even more.

In the interview with Mr. Lunter it became clear that technology alone will not entirely deal with the emission problems (M. Lunter, interview, September 27th, 2012 – see appendix 8). A completely different approach to flying as it is known is needed. To start, it is recommended that airline operators take a better look to their frequency of flights in comparison with their load factor. They should revise how dense the frequency of their flights has to be in order to maintain a good network with good connections. They should ask themselves if maintaining these connections could also be done with a lower frequency of flights and a higher load factor. For example, instead of flying 10 times a day with a load factor of 75% maybe they could fly 7 to 8 times a day with a load factor of around 100%. This would mean that they transport just as many passengers with two flights less a day, which will result in lower emissions (M. Lunter, interview, September 27th, 2012 – see appendix 8).

In the overview of international climate negotiations in chapter 1 one of the main recurring points is that there is a need for a global climate agreement, legally binding for everyone. Chapter 4 also mentions that China, India and the US have adopted legislation which forbids their airline operators to cooperate with the European Emission Trading Scheme. It might be wise for the international community to boost discussions on a global climate agreement, before relations between the European Union and other continents turn tense in such a way that future negotiations would become even more difficult.

References

- BNR Duurzaam (2012). *KLM benut historisch lage CO2-prijzen*. Retrieved September 15th, 2012 from: <http://www.bnr.nl/programma/bnrduurzaam/484454-1201/klm-benut-historisch-lage-co2-prijzen>
- Carbon Planet (2012). *The Copenhagen Accord: What Happened At COP15 In Copenhagen?* Retrieved: March 30th, 2012 from: <http://www.carbonplanet.com/copenhagen>
- Convention on Biological Diversity (n.d.) *Conference Of The Parties (COP)*. Retrieved: April 4th, 2012 from: <http://www.cbd.int/cop/>
- Dutch Emissions Authority (2012). *Carbon leakage*. Retrieved November 1st, 2012 from: <https://www.emissieautoriteit.nl/emissierechten/Toewijzing%20/toewijzing-2013-2020/carbon-leakage>
- Europa.eu (2007). *Launching The European Climate Change Programme (ECCP)*. Retrieved April 14th, 2012 from: http://europa.eu/legislation_summaries/environment/tackling_climate_change/128185_en.htm
- Europa-Nu (2011). *Kritiek op door EU bejubelde uitkomst klimaatconferentie Durban*. Retrieved May 1st, 2012 from: http://www.europa-nu.nl/id/viv7izd7c5zo/nieuws/kritiek_op_door_eu_bejubelde_uitkomst?ctx=viuhgy6v0hyp
- European Commission, (2007)¹. *Combating climate change: the EU leads the way*. Luxembourg: Office for Official Publications of the European Communities. Retrieved April 8th, 2012 from: <http://ec.europa.eu/publications/booklets/move/70/en.pdf>
- European Commission, (2012)². *Climate action: emissions trading system (EU ETS)*. Retrieved October 5th, 2012 from: http://ec.europa.eu/clima/policies/ets/index_en.htm
- European Commission (2010)³. *Climate action: European climate change programme*. Retrieved: March 15th, 2012 from: http://ec.europa.eu/clima/policies/eccp/index_en.htm
- European Commission (2010)⁴. *Climate Action: UN Negotiations and other International Fora*. Retrieved: March 20th, 2012 from: http://ec.europa.eu/clima/policies/international/negotiations/index_en.htm

European Commission (2012⁵). *What is the EU doing about climate change?* Retrieved March 12th from: http://ec.europa.eu/clima/policies/brief/eu/index_en.htm

European Commission (2009⁶). *EU action against climate change: the EU Emissions Trading Scheme*. Luxembourg: Office for Official Publications of the European Communities. Retrieved April 9th, 2012 from: http://www.ab.gov.tr/files/ardb/evt/1_avrupa_birligi/1_6_raporlar/1_3_diger/environment/eu_emissions_trading_scheme.pdf

European Commission (2010⁷). *Climate Action: Progress Towards A Legally Binding Global Climate Framework*. Retrieved April 6th, 2012 from: http://ec.europa.eu/clima/policies/international/negotiations/progress/index_en.htm

European Commission (2010⁸). *Climate Action: First European Climate Change Programme*. Retrieved: May 20th, 2012 from: http://ec.europa.eu/clima/policies/eccp/first/index_en.htm

European Commission (2010⁹). *Climate Action: Second European Climate Change Programme*. Retrieved: May 20th, 2012 from: http://ec.europa.eu/clima/policies/eccp/second/index_en.htm

European Commission (2010¹⁰). *Climate Action: The EU Climate and Energy Package*. Retrieved: May 27th, 2012 from http://ec.europa.eu/clima/policies/package/index_en.htm

European Commission (2012¹¹). *Benchmarks for free allocation*. Retrieved, October 15th, 2012 from http://ec.europa.eu/clima/policies/ets/benchmarking/index_en.htm

European Commission (2012¹²). *Linking the EU ETS to other Emissions Trading Systems and use of international credits*. Retrieved October 16th, 2012 from: http://ec.europa.eu/clima/policies/ets/linking/index_en.htm

European Commission (2012¹³). *Monitoring, Reporting and Verification of Greenhouse Gas Emissions under the EU ETS*. Retrieved October 15th, 2012 from: http://ec.europa.eu/clima/policies/ets/monitoring/index_en.htm

European Commission (2011¹⁴). *Allocation of aviation allowances in an EEA-wide Emissions Trading System*. Retrieved July 6th, 2012 from: http://ec.europa.eu/clima/policies/transport/aviation/allowances/index_en.htm

European Commission Directorate General for Climate Action (2012). *Management plan: DG climate action*. Retrieved: May 20th, 2012 from:

http://ec.europa.eu/atwork/synthesis/amp/doc/clima_mp.pdf

European Environment Agency (2012). *EUA future prices 2008–2012*. Retrieved November 2nd, 2012 from: <http://www.eea.europa.eu/data-and-maps/figures/eua-future-prices-200820132012>

Financial Times.com (2012). *Warning on EU carbon-market ‘meddling’*. Retrieved November 1st, 2012 from: <http://www.ft.com/intl/cms/s/0/37bff658-5270-11e1-ae2c-00144feabdc0.html#axzz2B6tKhknc> - Please see thesis dossier for article

Greenaironline.com (2012). *CO2 emissions from scheduled airline flights within the scope of the Aviation EU ETS fell by around 7 percent in 2009*. Retrieved October 29th, 2012 from: <http://www.greenaironline.com/news.php?viewStory=772>

Icecap (2005). *European Emissions Trading*. Retrieved September 20th, 2012 from: <http://www.icecapltd.com/subcontent.asp?page=4&subpage=12>

International Emissions Trading Association (2012). *EU ETS & Aviation*. Retrieved August 5th, 2012 from http://www.ieta.org/assets/3-Minute-Briefings/3-minutes-briefing_eu-ets-aviation_final-01192012.pdf

Kennisinstituut voor mobiliteitsbeleid (2012). *De luchtvaart in het EU-emissiehandelssysteem: gevolgen voor de luchtvaartsector, consumenten en het milieu*. Retrieved October 25th, 2012 from: <http://www.rijksoverheid.nl/documenten-en-publicaties/rapporten/2012/03/14/de-luchtvaart-in-het-eu-emissiehandelssysteem-gevolgen-voor-de-luchtvaartsector-consumenten-en-het-milieu.html>

Kopp, R.J. (2011). *The climate has changed – so must policy*. Retrieved March 12th, 2012 from: <http://www.rff.org/RFF/Documents/RFF-IB-11-03.pdf>

Library House of Commons (2011). *EU ETS and aviation*. Retrieved August 5th, 2012. Please see thesis dossier for report.

Luchtvaartnieuws.nl (2012). *VS nemen wet aan tegen betalen Europese CO2-taks*. Retrieved November 1st, 2012 from: http://www.luchtvaartnieuws.nl/nl-NL/Article.cms/Airlines/VS_nemen_wet_aan_tegen_betalen_Europese_CO2-taks

- Lufthansa (2012¹). *Policy brief: Europe at a crossroads – support economic growth*. Retrieved October 10th, 2012 from: http://presse.lufthansa.com/fileadmin/downloads/en/policy-brief/10_2012/LH-PolicyBrief-October-2012-Support-economic-growth.pdf – please see thesis dossier for policy brief.
- Lufthansa (2012²). *Policy brief: Emissions trading: many open issues remain*. Retrieved September 5th 2012 from: http://presse.lufthansa.com/fileadmin/downloads/en/policy-brief/12_2010/LH-PolicyBrief-December-2010-Emissions.pdf
- Nederlandse Emissieautoriteit (2012). *Kennisgeving toewijzing broeikasgasemissierechten voor de luchtvaart*. Retrieved October 1st, 2012 from: https://www.emissieautoriteit.nl/mediatheek/luchtvaart/legislation/2011-12-20_Staatscourant_overview_Allocation_Levels_for_EU_ETS_Aviation.pdf
- The Guardian (2012). *Airline industry: EU emissions trading scheme 'could risk trade war'*. Retrieved October 31st, 2012 from: <http://www.guardian.co.uk/world/2012/jun/11/airline-industry-eu-emissions-trading-trade-war>
- The Scottish Government (2010). *Towards a Low Carbon Economy for Scotland: Discussion Paper*. Retrieved November 1st, 2012 from <http://www.scotland.gov.uk/Publications/2010/03/22110408/4>
- Thomson Reuters (2009). *What was agreed and left unfinished in U.N. climate deal*. Retrieved March 16th, 2012 from: <http://in.reuters.com/article/2009/12/20/idINIndia-44872920091220> – Please see thesis dossier for article
- United Nations (1992). *United Nations Framework Convention on Climate Change*. Retrieved March 12th, 2012 from: <http://unfccc.int/resource/docs/convkp/conveng.pdf>
- United Nations (1998). *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. Retrieved August 5th, 2012 from: <http://unfccc.int/resource/docs/convkp/kpeng.pdf>
- United Nations Framework Convention on Climate Change (2012¹). *Essential Background: The Convention*. Retrieved: March 20th, 2012 from: http://unfccc.int/essential_background/convention/items/6036.php

