IMPACTS OF THE EU'S EMISSION TRADING SYSTEM ON THE AIRLINE INDUSTRY:

A CASE OF THAI AIRWAYS INTERNATIONAL

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ผลกระทบของระบบกฎการค้าสิทธิ์การปล่อยมลพิษของสหภาพยุโรปที่มีต่ออุตสาหกรรมการบิน: กรณีศึกษา บริษัท การบินไทย จำกัด (มหาชน)

น.ส. ธนพร วิเชียรเกื้อ

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
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วิทยานิพนธ์ฉบับนี้ได้ทบทวนกติกาและกฎระเบียบนานาชาติที่เกี่ยวข้องกับสภาวะแวดล้อมโดยเฉพาะในส่วนของสหภาพยุโรปและความพยายามที่จะลดการปล่อยก๊าซคาร์บอนไดออกไซด์โดยยกประเด็นผลกระทบ ของกฎระเบียบที่เกี่ยวข้องกับอุตสาหกรรมการบิน ทั้งนี้มีจุดมุ่งหมายที่จะศึกษาผลกระทบของระบบกฎการค้าสิทธิ์การ ปล่อยมลพิษของสหภาพยุโรปต่ออุตสาหกรรมการบินของประเทศในเอเชียที่มีเที่ยวบินไปกลับกับสหภาพยุโรป ในการวิเคราะห์ดังกล่าวได้อ้างอิงถึงข้อบังคับต่างๆทั้งที่มีผลบังคับใช้และข้อบังคับที่ยังไม่ได้ถูกนำไปใช้จริงหรือข้อบังคับต่างๆ ที่ มีผลบังคับใช้ที่มีโอกาสที่จะเกิดขึ้นได้ในอนาคต ทั้งนี้ได้เน้นใช้บริษัท การบินไทย จำกัด มหาชน เป็นกรณีศึกษา สภาพการแข่งขันในตลาดการบินในยุโรปจะถูกวิเคราะห์ในเรื่องความเป็นไปได้ในการสร้างกำไร,กลุ่มลูกค้า,อุปสงค์ฯลฯ ที่จะส่งผลต่อการดำเนินกิจการของ บริษัท การบินไทย

วิธีการศึกษานั้นได้อาศัยแบบจำลอง Porter's Five Force, Value Chain Analysis และ SWOT Analysis เพื่อประเมินสถานภาพของตลาดการบินในยุโรปและประสิทธิภาพของบริษัท การบินไทย จำกัด มหาชน นอกจากนั้นยังมีการคำนวนผลกระทบของต้นทุนที่เกิดขึ้นจากระบบกฎการค้าสิทธิ์การปล่อยมลพิษของ สหภาพยุโรปต่ออุตสาหกรรมการบิน ผลของการศึกษาพบว่า 1) บริษัท การบินไทย จำกัด มหาชน สามารถรับภาระด้านต้นทุนของกฎดังกล่าว 2) ระบบกฎการค้าสิทธิ์การปล่อยมลพิษของสหภาพยุโรป (EU's Emission Trading System) มีผลต่อต้นทุนการประกอบการและผลกำไรค่อนข้างน้อยเมื่อเปรียบเทียบกับสายการบินอื่นๆในเอเชีย 3)ข้อเสนอแนะต่อการบินไทยจากการศึกษาดังกล่าวคือการลดค่าใช้จ่ายโดยการลดต้นทุนและบริหารการใช้ทรัพยากรอย่างมีประสิทธิภาพในการเตรียมความพร้อมเพื่อรับมือกับข้อบังคับใช้ที่จะ เริ่มในปีพ.ศ.2555.

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KEYWORDS: AVIATION INDUSTRY, AIR TRAVELS BETWEEN ASIA TO EU, IMPACTS OF CLIMATE CHANGE POLICIES, GLOBAL WARMING, THE EUROPEAN UNION, THAI AIRWAYS INTERNATIONAL.

THANAPORN WICHIENKUER: IMPACTS OF THE EU'S EMISSION TRADING SYSTEM ON THE AIRLINE INDUSTRY: A CASE OF THAI AIRWAYS INTERNATIONAL. THESIS ADVISOR: ASSOCIATE PROFESSOR CHAYODOM SABHASRI, 207 pp.