United Nations Framework Convention on Climate Change (2009²). *Draft decision -/CP.15, proposal by the president – Copenhagen Accord*. Retrieved March 30th, 2012 from:
<http://unfccc.int/resource/docs/2009/cop15/eng/107.pdf>

UNFCCC (2012³). *The Cancun Agreements: An Assessment By The Executive Secretary of the United Nations Framework Convention on Climate Change*. Retrieved: May 1st, 2012 from: <http://cancun.unfccc.int/>

UNFCCC (2012⁴). *Cancun climate change conference – November 2010*. Retrieved: May 1st, 2012 from: http://unfccc.int/meetings/cancun_nov_2010/meeting/6266.php

UNFCCC (n.d.⁵) *About CDM*. Retrieved October 15th, 2012 from:
<http://cdm.unfccc.int/about/index.html>

Volkskrant (2012). *Canada, Rusland, Japan verlengen 'Kyoto' niet*. Retrieved: May 2nd, 2012 from:
<http://www.volkskrant.nl/vk/nl/2816/Klimaatverandering/article/detail/3072340/2011/12/1/1/Canada-Rusland-Japan-verlengen-Kyoto-niet.dhtml>

Wikipedia (2012). *Air France – KLM*. Retrieved November 4th, 2012 from:
http://nl.wikipedia.org/wiki/Air_France-KLM

Appendix 1

The main objectives of the Cancun Agreements are amongst others:

- Formulate clear goals and a prompt schedule in order to reduce greenhouse gas emissions resulting from human actions and to keep the global temperature rise below 2 degrees;
- Stimulate the participation and cooperation of all countries in cutting these emissions;
- Ensure the countries are transparent about the actions they are taking;
- Providing capital, for the short and long term, to empower developing countries in taking greater and more efficient measures;
- Establish the 'Green Climate Fund', in order to distribute \$100 billion per year by 2020 to developing countries, to support them in reducing climate change and dealing with its impacts;
- Preserve the world's forests, which are an important depository of carbon;
- Develop global capacity, in particular in emerging nations, to meet the global challenge;
- Establish efficient systems and institutions, to ensure these goals are carried out with success (UNFCCC, 2012).

Appendix 2

The new framework, also known as the Durban Platform for Enhanced Action, should contain the following:

- All Parties should make legally binding commitments to reduce their emissions, with differentiation of commitments applicable to developing countries;
- The overall objective must be to keep the global temperature rise below 2 degrees compared to preindustrial temperatures;
- It should cover the rules and institutions agreed upon in Cancun and Durban, as well as the key points of the Kyoto Protocol;
- It should have a common accounting system, to ensure a good overview of measures taken by each country and to verify if the world is on the right path to stay within the temperature ceiling. Also, a system is needed to measure, report and verify if the Parties are keeping their promises;
- The new framework should cover all the economic sectors, also the ones which are not included at the moment, such as international air and maritime transport and agriculture;
- It should contain new market-based instruments to help cut emissions in a profitable manner;
- It must include a plan for financial assistance to developing countries to enable them to take effective and transparent actions for reduction of their emissions (European Commission, 2010⁷).

Appendix 3

An overview of DG Clima's methods to achieve objectives objectives:

- **To pursue ambitious climate action at international level.** According to DG CLIMA, 'the EU should maintain its leading role in international negotiations en route to a legally binding global climate change agreement. Also, it should contribute to international attempts in recovering the ozone layer.' (European Commission Directorate General for Climate Action, 2012).
- **To ensure the EU achieves its 2020 climate and energy targets and prepares the transition to a low carbon economy by 2050.** The EU is taking actions within the Community in order to reduce emission levels, of which one is the climate and energy package (more on this in paragraph 1.2.3). Another example of actions the EU is taking is the Commission's decision to raise the proportion of the EU budget spent on climate related issues to 20% (European Commission, 2011). DG CLIMA has the goal to decrease European greenhouse gas emissions with 80-95% and transform the current EU economy to a low carbon economy by 2050. DG CLIMA is in charge of preparing this transition (European Commission Directorate General for Climate Action, 2012).
- **To mainstream climate action into relevant policies and programs and to adapt the EU economy to inevitable climate change.** In order to meet the targets set for 2020 and 2050, it is very important to integrate climate change into other policies, especially the ones with regard to agricultural and rural development, transport and energy programs etc (European Commission Directorate General for Climate Action, 2012).

Appendix 4

The Climate and Energy Package includes four pieces of interrelated legislation, which are:

- Modifications and improvements to the EU Emissions Trading Scheme, from now on referred to as ETS. As from 2013, a single EU-wide cap on emission allowances will apply to all emitters covered by this scheme. These allowances will be cut annually, which will lead to a 21% reduction of allowances in 2020, below the 2005 level of allowances. The allocation of free allowances will be substituted by auctioning. Moreover, the sectors and gases covered by the scheme will be extended.
- Emissions from sectors not included in the ETS, for instance transport, housing, agriculture and waste will be regulated by an 'Effort Sharing Decision'. The Member States have agreed on a binding national target for 2020 which is to limit the emissions from these sectors. The targets vary from an emissions reduction of 20% by the richest Member States to an increase in emissions of 20% by the poorest. In other words, the targets reflect the country's wealth. These targets will result in a 10% cut by 2020 (compared to 2005 levels) of the total EU emissions from the non-ETS sectors.
- Restraining national targets for renewable energy will altogether boost the average renewable share across the EU to 20% by 2020. The national targets vary from a renewable share of 10% in Malta to 49% in Sweden. These targets will help to reduce the EU's reliance on imported energy. Moreover, it will contribute to reducing the EU's greenhouse gas emissions.
- Making use of a legal framework to encourage the development and safe use of carbon capture and storage (CCS). CCS is an upcoming technology which captures carbon dioxide created by industrial processes and stores it underground where it cannot contribute to global warming (European Commission, 2010¹⁰).

Appendix 5

This table gives an overview of expansion from 2005-2008 in the allowance market.

Year of operation	Number of allowances traded	Average price of allowances	Approximate total value (x billion)
2005	362 million	€22	€7.2
2006	1 billion	€20,2	€20.2
2007	1.6 billion	€20,5	€41.4
2008	3.1 billion	€23	€71.3

Source: European Commission, 2009⁶

The average price of allowances is retrieved by calculating the average price per year from the graph below. In order to get to the approximate total value of the allowance market, this average price is multiplied by the number of allowances traded.

Price of EU ETS allowances during first two trading periods



Source: The Scottish Government, 2010.

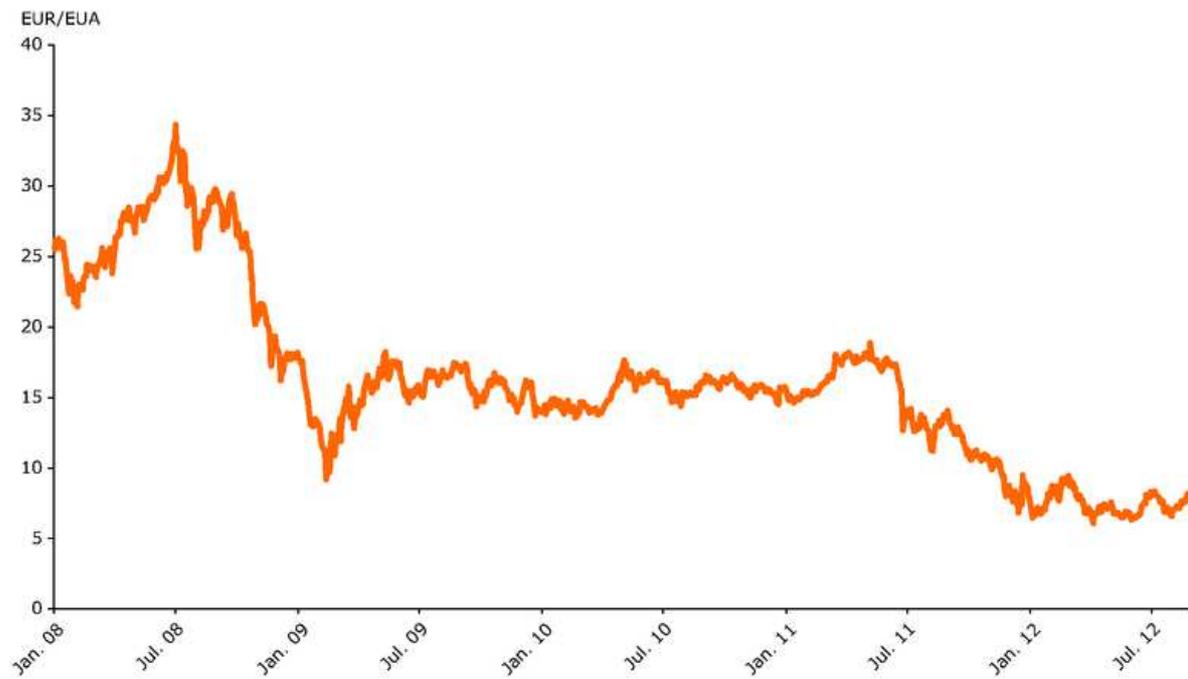
Appendix 6

Future of ETS from 2013

- The scope of the scheme will be extended to cover more industries and other greenhouse gases. In addition capture, transport and storage of CO₂ will be included (European Commission, 2009⁶, p.11-12);
- The national caps on emission allowances will be replaced by a single EU-wide cap. The cap for 2013 will be around 2.04 billion allowances (European Commission 2012¹¹). Experience acquired during the first trading period of the Scheme demonstrates that a single cap for the European Union will give more assurance that the EU's 2020 emissions reduction goals will be met. Moreover, it is also supposed to be more efficient in keeping the costs of achieving these targets to a minimum (European Commission, 2009⁶, p.11-12);
- A fixed annual reduction of 1.74% on the cap on allowances up to 2020 and beyond. This reduction rate will result in a significant reduction of EU wide emissions over time targeting the agreed emission level reduction within the Kyoto protocol. In addition, this clear long term measure should enable market parties to make necessary investment decisions to reduce their emissions (European Commission, 2009⁶, p.11-12);
- The cost free allocation system will be replaced by a full auctioning system. The fact that allowances are no longer free, but will have to be paid for should provide a strong incentive for businesses to take the needed environmental action. It is intended that as of 2013 half of the allowances will be sold at auction. Full auctioning is foreseen at the rather distant 2027 (European Commission, 2009⁶, p.11-12);
- Rules on monitoring, reporting and verification of emissions within the EU will be more harmonised (European Commission, 2009⁶, p.11-12);
- Low emission installations may be excluded from the scheme if member states can show that their fiscal or other measures will result in a similar effect on emissions as the ETS (European Commission, 2009⁶, p.11-12).

Appendix 7

This graph shows how the price of EU ETS allowances has dropped from 2008 until present.



Source: European Environment Agency, 2012.

Appendix 8

Transcription Interview with Mr. Michael Lunter

Ministerie van Infrastructuur en Milieu

Senior/Coördinerend Beleidsmedewerker

27 september 2012

Anke: Goedemiddag, u spreekt met Anke Terdu. Zoals afgesproken bel ik om u een aantal vragen te stellen voor mijn scriptieonderzoek.

Mr. Lunter: Goedemiddag, dat klopt, je zou me bellen. Brandt los, zou ik zeggen.

Anke: Oké. Kunt u mij misschien eerst even uitleggen wat uw functie precies is? Ik wil dat namelijk graag vermelden bij de uitwerking van mijn interview.

Mr. Lunter: Ja, ik ben senior/coördinerend beleidsmedewerker bij de directie luchtvaart van het directoraat generaal bereikbaarheid, wat valt onder het Ministerie van Infrastructuur en Milieu.

Anke: Oké. Mijn eerste vraag aan u is: waarom is er in de afgelopen jaren pas besloten om de luchtvaartindustrie toe te voegen aan het European Emission Trading Scheme? Waarom is dit niet eerder besloten?

Mr. Lunter: Daar kan ik heel veel over zeggen. Misschien eerst even iets over mijn betrokkenheid voordat ik antwoord ga geven op je vraag. Ik werk vanaf 2007 aan dit dossier, mijn betrokkenheid wordt steeds groter, dus ik kan redelijk ver teruggaan in de geschiedenis van de totstandkoming. Op basis van het Kyoto Protocol, artikel 2.2, is de verantwoordelijkheid voor de reductie van CO₂ emissies gelegd bij de organisaties die voor luchtvaart verantwoordelijk zijn, ICAO dus. Vanaf dat moment is er in de luchtvaart gesproken over, en zijn er onderzoeken geweest naar de wijze waarop deze reductie het beste zou kunnen plaatsvinden. Toen in 2003 de Europese Unie het emissiehandelssysteem het licht liet zien en dat voor de industrie ging introduceren, toen is er binnen ICAO ook onderzoek gedaan naar de mogelijkheid van emissiehandel. ‘Wat zijn nou de eisen of waar moet je aan denken als je een emissiehandelssysteem zou willen introduceren voor de luchtvaart?’ Vanaf die tijd is er dus binnen ICAO en in verschillende assemblies gesproken over hoe we tot reductie kunnen komen. Echter, dat heeft in de ogen van de Europese Commissie en veel NGO’s niet tot fundamentele en effectieve stappen geleid die zorgen voor reductie, althans, reductie in de mate waarin men vindt dat dit had moeten plaatsvinden. In de periode 2005/2006

had de Europese Commissie haar beleid voor de komende jaren vastgesteld en het CO₂ emissie reductie beleid vastgesteld op een programma dat heet '20% in 2020'. Er moet dus 20% reductie van CO₂ emissies plaatsvinden in 2020. Daar moet de luchtvaart ook aan bijdragen. Doordat de groeiprognoses behoorlijk fors waren maakte de Commissie zich er zorgen over dat de winst die zou worden geboekt in andere sectoren door de luchtvaart teniet zou kunnen worden gedaan. Vanuit die zorg en vanuit het feit dat men in Europa van mening was dat de progressie in de luchtvaart te klein was, dat er eigenlijk geen echte stappen gezet werden, heeft men in 2006 een voorstel geschreven om de luchtvaart op te nemen in het emissiehandelssysteem wat toen nog maar net, vanaf 2003, aan het functioneren was. Dat voorstel is toen vervolgens in procedure gebracht. Dat heeft toen ongeveer 2 jaar geduurd en toen is in december 2008 het voorstel in de milieuraad met unanimité aangenomen, ook door Nederland, en vanaf dat moment is begonnen met de implementatie in de nationale wetgeving.

Anke: Die implementatie had natuurlijk ook enige tijd nodig.

Mr. Lunter: Ja precies, nou ja enige tijd, er was besloten om een proefjaar te doen en zodra er in 2013 begonnen wordt met een nieuwe handelsperiode en een gereviseerde ETS richtlijn, dan gaat de luchtvaart daar automatisch in mee. In 2012 wordt er een aparte richtlijn uit 2008 gehanteerd en wordt de luchtvaart nog apart behandeld, want dit is het eerste jaar waarin gekeken wordt hoe het een en ander verloopt.

Anke: Maar even terug naar mijn vraag: wat is nou eigenlijk de reden dat de Commissie hiertoe besloten heeft?

Mr. Lunter: Ja, die is dus tweeledig.

- Ten eerste, de Commissie heeft ertoe besloten omdat men angst had of zorgen had over het tenietdoen van de winst in CO₂ reductie vanwege de stijging van de luchtvaartactiviteiten.
- Ten tweede, men vond dat de progressie in de luchtvaart niet snel genoeg ging en dat daar, medegezien die groei ook, best wat meer aan gedaan kon worden. Bovendien vond de Commissie ook dat technologie onvoldoende oplossing zou bieden voor de CO₂ problematiek.

Anke: Ok, dat is helemaal duidelijk. In mijn onderzoek tot dusver is heel erg naar voren gekomen dat de Europese Unie en de Verenigde Naties graag een globale overeenkomst willen die bindend is voor alle landen. Als zo'n globale overeenkomst in het leven geroepen

wordt, hoe zit het dan met het European Emission Trading Scheme? Blijft dat dan gewoon bestaan?

Mr. Lunter: De luchtvaart is een mondiale sector. Daarom moet je proberen te voorkomen dat je regionale oplossingen gaat zoeken voor wat dan ook, die kunnen leiden tot verschillen en discriminatie. Er is een belangrijk principe binnen ICAO dat heet 'non-discrimination'. Non-discrimination betekent dat alle landen die iets met luchtvaart doen zich conformeren aan de afspraken die mondiaal worden gemaakt binnen het ICAO verband. Dat is ook een belangrijke reden waarom artikel 2.2 van het Kyoto Protocol in het leven geroepen is, omdat binnen het hele Kyoto gebeuren er wel onderscheid gemaakt wordt, namelijk tussen Annex 1 en Non-Annex 1 landen. Dat doen we in luchtvaartland in principe niet. Wat je ziet gebeuren is dat dit onderscheid uitgespeeld wordt door de Non-Annex 1 landen, omdat ze de ene keer in UNFCCC roepen: 'ja, maar met de luchtvaart hebben we te maken met non-discrimination' en zodra ze in ICAO verband vergaderen roepen ze: 'ja, maar we hebben binnen UNFCCC CDR (Common Differentiated Responsibility)', dus wel onderscheid. Dat spelen ze dus een beetje tegen elkaar uit en dat geeft een heel lastige onderhandelingspositie. Daarbij speelt ook nog dat een aantal ontwikkelingslanden zoals China en Brazilië heel grote luchtvaartlanden zijn. Dus op luchtvaartgebied zijn het helemaal geen ontwikkelingslanden of kleine landjes. Dat is even ook goed om in de gaten te houden. Non-discrimination is dus wel degelijk een heel belangrijk aspect.

Anke: Maar als we nou naar een mondiaal systeem toegaan waaraan iedereen zich conformeert, wat betekent dat dan voor het EU ETS?

Mr. Lunter: In principe is het zo dat het EU ETS niet zou voortbestaan als je met elkaar tot een systeem besluit waar iedereen het zodanig over eens is dat ze daar allemaal aan meedoen. Dan moet je geen regionale systeem handhaven, want dan ga je in tegen de afspraken waaraan je je geconformeerd hebt. De Commissie heeft wel gezegd: 'Wij kunnen alleen maar instemmen met een systeem waarvan het effect minstens even groot is als het effect van het EU ETS.' Dat is ook een hele interessante opmerking om vast te houden, want dat is iets waar de Commissie al een aantal keer naar gerefereerd heeft. Ze hebben gezegd: 'Prima, we willen best op een gegeven ogenblik aan een mondiaal besluit meedoen, maar dan moet het wel aan dit en dit voldoen.'

Anke: Wat zou er gebeuren als de EU vast zou houden aan haar eigen systeem?

Mr. Lunter: Als de EU vasthoudt aan haar systeem, Australië en Nieuw-Zeeland op een gegeven moment iets hebben waaraan zij vasthouden, de Zuid-Amerikaanse landen ook iets moois hebben waar ze aanvasthouden, de VS, China en ga zo maar door, dan krijgen we dus 10 systemen

waarvan iedereen zegt: 'Dit wil ik graag volhouden, ondanks het feit dat ik mij conformeer aan een mondiaal systeem.' Dat gaat niet werken. Dat is onwerkbaar, omdat maatschappijen die kriskras over de hele wereld functioneren dan een onwaarschijnlijk grote hoeveelheid administratie moeten gaan voeren om dat allemaal in kaart te brengen en op elkaar af te stemmen. Dat is haast niet te doen.

Anke: Begrijpelijk. Het European Emission Trading Scheme kan ook gelinkt worden aan emissiehandelssystemen in andere landen, toch?

Mr. Lunter: Op dit moment is het zo dat die mogelijkheid bestaat, zolang het EU ETS er is. Hoe dat dan precies zou moeten gaan, op welke voorwaarden en welke basis, is nog steeds een punt van discussie. De Commissie zelf is daar ook niet duidelijk over. Het feit is dat er een overeenkomst is om twee systemen met elkaar te verbinden, maar daarmee is de link nog niet tot stand gebracht. Daar gaat nog enorm veel studie, onderzoek en afstemming aan vooraf voordat dat überhaupt mogelijk is.

Anke: want dat zou betekenen dat als twee landen gelinkt worden de reductiedoelen ook op hetzelfde niveau moeten komen, toch?