This thesis has reviewed the rules and international regulations in relation to the environment with the focus on the European Union in its effort to reduce CO_2 emission by presenting issues and possible impacts on the airline industry. The aim is to study the impacts of the EU's Emission Trading Scheme on the airline industry with specific attention on Asian airlines having flights to, from and within the EU. During the process of analysis existing, pending and possible future regulations were taken into account. Thai Airways International Co., Ltd was used as a case study. Competitive environment in the EU's airline industry will be analyzed in terms of creating profitability, target customers, demand and other factors that will have effects on the airline's operations of Thai Airways International.

The study uses Porter's Five-Force model, Value Chain Analysis and the SWOT Analysis to assess the situation in the EU's airline market and the efficiency of Thai Airways International in the said market. Calculations of profit have been done to assess the changes in operating costs resulting from the scheme on the airline industry. The study has found that: 1) THAI will be able to absorb the extra cost of the regime; 2) the EU ETS seems to have minimal impact on costs and profitability for THAI when compared with other Asian airlines; 3) recommendations for THAI according to the study include reducing operating costs and practicing resource usage efficiency. The conclusion of the thesis is that the impact of the EU ETS scheme on THAI will be quite small.

Field of Study : European Studies ..... Student's Signature .....

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List of Abbreviations

AAU	Assigned Amount Units
AFTK	Available Freight Tonne Kilometers measures available total freight capacity
ASK	Available Seat Kilometers measures available passenger capacity
ATC	Air Traffic Control
BASIC	China, India, South Africa and Brazil
CAGR	Compound Annual Growth Rate
CASM	Cost Per Available Seat Mile
CBDR	Common But Differentiated Responsibilities
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CITL	Community Independent Transaction Log
CO2	Carbon Dioxide
COP	Conference of the Parties
CSR	Corporate Social Responsibility
DEHST	German Emissions Trading Authority
EASA	European Aviation Safety Agency
EC	The European Commission
ECCP	European Climate Change Program
ECJ	The European Court of Justice
ERU	Emission Reduction Unit
EU	The European Union
EU ETS	European Union Emissions Trading Scheme
EUA	EU Emission Allowance
EUROCONTROL	European Organization for the Safety of Air Navigation
FFP	Frequent Flyer Program

FLF	Freight Load Factor is % of AFTKs used
FTK	Freight Tonne Kilometers measures actual freight traffic
GDP	Gross Domestic Product
GHGs	Greenhouse Gases
HSR	High-Speed Rail
IATA	The International Air Transport Association
ICAO	International Civil Aviation Organization
IESC	International Environmental Science Center
INC	Intergovernmental Negotiating Committee
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
KLM	The Dutch Airline
LCC	Low-Cost Carriers
LDCs	Least Develop Countries
MRT	Mass Rapid Transit
MRV	Measured, Reported and Verified
NAMAs	Nationally Appropriate Mitigation Action
NAP	National Allocation Plan
NC2	National Communication 2
OPC	Operation Center
PAD	People's Alliance for Democracy
PLF	Indicates point differential between the periods compared
PPM	Parts Per Million
R&D	Research and Development
RPK	Revenue Passenger Kilometers measures actual passenger traffic
RPMs	Revenue per Passenger Miles
SA	Singapore Airlines
SAVE	Special Action Programme for Vigorous Energy Efficiency
SBRP	Sustainable Bioenergy Research Project

SIDS	Small Island Developing States
THAI, TG	Thai Airways International Company Limited
THB	Thai Baht
TGO	Thailand Greenhouse Gas Management Organization
UNCCC	United Nations Climate Change Conference
UNFCCC	United Nations Framework Convention on Climate Change

CHAPTER I

INTRODUCTION

Global warming is caused by the collective, unconscious actions and represents the challenges in the environment, social, and the economy. Human activities responsible for global warming include the burning of fossil fuels, agriculture, and deforestation, all of which contribute to global warming by releasing CO2 and other greenhouse gases into the atmosphere.