Mr. Lunter: Kijk, zo'n link is uiteindelijk bedoeld om te zeggen: 'Maatschappijen uit het land waarmee we gelinkt zijn, hoeven niet te voldoen aan ons EU ETS.' Als je dat in een wat bredere zin bekijkt en ook kijkt naar de voorwaarden die daar bijhoren binnen de richtlijn, kom je op het begrip equivalent measures uit. De equivalentie zit vooral in het effect van de maatregel, het moet vergelijkbare reducties tot stand brengen als de EU ETS. Op basis waarvan dat berekend zou moeten worden is nog niet duidelijk. Wat het begrip equivalentie omvat is ook nog steeds punt van discussie. De Europese Commissie zegt hierover tegen landen die vragen wat equivalent precies inhoudt: 'Kom maar met een voorstel', waarop die landen tegen de Commissie zeggen: 'Dat willen we wel doen, maar we moeten wel weten wat jullie onder equivalent verstaan voordat we met een voorstel komen. Het is jullie begrip, jullie idee en jullie praten over equivalent. Vertel het dus maar.' Dit zorgt ook weer voor een impasse in de discussie, want de Commissie wil niet zeggen wat zij onder equivalent verstaat en de landen kunnen niet met voorstellen komen zolang ze niet weten waaraan ze moeten voldoen.

Anke: Kunt u iets meer vertellen over hoe de ETS tot standgekomen is?

Mr. Lunter: De richtlijn is onder druk en onder een zekere mate van emotie tot stand gekomen. De wens en drive om iets te doen was hierbij groter dan de rationele gedachtegang. De rationaliteit was

een stuk minder groot dan de emotie tijdens de totstandkoming, met gevolg dat er hier en daar ook hele rare weeffouten in de richtlijn zitten. Zo moet bijvoorbeeld de business aviation, wat een hele kleine club is enorme investeringen doen in administration, terwijl ze qua frequentie eigenlijk onder de uitzonderingsregel van 243 vluchten per kwartaal vallen. Om de een of andere reden valt de business aviation niet onder die uitzondering en moeten ze aan de ETS meedoen. Dat is een verzinzel geweest van iemand in het Europees Parlement die daarvoor gepleit heeft, zonder eigenlijk precies te weten wat hij zei. Kennelijk heeft hij dit ook heel lang volgehouden. Het is dan ook volkomen onduidelijk en niet goed terug te halen wat daar precies de argumentatie voor geweest is. Er zijn wel meer van dit soort curieuze artikelen. Het probleem met de richtlijn is dat het geen kaderrichtlijn is, maar een richtlijn die vrij specifiek omschrijft aan welke eisen voldaan moet worden en welke toepassingsgebieden het kent. Bij sommige richtlijnen heb je de basisrichtlijn en daarbinnen heb je een aantal uitvoeringsbesluiten om het zo maar te zeggen. Die uitvoeringsbesluiten zijn vrij makkelijk aan te passen en te verbeteren. Een richtlijn zoals deze moet via een Raad, waar een heel besluitvormingsproces van een jaar of twee aan voorafgaat. Als je dus iets met deze richtlijn wilt doen, een klein detail wilt veranderen bijvoorbeeld, dan heb je daar een procedure van een jaar of twee voor nodig. Bovendien moet het dan ook weer in de Milieuraad besproken worden.

Anke: Wat zijn nou precies de gevolgen van het European Emission Trading Scheme voor de luchtvaartindustrie?

Mr. Lunter: Het antwoord op deze vraag is enigszins afhankelijk van degene aan wie je de vraag stelt. De groene lobby, de milieu NGO's, roepen dat de luchtvaart alles kan doorberekenen aan de consument en dat de kosten per ticket heel laag zijn. Mevrouw Hedegaard heeft dat heel onverstandig vergeleken met de kosten voor een kopje koffie. Naar mijn mening is dat een denigrerende vergelijking en kun je dat beter niet doen, maar goed, zij heeft het daar dus mee vergeleken. Sommige maatschappijen hebben de kosten ingeschat op 3 a 4 dollar per ticket als het gaat om transcontinentale vluchten. Het effect van het European Emission Trading Scheme is afhankelijk van de prijs van een emissierecht. Op dit moment betaal je voor een ton CO2 maar 7 euro 50, dus de prijs ligt erg laag. Dit baart zorgen. De lage prijs heeft te maken met het feit dat de industriële activiteiten door de economische recessie lager zijn. De vraag naar CO2 emissierechten is daardoor ook lager. Het systeem op zich, als marktconform systeem, werkt dus zou je kunnen zeggen. Maar goed, op dit moment hebben maatschappijen er nog niet zo heel erg last van. Het is ook afhankelijk van de benchmark, dus hoeveel gratis rechten een maatschappij gekregen heeft en hoeveel die er bij moet gekopen gezien de groei die de maatschappij doorgemaakt heeft sinds die

benchmark en de efficiency van de vliegtuigen waarmee er op dit moment gevlogen wordt. Dus als je na de benchmark een aantal efficiënte vliegtuigen hebt aangeschaft in het kader van vlootvernieuwing, dan heb je relatief veel rechten ten opzichte van de uitstoot die je op dat moment genereert. Vlootsamenstelling is dus van belang nadat de benchmark heeft plaatsgevonden.

Anke: Klopt het dus dat luchtvaartmaatschappijen een aantal vrije credits toegekend krijgen op basis van de hoeveelheid CO2 die ze uitgestoten hebben in 2010?

Mr. Lunter: Ja, er wordt een berekening op losgelaten. Op basis van die berekening krijgen ze een bepaalde hoeveelheid emissierechten toegekend waar voorlopig niet verder aan getornd wordt. Dus om het aantal rechten dat je nodig hebt zo laag mogelijk te krijgen moet je maatregelen nemen. Je moet of rechten aanschaffen of bijvoorbeeld overgaan op andere vliegtuigen om reductie te verminderen. Dus waar het makkelijkst en het goedkoopst reductie te vinden is daar moet je in investeren. Dat is eigenlijk het idee van het ETS. We hebben nu de financiële kant gehad, de vlootsamenstelling en de milieuprestaties. Dan is er ook nog de concurrentie en de netwerken die over de hele wereld worden bediend. In hoeverre is het ETS van invloed op de manier waarop een netwerk wordt opgebouwd? Dan zie je dat de angst is dat maatschappijen die net buiten Europa een hub hebben, wel eens heel gunstig en goedkoop, namelijk zonder ETS kosten, naar die hub kunnen vliegen waar ze dan de mensen laten overstappen zodat die vervolgens Europa kunnen binnenvliegen. Dat soort dingen is dus mogelijk. Of men kan zeggen: 'Nou, aanvankelijk was Europa wel handig, maar nu vliegen we via net buiten Europa gelegen hubs.' Met name de ontwikkelingen op het Arabisch schiereiland en daar in de omgeving, waar zich grote luchthavens bevinden die de reiziger heel veel bieden zorgen ervoor dat de focus enigszins verschuift. Azië – Arabisch Schiereiland – VS of Zuid-Amerika is een hele interessante route die nu veelal ook via Europa verloopt, maar door de ETS en de kosten die daar mee gepaard gaan wel eens via Dubai of Qatar zou kunnen gaan plaatsvinden in plaats van via Europa. Dat is een grote zorg.

Anke: Dus de grootste gevolgen voor de luchtvaartindustrie hangen samen met de concurrentiepositie?

Mr. Lunter: De concurrentiepositie en het effect eventueel op de werkgelegenheid in en rondom luchthavens.

Anke: Hoe wordt daar mee omgegaan? Is er een bepaald soort maatregel die hiertegen kan werken?

Mr. Lunter: Nee, wat kun je doen? Wat is een maatregel om er tegenin te gaan? Netwerk is een vrij ingewikkelde uitkomst. Er is zeg maar een balans tussen heel veel verschillende aspecten en eigenlijk is het een optimaliseringsproces. Hoe kun je zoveel mogelijk bestemmingen aanvliegen op een zo effectief en optimaal mogelijke manier? Dat is waar maatschappijen als KLM, Air France, Lufthansa enzovoorts mee bezig zijn. Daarin moet je aannames doen en moet je rekening houden met de bewegingen van de reiziger. Die moet je proberen naar jouw hub toe te trekken, maar ja, als de reiziger op een gegeven moment het gevoel krijgt dat hij beter af en goedkoper uit is om dat via een ander te doen, ja, wat kan je daar dan tegen doen? Dat is heel lastig. Het zwaartepunt van de luchtvaart gaat ook langzaam verschuiven naar Azië en Zuid-Amerika want daar zijn de opkomende economieën, terwijl we hier een beetje in de laatste dagen van Rome aangeland zijn. Stond gisteren ook in de krant, maar het is al oud nieuws vind ik.

Anke: Helemaal duidelijk. Hoe wordt er eigenlijk in Nederland gecontroleerd of luchtvaartmaatschappijen zich echt houden aan de emissierechten die zij toegekend krijgen?

Mr. Lunter: In Nederland is er een emissieautoriteit. De Nederlandse Emissieautoriteit is een onderdeel van het Ministerie van Infrastructuur en Milieu, dat wil zeggen: het is een zelfstandig bestuursorgaan geworden, maar valt politiek gezien onder de verantwoordelijkheid van het Ministerie van Infrastructuur & Milieu. De Nederlandse Emissieautoriteit is verantwoordelijk voor alle industriële emissies en in dit geval dus ook de CO2 emissies van de luchtvaart. Zij zijn degene die gaan over de rapportage en de administratieve zaken rondom emissiehandel. De Nederlandse Emissieautoriteit verwacht ergens in het voorjaar, maart/april, de emissierapportage van de maatschappijen die in Nederland geregistreerd staan en waarvoor de Nederlandse Emissieautoriteit dus de verantwoordelijkheid draagt. Zij zullen dan op basis van die rapportage controleren of het aantal rechten dat is ingeleverd correspondeert met het aantal gevlogen RTK, Revenu Ton Kilometer, en de emissies die daarbij horen. RTK is de maat voor gevlogen betaalde kilometers. Als deze twee corresponderen is er niets aan de hand, maar zodra het niet correspondeert is er een probleem. Althans, als het aantal geëmitteerde CO2 eenheden meer is dan het aantal aangekochte emissie-eenheden dan heeft het bedrijf wat uit te leggen, want dan hebben ze niet voldaan aan de eis dat ze moeten betalen voor elke CO2.

Anke: En dan volgt er een boete?

Mr. Lunter: Ja, dan volgt er een handhavingstraject.

Anke: Hoe hoog is de boete die de luchtvaartmaatschappijen dan moeten betalen?

Mr. Lunter: Dat kan oplopen afhankelijk van de overtreding, maar dat weet ik niet uit mijn hoofd. Er zitten bepaalde bedragen aan vast maar dat kan oplopen tot 10.000 euro per uitgestoten ton, geloof ik. Bij sommige maatschappijen, bijvoorbeeld Chinese maatschappijen, hebben we het dan over 50 tot 100 miljoen euro boete voor het niet inleveren of het niet meedoen aan het systeem op basis van hun geëmitteerde CO₂. Dat kan dus behoorlijk in de papieren lopen.

Anke: Dat is inderdaad heel veel geld. Wat kan er volgens u nog meer voor het milieu gedaan worden door de luchtvaartindustrie?

Mr. Lunter: Kijk, waar je uiteindelijk naartoe wilt is naar het vliegen op basis van noodzaak, ja wat is noodzaak, maar in ieder geval, je kunt van de maatschappijen niet vragen dat ze een maatschappelijke ontwikkeling in gang zetten die hun bedrijfsvoering zou bedreigen. Er zal echter ongetwijfeld een maatschappelijke ontwikkeling gaan plaatsvinden die hen verplicht tot aanpassing. De internationale luchtvaartorganisatie IATA heeft een vier pijlerstrategie. In die vier pijlers gaat het:

- In eerste instantie om technologie. Hoe kunnen we vliegtuigen nóg zuiniger, nóg stiller en nóg efficiënter maken? Hoe kunnen we de afvalstoffen, niet alleen CO₂ emissies maar ook het gewone afval, minimaliseren en/of hergebruiken? Hoe kunnen we ervoor zorgen dat er een soort van cradle-to-cradle principe toegepast wordt op het hele proces van vliegen? Dat is vanuit de technologie.
- Dan heb je een tweede pijler en dat is efficiënt gebruik maken van je luchtruim. Hoe kun je de route van punt a naar b zo kort mogelijk maken zonder dat je allerlei omwegen moet maken en allerlei toeren moet uithalen om van het ene vliegveld naar het andere te komen? Hoe kun je voorkomen dat er op het vliegveld van aankomst zodanige filevorming is dat je, zoals je bij London Heathrow nog wel eens ziet, een paar rondjes moet vliegen boven Londen voordat je eindelijk mag landen. Dat zijn ATM, dus Air Traffic Management zaken die weer samenhangen met capaciteit, slotcapaciteit en airportcapaciteit, dus het is een wat breder plaatje.
- De derde pijler is marktconforme maatregelen. Hoe kun je in een systeem als bijvoorbeeld het ETS ervoor zorgen dat investeringen zo effectief mogelijk gedaan worden? Kunnen maatschappijen die rechten aanschaffen door elders grote reducties te creëren, nog blijven vliegen? Dat is allemaal nog het handhaven van vliegen zoals we dat doen.

- De vierde pijler heeft betrekking op brandstoffen. De alternatieve brandstof, waarbij je kan denken aan biokerosine, die dan duurzaam moet zijn op basis van de duurzaamheidscriteria die in Europa zijn geformuleerd. In de luchtvaart proberen we nog een stapje verder te gaan wat betreft die duurzaamheid om elke schijn van concurrentie met voedsel, verkeerd landgebruik of ontwrichting van sociale structuren te vermijden. Die schijn mag er niet zijn, dus dat probeert men in de luchtvaart voor te zijn. Die duurzaamheidscriteria zijn heel belangrijk bij de ontwikkeling van biobrandstof.

Ik denk dat er op een gegeven moment ook een vijfde pijler komt, die voor een deel in de technologie zal zitten. Men is al heel lang op zoek naar een ander concept van vliegen. We vliegen nu al heel lang op basis van het concept straalmotor, een gasturbine eigenlijk. Dat is een prima concept, prachtig allemaal, maar eigenlijk is dat heel plat gezegd een technologie van 100 jaar geleden. Men is op zoek naar een ander concept van door de lucht transporteren. Op een zeker moment komen we dus in een heel ander soort van vliegtuigen terecht. Een andere dimensie die bij die vier pijlers van IATA ook niet genoemd wordt is het aanpakken van de noodzaak tot vliegen en het zo vol mogelijk maken van vliegtuigen, dus de bezettingsgraad. Het valt misschien ook een beetje onder operations, maar wat je nu ziet is dat een netwerk wordt opgebouwd rond een bepaalde effectiviteit en een bepaalde bezettingsgraad die dan minimaal moet worden bezet. Men hoopt natuurlijk op volle vliegtuigen, maar met een bepaald percentage bezetting kun je een heel groot netwerk bedienen. Alleen al als je de frequentie omlaagbrengt kom je in de problemen met connecties. Bovendien vliegen we in Europa afstanden die je eigenlijk beter met de trein kan doen. Nou, dat soort dingen dus, transport van a naar b zien als een combinatie van verschillende modaliteiten en daarnaar optimaliseren, dat is een aspect van de toekomst. Er moet met name binnen Europa eens goed gekeken worden naar wat nou een effectieve en efficiënte manier is om je van punt a naar b te begeven. Misschien kun je dat wel beter met de hogesnelheidstrein in plaats van met het vliegtuig doen. Een ander aspect is, mondiaal gezien, de frequentie van de vluchten. Hoe dicht wil je de frequentie hebben? Hoe dicht moet de frequentie aan vluchten zijn om een goed netwerk met goede connecties te onderhouden? Zou dit ook met een lagere frequentie kunnen? Dan heb je nog steeds dat je heel veel mensen vervoert, maar dan niet 10 x op een dag met 0,75% bezetting maar 7 à 8 keer per dag met bijna 100% bezetting. Dat zijn twee vluchten minder. Voor dit soort concepten, dit soort ideeën zal op den duur wel meer ruimte komen, denk ik. Op een gegeven moment is alles gewoon niet meer rendabel te houden tegen redelijke kosten. Nou, dat zijn zo even wat gedachten waar je wellicht wat aan hebt.

Anke: Daar kan ik zeker wat mee. Dan wil ik hierbij gelijk het interview afsluiten, want al mijn vragen zijn beantwoord. Ik wil u graag bedanken voor uw medewerking en voor alle informatie die u gegeven hebt.

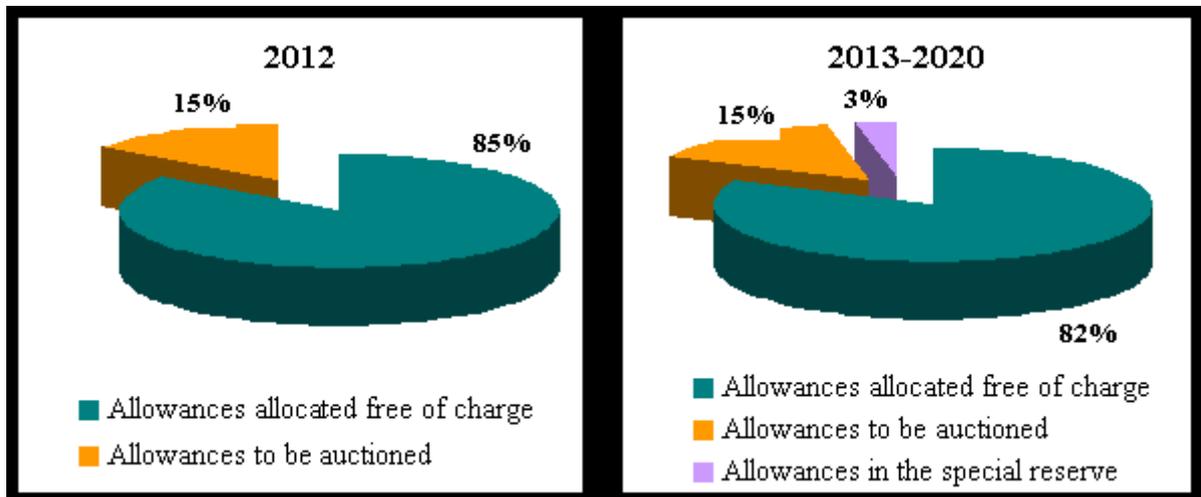
Mr. Lunter: Heel graag gedaan. Ik hoop dus inderdaad dat je er iets mee kunt en dat je er wat aan hebt. Zijn er nog vragen die naar boven komen tijdens het opschrijven en verwerken van deze informatie bel gerust of zend me een email. Heel veel succes verder met je scriptie.

Anke: Hartelijk bedankt. Dag!

Mr. Lunter: Dag!

Appendix 9

This graph shows the total amount of allowances for the airlines will be allocated in the 2012 and the period of 2013-2020.



Source: European Commission, 2011¹⁴

Appendix 10

ANNEX I

CATEGORIES OF ACTIVITIES TO WHICH THIS DIRECTIVE

APPLIES

- Installations or parts of installations used for research, development and testing of new products and processes and installations exclusively using biomass are not covered by this Directive.
- The thresholds values given below generally refer to production capacities or outputs. Where several activities falling under the same category are carried out in the same installation, the capacities of such activities are added together.
- When the total rated thermal input of an installation is calculated in order to decide upon its inclusion in the Community scheme, the rated thermal inputs of all technical units which are part of it, in which fuels are combusted within the installation, are added together. These units could include all types of boilers, burners, turbines, heaters, furnaces, incinerators, calciners, kilns, ovens, dryers, engines, fuel cells, chemical looping combustion units, flares, and thermal or catalytic post-combustion units. Units with a rated thermal input under 3 MW and units which use exclusively biomass shall not be taken into account for the purposes of this calculation. 'Units using exclusively biomass' includes units which use fossil fuels only during startup or shut-down of the unit.
- If a unit serves an activity for which the threshold is not expressed as total rated thermal input, the threshold of this activity shall take precedence for the decision about the inclusion in the Community scheme.
- When the capacity threshold of any activity in this Annex is found to be exceeded in an installation, all units in which fuels are combusted, other than units for the incineration of hazardous or municipal waste, shall be included in the greenhouse gas emission permit.

From 1 January 2012 all flights which arrive at or depart from an aerodrome situated in the territory of a Member State to which the Treaty applies shall be included.

Activities covered by the ETS:

- Combustion of fuels in installations with a total rated thermal input exceeding 20 MW
- (except in installations for the incineration of hazardous or municipal waste);
- Refining of mineral oil;
- Production of coke ;
- Metal ore (including sulphide ore) roasting or sintering, including pelletisation;
- Production of pig iron or steel (primary or secondary fusion) including continuous casting, with a capacity exceeding 2,5 tonnes per hour;
- Production or processing of ferrous metals (including ferro-alloys) where combustion units with a total rated thermal input exceeding 20 MW are operated. Processing includes, inter alia, rolling mills, re-heaters, annealing furnaces, smitheries, foundries, coating and pickling;
- Production of primary aluminium;
- Production of secondary aluminium where combustion units with a total rated thermal input exceeding 20 MW are operated;
- Production or processing of non-ferrous metals, including production of alloys, refining, foundry casting, etc., where combustion units with a total rated thermal input (including fuels used as reducing agents) exceeding 20 MW are operated;
- Production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day;
- Production of lime or calcination of dolomite or magnesite in rotary kilns or in other furnaces with a production capacity exceeding 50 tonnes per day;
- Manufacture of glass including glass fibre with a melting capacity exceeding 20 tonnes per day;

- Manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day;
- Manufacture of mineral wool insulation material using glass, rock or slag with a melting capacity exceeding 20 tonnes per day;
- Drying or calcination of gypsum or production of plaster boards and other gypsum products, where combustion units with a total rated thermal input exceeding 20 MW are operated;
- Production of pulp from timber or other fibrous materials;
- Production of paper or cardboard with a production capacity exceeding 20 tonnes per day;
- Production of carbon black involving the carbonisation of organic substances such as oils, tars, cracker and distillation residues, where combustion units with a total rated thermal input exceeding 20 MW are operated;
- Production of nitric acid;
- Production of adipic acid;
- Production of glyoxal and glyoxylic acid;
- Production of ammonia;
- Production of bulk organic chemicals by cracking, reforming, partial or full oxidation or by similar processes, with a production capacity exceeding 100 tonnes per day;
- Production of hydrogen (H₂) and synthesis gas by reforming or partial oxidation with a production capacity exceeding 25 tonnes per day;
- Production of soda ash (Na₂CO₃) and sodium bicarbonate (NaHCO₃);
- Capture of greenhouse gases from installations covered by this Directive for the purpose of transport and geological storage in a storage site permitted under Directive 2009/31/EC;
- Transport of greenhouse gases by pipelines for geological storage in a storage site permitted under Directive 2009/31/EC;

- Geological storage of greenhouse gases in a storage site permitted under Directive 2009/31/EC.

Aviation

Flights which depart from or arrive in an aerodrome situated in the territory of a Member State to which the Treaty applies.

Exemptions

This activity shall not include:

- Flights performed exclusively for the transport, on official mission, of a reigning Monarch and his immediate family, Heads of State, Heads of Government and Government Ministers, of a country other than a Member State, where this is substantiated by an appropriate status indicator in the flight plan;
- Military flights performed by military aircraft and customs and police flights;
- Flights related to search and rescue, fire fighting flights, humanitarian flights and emergency medical service flights authorised by the appropriate competent authority;
- Any flights performed exclusively under visual flight rules as defined in Annex 2 to the Chicago Convention;
- Flights terminating at the aerodrome from which the aircraft has taken off and during which no intermediate landing has been made;
- Training flights performed exclusively for the purpose of obtaining a licence, or a rating in the case of cockpit flight crew where this is substantiated by an appropriate remark in the flight plan provided that the flight does not serve for the transport of passengers and/or cargo or for the positioning or ferrying of the aircraft;
- Flights performed exclusively for the purpose of scientific research or for the purpose of checking, testing or certifying aircraft or equipment whether airborne or ground-based;
- Flights performed by aircraft with a certified maximum take-off mass of less than 5 700 kg;

- Flights performed in the framework of public service obligations imposed in accordance with Regulation (EEC) No 2408/92 on routes within outermost regions, as specified in Article 299(2) of the Treaty, or on routes where the capacity offered does not exceed 30 000 seats per year;
- Flights which, but for this point, would fall within this activity, performed by a commercial air transport operator operating either:
 - 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. Flights performed exclusively for the transport, on official mission, of a reigning Monarch and his immediate family, Heads of State, Heads of Government and Government Ministers, of a Member State may not be excluded under this point.

Source: ETS directive of the European Parliament and Council (2003).

Appendix 11

Transcription interview with Mr. Maurizio Di Lullo

Council of the European Union

Administrator in the Unit Climate Change, Coordination and Horizontal Affairs

September 19, 2012

Anke: Good morning, this is Anke Terdu speaking.

Mr. Di Lullo: Good morning.

Anke: I am calling you, because I received your contact details from your colleague, Mr. Garcia. He told me that you would be willing to answer some questions for my thesis.

Mr. Di Lullo: Yes, please.

Anke: Well, as a matter of fact I'm doing my thesis on the European Emission Trading Scheme and on how the airline industry is affected by this scheme.

Mr. Di Lullo: Okay.

Anke: So, the first question I wanted to ask you is regarding the inclusion of the airline industry into the European Emission Trading Scheme. What I wanted to ask is: why did the European Union decide to include the airline industry to the scheme in 2012? Why didn't they do this earlier? I can imagine that the growth of the airlines has been foreseen for a longer period of time. Why didn't the EU act earlier?

Mr. Di Lullo: Well, in fact, the basic premise of the EU has always been on aviation and also on maritime emissions. The best solution to handle these emissions is to deal with them at a global level. The EU has been asking ICAO, the International Civil Aviation Organization, and IMO, the International Maritime Organization, for many years to act. The problem is that, because of the internal dynamics in both organisations, there hasn't been the necessary action. So, the only way to put pressure for the EU was then to act unilaterally in a certain way. That is what has been done with aviation, because aviation is easier to deal with than, for example, maritime emissions. Therefore aviation has been included in the European Emission Trading Scheme.

Anke: But why didn't the EU do this many years ago instead of now, in 2012? The increase of airline emissions could have been foreseen earlier. Why didn't it take action earlier in order to prevent the growth in emissions?

Mr. Di Lullo: Well, the discussions have already started in 2009 if I'm not mistaking. It took a long time because it was a co-decision process. It was agreed to include aviation into the Scheme two years ago, but I mean, you need time for implementation. So it is only kind of entering into force right now. But, the EU has always said and continues to say, because you know that there is a whole debate on the inclusion of foreign airlines in the European Emission Trading Scheme, that the EU would always be willing to reconsider this step, if there is an agreement at a global level. So that's it basically.

Anke: Okay. So basically, the fact that it entered into force this year, and not some years ago, has to do with the slow decision-making process within the organisations and the slow way of taking action?

Mr. Di Lullo: Yes, because first, the EU has been waiting for an international deal on that, but there was nothing. Secondly, it had, at that point in time, to present legislation to deal with that. It is an environmental issue and these issues are always co-decision, which takes on average between one to two years to finalise. Then you also need to give time to implement it in the field. So, I mean, the decision was taken around 2008 but it takes until 2012 to come really into force, if you want.

Anke: Alright. I've read on the internet that the European Emission Trading Scheme is kind of a reaction the Kyoto Protocol, in order for the EU to meet the objectives that are set through this Protocol. How do you see that?

Mr. Di Lullo: Yes, the European Emission Trading Scheme is the pillar of the efforts of the EU to reduce its emissions. It has chosen a kind of market-based instrument to do that. It could have also chosen a tax or a levy, but as you know, a tax or a levy would have been difficult, because of the unanimity requirements that are still applicable within the EU. Countries as the UK and Ireland and maybe others were not willing to envisage an EU wide tax. So, the only possibility was a market-based instrument. Now, we have an emissions trading scheme which is, how to say, used to achieve the emission reduction goals. Of course, when it was set up and started working in 2005, it was the first phase where there were still some imperfections. Those imperfections have been corrected and the legislation was adopted a year or two ago, and it will enter into force as of the January 1st, 2013. So, let's say, we try to make it better, but still, there are problems.

Anke: What kind of problems are there?

Mr. Di Lullo: Yes, one of the main issues right now with the Emissions Trading Scheme is the price of the CO₂. The price of the permit has plummeted very seriously, because there is an oversupply of permits. This is a feature of a market-based instrument and one of the disadvantages of a market-based instrument is that the price varies determined by the market. If we would have had a tax, we would have had a fixed price. However, the disadvantage of a tax would have been that you are not sure about the decrease in emissions. With the Emissions Trading Scheme, now as the 1st of January 2013, we have an annual decrease in emissions that is established in the directive, so you have certainty about the decrease in emissions. Even if it's not always fully done domestically, because you can also buy credits by reducing emissions abroad, you are sure that globally you are decreasing emissions by a certain degree. This you don't have with a tax.

Anke: So a big disadvantage to this market-based instrument is that the price is determined by the market?

Mr. Di Lullo: Yes, because of this, the price can be very low. The problem then is that one of the other features of a market-based instrument is that it should also provide incentives to go to a low carbon economy. This feature is kind of wiped out. Because of the low price, there is no incentive to switch to, for example, gas or renewables. It is still more expensive to switch to gas or to renewables instead of staying with coal. The price of the CO₂ permit is too low to encourage that switch.

Anke: What kind of effect is this going to have in the future? I mean if the price stays low the economic incentive to switch to, for example, green energy is low as well. How do you think this is going to be solved? It is a market-based instrument of course, so I don't think it would be possible for the EU to say: 'Okay, let's raise the prices', right?

Mr. Di Lullo: It's a difficult issue which is being debated right now in the EU. There are some solutions which are being put forward, but let's say politically it's difficult to have a solution right now, especially considering the current economical and financial circumstances. You could, for example, imagine having permits that are taken from the market, so that there would be a scarcity and the prices would go up again, but that is an intervention in the market-based mechanism. Some are favouring it and others are saying that it would be dangerous.

Anke: What other things could be done?

Mr. Di Lullo: Well, there is another proposal to, for example, have the auctioning of allowances more towards the end of the period, to not overload the market with even more allowances. So I mean there are plenty of possibilities but there are difficulties with implementing everything.

Anke: Okay, that is all clear. So my next question is regarding the overall consequences of the European Emission Trading Scheme. What effects is the ETS going to have for the airline industry? I can imagine that the airline industry will really have to invest in green and environmentally friendly technologies. What other consequences are you foreseeing for this industry?

Mr. Di Lullo: I think that the effects of the ETS for the aviation industry have been overstated in the press and some publications. If you look at what is asked of them in terms of starting point, the calculation of the allowances and so on, you can see that the efforts will be quite minimal and that with the energy efficiency measures they are already taking they will meet the targets, I would not say quite easily, but that they will not have tremendous difficulties in meeting the targets. The system as it is now with starting point and with allocation and so on is quite favorable to the aviation industry, even if all the industries are saying the opposite.

Anke: As you said, 1st of January 2013 the European Emission Trading Scheme will be taken to the next level. What kind of reactions are you expecting globally towards this new development? Do you foresee any more reactions like the ones we have seen at the beginning from the US, China and others?

Mr. Di Lullo: That is difficult to foresee. We will also be dealing with the maritime emissions soon. It all depends on the way that is going to be integrated, but it's difficult to say.

Anke: Right. Can you maybe explain to me how the European Union is going to check if the airline operators are sticking to their allowances?

Mr. Di Lullo: That is no problem at all. There is a whole monitoring, reporting and verification system with international rules that has been implemented at an EU level, with specific EU rules that are even stricter than the international rules. So, there is a whole system in place within the EU to monitor that. It should be no problem at all. It's very technical, I don't know the full details, but I know there is a whole range of rules to deal with that.

Anke: Good. So, how can airlines anticipate best to the European Emission Trading Scheme, in your opinion? Do you maybe have some advice for the airline operators?

Mr. Di Lullo: I mean, the easiest way is to continue working on energy efficiency measures, fuel efficiency and that is what they are doing basically. It's not only kind of good in terms of avoiding climate measures, if I can call it like that, but it is also reducing costs for them. They are doing it automatically. The only thing is that we will need to see is how fast they are doing it basically and how the legislation evolves on that basis. This is only the start, let's say, so let's see what happens next. We will also have to see if there is any evolution in the international context as well because it's not only EU legislation it's also what happens in the international field.

Anke: Okay, perfect. Everything is all clear for me and I have no more questions. Thank you very much for your help, I really appreciate it.

Mr. Di Lullo: Okay, don't hesitate to contact me.

Anke: Thank you very much.

Mr. Di Lullo: You're welcome, bye.

Anke: Bye.

Appendix 12

Transcription Interview with Mrs. Simone Ruiz

International Emissions Trading Association

EU Policy Director

September 28, 2012

Anke: Good morning, this is Anke Terdu. Is this Mrs. Ruiz speaking?

Mrs. Ruiz: Oh hello Anke, yes it is. How are you doing?

Anke: I'm doing fine, how are you?

Mrs. Ruiz: Fine, thank you. What is the topic of your thesis again? I think you already told me in your email, but I'm afraid I forgot.

Anke: Okay, well I am writing my thesis on the European Emission Trading Scheme and the consequences of this regulation for the airline industry.

Mrs. Ruiz: Ah right! Now I remember.

Anke: Good. So, for this interview I have four questions planned and yeah, we will just see how it goes. To start off, can you tell me something about the consequences of the European Emission Trading Scheme for the airline industry?

Mrs. Ruiz: Yes, I think so. As you know, the airlines were included this year, and next year they will have to surrender their emission allowances for the first time. They are then part of the EU wide cap. There are very strong growth rates expected for this industry, so this is one sector where you can say with certainty that they will not have enough allocations. They get 85% of the allowances for free, based on a complex allocation method, which looks at their historic emissions, so at what they have been emitting in the past. Because it is such a fast growing sector, this means that they will have to purchase allowances from other sectors to get enough. No one expects the airline industry to be able to do a lot of emissions reduction in a very short time. So what happens is that everyone is expecting that it will be a lot of costs for them to pay. So if they have the choice between abating at a certain cost, reducing the emissions at a certain cost through buying an allowance from their neighbouring industrial plant who has much lower costs in reducing

emissions, it is pretty clear that they will do that. So instead of reducing, they would buy allowances from the other participants.

Anke: So, are you saying that the biggest consequence of the European Emission Trading Scheme for the airline industry is the fact that airlines will have to invest in emissions reduction or buy allowances from another sector?

Mrs. Ruiz: Yes, exactly.

Anke: What would be an alternative for them instead of the European Emission Trading Scheme?

Mrs. Ruiz: The alternative would be to have something that applies just to their sector which obliges them to reduce. A consequence of such a regulation would be that the industry can no longer grow at the same pace. Also, in many cases airlines are still of national interest. Every country has its own airline, like KLM. KLM is now together with Air France, but it remains a Dutch airline, right? So what you have is that without it governments are very open to speak with this industry, because they consider it to be of primary national importance. As a result, it's very difficult to pose high costs on them. What you could do here is you could include them into a Trading Scheme with other sectors, whereby they can basically offset their emissions. Instead of saying: 'I will reduce a ton', they say: 'I will pay my neighbour to reduce a ton.' It's this, but partially they can also reduce themselves because they have an incentive; there is a price in the market. A lot of airlines, for instance British Airways, have already announced that they have strongly enhanced the share of bio fuels in their fuel mix. They also have an innovation or a research centre which looks into the quality of fuel and how the emission content can be reduced. So there are already some research initiatives that have been really a direct consequence of this implementation. No one likes paying someone else for something that they can do themselves with a double benefit of reducing emissions and not having to pay the price for the future growth and reducing the fuel consumption.

If you do it well with energy efficiency and energy saving you reduce your costs. Airlines in fact say that they are themselves among the most energy efficient industries because the energy costs are such a high share of the overall costs that they are having an interest themselves in cutting down these costs by optimizing:

- the flights;
- the load;

- the way they actually tank the fuel;
- the times that they have to land and refill the tank.

A lot of research has already happened. They have committed themselves to zero carbon neutrality by 2020. They want to be carbon neutral, no further carbon emissions growth by 2020. And whatever they cannot reduce, they will offset by allowances from other schemes or using international offset credits.

Anke: There have been quite some reactions from the airline industry towards the European Emission Trading Scheme. Could you maybe list some specific reasons why they would be so reluctant towards the fact that they have been added to the Scheme?

Mrs. Ruiz: Well, the reason is very complex. On the one side it's fairly political. It's over 20 years since the beginning of the international negotiations on climate change. The aviation industry has been opposing any attempt to include aviation into the international climate treaties. They have been resisting this regulation quite successfully actually. They have always been saying: 'We will regulate ourselves'. There is a regulatory body for the aviation worldwide, it's called ICAO. These guys are, together with all the governments and some NGO's, negotiating standards, for example safety standards. They started looking into emissions reduction, but it all went very slowly and almost nothing happened over 20 years. As a result of that, the EU said: 'Look guys, if you don't do anything we will include aviation into the Scheme. We won't discriminate against anyone. We will include all the flights that come into Europe and that leave Europe again. We don't care what happens outside, of course we would rather have everyone covered, but this is the only thing we can do. We are one single territory in the EU and we can control our airspace.' The US took this particularly bad, as well as almost all other countries. I think it is accurate to say that the EU was completely isolated in the international space. All the other countries found that the EU was introducing a unilateral measure, not wanting to wait for an international agreement. As a result of that the international discussion has turned very sour, very bitter.

Anke: Do you mean the international climate change negotiations?

Mrs Ruiz: The ICAO negotiations, on the aviation.

Anke: Can you maybe also say something on the effectiveness and the operation of the European Emission Trading Scheme?

Mrs Ruiz: maybe one thing just about the airlines why they complain a lot about the emissions trading scheme is that its complex, because they have to monitor and measure all the emissions of their flights and report that back to the EU. But as a result the EU knows exactly and precisely which emissions take place per airline, but it's a lot of data to submit. So there's the cost of submitting data and the complexity of the scheme. Some companies.. well there are three main critiques I would say:

- The first is the complexity;
- The second is the critique that there is fraud;
- The third critique is that it does not deliver.

I will say something on each of them:

- First, on the complexity, now if you want to make a system which really looks into how much each installation, or each industry body is emitting you have to measure, you have to monitor it took the EU 5 years to put the system into place and to get accurate data. Now it's basically, you push a button, the data comes out, you put this into a report, send it to a third party, so an external company, that is the verification, there is a verification report, you submit this to your government and so we can say with extremely high accuracy the EU is now measuring the emissions of its entire industry sectors. And that has been so successful that countries around the world copy that. So you have California, you have Australia, you have China, you have Turkey, you have I mean 20 countries around the world are now copying the EU's emission measuring. Even if they don't have emissions trading, they use it because they want to measure and monitor how much their sectors emit.
- The second point of critique is that there was fraud. There has been significant fraud. On the one side you know that we have a bit of a funny VAT system. Each country has a different VAT rate. And in the trade between countries there is no VAT. So you can sell me something in Belgium, I don't pay you anything in VAT but I sell it on and I get VAT for what I sell. Then I just, instead of giving it to my state, I disappear and I get the entire VAT amount. And because emissions trading is electronic and it gets very fast, people

have been doing this on a massive scale. So there were criminals entering this market and stealing the VAT revenue by trading in this market. That has been a real problem because it affected almost all the member states. But again, VAT is very specific to the EU and it has been stopped by introducing a change in the VAT system for emissions trading and the same fraud has happened on mobile phones, computer chips, on jewelry, so it has happened many times before, it's not new. Now it's actually moving to electricity and gas. So the VAT fraud as such is not unique to the ETS. It has been taking place on a massive scale, but it has been stopped now. So the other thing, the other fraud was a test, like when you have when you enter your bankaccount, someone can get access to your bankaccount, it happened also on 3 million allowances at a value of 15 euros an allowance were stolen, so that was also 45 million lost and this has also been very difficult because you cannot trace back that immediate.. because in an electronic system you can easily hide your identity and disappear. And so this has also been fixed. The security of the electronic system has significantly been increased, its now on the same level I would say as a bank but before that it was so ignored that there is value in these accounts and suddenly people realize 'oh there is value, there can be some risk to having this stolen, so lets put this more secure'. Since then I have been interviewed by so many emerging not yet implemented trading schemes around the world, especially California and Australia, they all want to know what happened in the EU and how they can prevent that from happening. Lesson learnt for the other schemes around the world.

- The third problem was the cap and the critique that it does not deliver. Now one thing is sure is that the price is not very high, so the price has fallen quite dramatically for many reasons the main reason being the economic recession. The economic recession means less emissions which results in less demand for buying allowances to cover the emissions and the price goes down. It's always a supply-demand balance.

Anke: Because it is a market-based mechanism.

Mrs Ruiz: Exactly, so the problem with that market-based mechanism is that the supply cannot react to changes in the demand. So the supply is fixed by the government and the Commission years in advance based on historic emissions. Now in the future there is going to be a lot more auctioning, and then as a result if no one needs the allowances, no one buys from auctions, the price is very low the auction can be cancelled. There is more flexibility in the future, but now it's really problematic so the prices come down, so there is no real incentive to invest but because of the cap you get only a certain amount of allocations. You cannot emit more than what the cap tells

you to emit at each year and the cap goes down every year. So you can be absolutely certain that you reach your emission reduction objective at the end of the next phase, that is in 2020. You know exactly how much emissions you have reduced compared to 2005 emissions. So there is the environmental integrity is there you are absolutely sure, a tax would not give you that, a tax just puts the price but doesn't tell you how much to emit, you can emit as much as you want as long as you are ready to pay. But a trading scheme really caps the emissions and so as a result of that it does deliver, it actually delivers more than expected.

Anke: Okay. Well, those were my questions. Thank you very very much for taking the time to answer my questions. I really appreciate your input.

Mrs Ruiz: Good luck with everything.

Anke: Thank you, I really appreciate your help.

Mrs Ruiz: If you have more questions you can always get back to me okay?

Anke: Thanks a lot.

Mrs Ruiz: Bye!

Anke: Byebye!

Appendix 13

This table shows the total CO₂ emissions per airline of 2008 and 2009.

CO ₂ output by Airline (tonnes)	Total 2008	Total 2009	% +/-
Lufthansa	19,702,395	19,045,017	-3.34%
British Airways	20,016,000	18,921,244	-5.47%
Air France	16,471,318	15,623,617	-5.15%
KLM	12,027,656	11,016,567	-8.41%
Ryanair	9,643,648	9,617,105	-0.28%
Iberia	9,514,220	8,994,872	-5.46%
easyJet	7,423,088	7,565,568	1.92%
United Airlines	6,409,534	5,854,564	-8.66%
Delta Airlines	7,086,837	5,564,615	-21.48%
airberlin	4,539,723	4,877,073	7.43%
Virgin Atlantic Airways	4,833,403	4,533,006	-6.22%
Alitalia	5,106,950	4,013,846	-21.40%
TAP-Portugal	4,011,697	3,592,512	-10.45%
SAS	4,504,916	3,575,975	-20.62%
Qantas Airways	4,110,851	3,464,762	-15.72%
American Airlines	3,713,575	3,317,744	-10.66%
Continental Airlines	3,680,563	3,305,588	-10.19%
Emirates	2,849,866	2,941,452	3.21%
Aer Lingus	2,741,887	2,581,825	-5.84%
US Airways	2,611,897	2,570,936	-1.57%
Austrian	2,703,466	2,480,110	-8.26%
Finnair	2,872,640	2,458,971	-14.40%
Thai Airways International	2,426,169	2,296,063	-5.36%
Condor Flugdienst	2,308,212	2,090,105	-9.45%
Cathay Pacific Airways	1,940,892	2,008,373	3.48%
Singapore Airlines	2,629,768	2,001,378	-23.90%
Air Canada	1,844,171	1,883,218	2.12%
Air Europa Lineas Aereas	1,676,425	1,547,634	-7.68%
Air China	1,783,519	1,489,296	-16.50%
Vueling Airlines	977,431	1,222,530	25.08%
Total - All Airlines	252,706,305	235,391,304	-6.85%

Source: Greenaironline.com (2012)

Appendix 14

Kennisgeving toewijzing broeikasgasemissierechten voor de luchtvaart

De directeur van de Nederlandse Emissieautoriteit deelt, gelet op het bepaalde in artikel 16.391, derde lid, van de Wet milieubeheer mee, dat hij met zijn besluit van 19 december 2011 de aantallen kosteloos toe te wijzen broeikasgasemissierechten voor de luchtvaart heeft berekend. De toewijzing heeft betrekking op de periodes 2012 en 2013-2020. De toewijzing vindt plaats voor de vliegtuigexploitanten waarvoor Nederland administrerende lidstaat is, als bedoeld in artikel 16.39a, tweede lid, van de Wet milieubeheer. De berekening is uitgevoerd met de benchmarks die de Europese Commissie voor dat doel heeft vastgesteld. De uitkomst van de berekening voor elke vliegtuigexploitant is opgenomen in de tabel. In de tabel zijn opgenomen de toewijzing voor 2012, de jaarlijkse toewijzing in de periode 2013-2020 en de totale toewijzing voor de periode 2013-2020.

CRCO	Luchtvaartmaatschappij	Toewijzing voor 2012	Jaarlijkse toewijzing in de periode 2013-2020	Totale toewijzing voor de periode 2013-2020
1640 + 1989	Koninklijke Luchtvaart Maatschappij NV en KLM Cityhopper	7897037	7461239	59689912
1833	Martinair Holland N.V.	1548398	1462950	11703600
31955	Jade Cargo International Co. Ltd	930395	879051	7032408
6984	China Airlines	834169	788135	6305080
2723	Transavia Airlines CV	748173	706885	5655080
24134	China Southern Airlines	745846	704686	5637488
1005	EL AL Israel Airlines Ltd	595737	562861	4502888
30852	TUI Airlines Nederland BV	303254	286519	2292152
278	Nippon Cargo Airlines	275921	260694	2085552
30777	Corendon Airlines	150916	142588	1140704
3140	PT Garuda Indonesia	30995	29285	234280
33613	Amsterdam Airlines BV	15151	14315	114520
2440	Shell Aircraft International	153	144	1152
29439	Liberty Global Europe BV	32	30	240
23316	Wilmington Trust Company	27	25	200
f11885	Liberty Global, Inc.	25	23	184
19232	Jetaway Air Service	23	22	176
32631	Sextant Holdings, LLC	21	20	160
22713	Eastman Chemical Company	12	12	96
f10294	Central Missouri Aviation, Inc.	10	10	80
12405	KOM Activity I B.V.	10	10	80
21725	Emergo Finance	10	9	72
34761	COVENTRY FIRST LLC	7	7	56
f12150	JAY Aviation II LLC	7	7	56
f10346	OMI Management US LP	5	5	40
f10255	Idaho Investments Inc.	3	3	24
12573	Redwood Aviation Center	1	1	8

Source: De Nederlandse Emissieautoriteit (2012)

Appendix 15

Lack of balance in burden-sharing

While European airlines have to submit emission allowances for virtually their entire route networks, only a fraction of the capacity of direct competitors will, even in a best-case scenario, be subject to emissions trading.



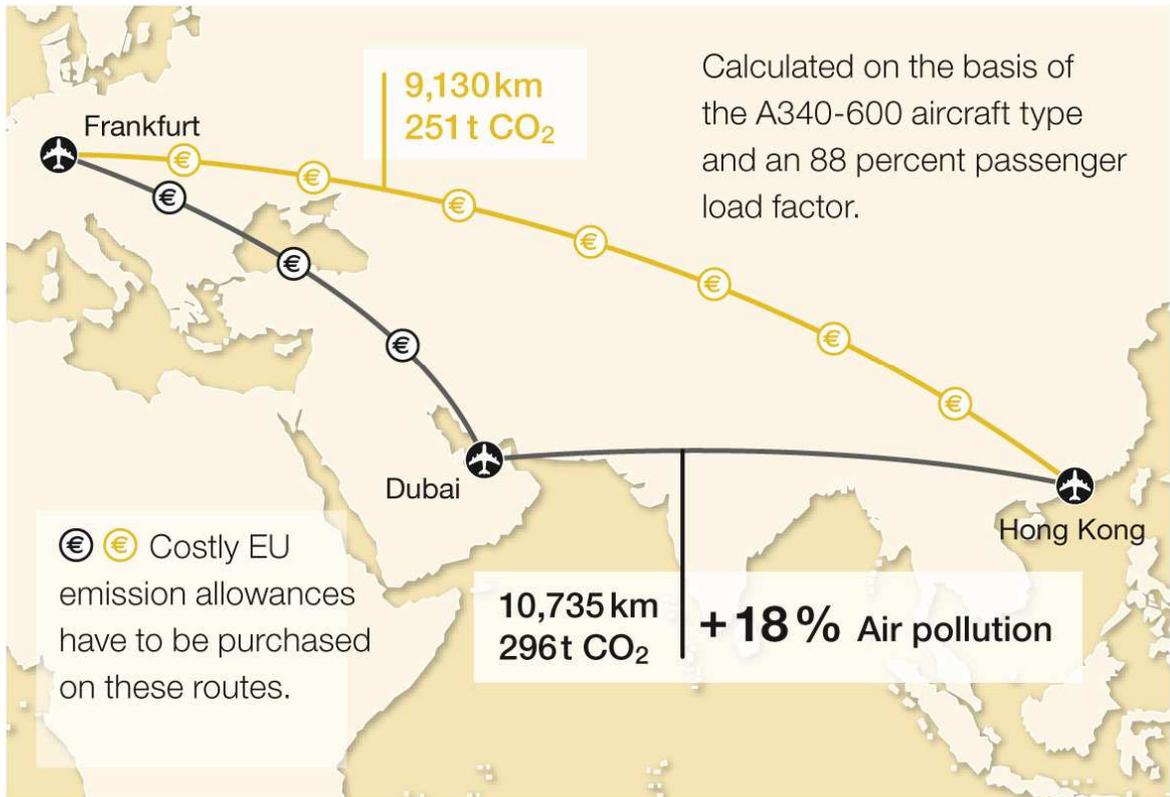
Source: AEA; measured in seat-kilometres

Source: Lufthansa (2012).

Appendix 16

The picture shows how airlines try to avoid having to pay for their emissions in EU airspace.

Example: Frankfurt – Hong Kong



Source: Lufthansa (2012²).