The Earth's atmosphere consists of water vapor, carbon dioxide and other gases that occur naturally. These gases let sunlight in but absorb heat that is redirected back into space in an occurrence known as "the greenhouse effect". For thousands of years this natural process has kept the earth's temperature stable enough to support life. The earth's temperature would otherwise be a freezing -18°c without it. Since the Industrial revolution in 1850 man-made greenhouse gases (GHGs) has increased resulting from burning fossil fuels and other everyday activities. These heat-trapping gases are making the earth warmer and changing the climate[1].

The UN and the World Meteorological Organization gave the long-term task of observation and gathering information about global warming to the climate experts at the Intergovernmental Panel on Climate Change (IPCC). So far there have been 5 reports all pointing to increasing evidences of global warming. The 4th report gave a more complete international knowledge on climate change and also legitimacy to EU's policy response to global warming.[2] Published in 2007, it stated that the rate of warming is unequivocal. The

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[1] COM, "Combating Climate Change: The EU Leads the way". European Commission, 2008.

[2] Zito, Anthony R, Creating Environmental Policy In the European Union (Great Britain: Macmillan Press Ltd., 2000), p.95.

observed average global temperature since the mid-20th century is very likely to have been due to emissions of greenhouse gases of human activities. The report also shows that climate change is already having major effects on ecosystems, water resources and coastal zones across the world. Due to climate timescale this anthropogenic warming and sea level rise would continue for centuries even if the emission rate stabilizes although the likely amount will depend on the intensity of human's fossil fuel burning during the next century.

For the skeptics the report estimates that the probability of these events to be caused by natural processes is less than 5%. World temperature could rise between 1.1cº and 6.4cº or 2.5 and 11.5 ºF during the 21st century and that sea level could rise between 18cm to 59cm (7.08 to 23.22 in.)[3]. The report concludes with 90% probability that there will be more frequent warm spells, heat waves, and heavy rainfall and with 66% probability that there will be an increase in droughts, tropical cyclones, and extremely high tides. The contribution of anthropogenic activities from the past and the future on global temperature and sea level rise will continue for at least a millennium. The global atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased since 1750 and far exceed the pre-industrial values and at their highest concentration in 650,000 years.

Changes are already taking place, threatening the livelihood of the population of six billion on the planet. The 2003 heat wave had killed 33,000 people in Europe and €13 billion in damage while the forest fire raged in the south destroying ecological systems and had serious impacts on the tourism industry[4]. 11 out of 12 warmest years on record of over the last 1,300 years are within the last 10 years[5]. Without any action taken the temperature is

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[3] EurActive, Science of Climate Change [Online], 29 January 2010. Available from: http://www.euractiv.com/en/climate-change/science-climate-change/article-162366.

[4] Ibid.

[5] Ibid.

predicted to rise 1.8°c-4.0°c before this century is over and an average of 0.7°c for the last 100 years[6]. Current levels of CO2 and methane in the atmosphere have reached its peak in 650,000 years. Any rise in temperature more than 2°c is seen as the point of no return, that the damage we have done will be irreversible.

Sources of EU's CO2 Emissions Release

Aviation in the EU is being blamed for its increasing contribution to the CO2 released during operations. The EU emission trading scheme has just recently included aviation in its scope of many polluting industries. The scheme treats airlines having operations in the EU equally as they do other businesses in other industries. Thai Airways International (THAI), the airline, chosen for this study, also operates in the EU countries and will have to comply to this scheme, will be affected in one way or another. Here are the reasons being given to justify the trading scheme in details:

Aircraft typically operates at cruising altitudes of 8 to 13 km, where they release CO2 in combination with several other types of gases and particles, which alter the composition of the atmosphere and contribute to climate change.[7] Direct emissions from the aviation sector accounted for 3% of all EU's CO2 emissions.[8] Growth in this sector is rapid in every measure—volume, distances traveled, and emissions of not only CO2 but other gases that contribute to global warming as well. EU emissions from international aviation are

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[6] The Europa Website, Climate Change: New report from the world's leading scientists underlines the need for urgent global action [Online], 24 March 2010. Available from: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/128&format =HTML&aged =0&langu age=EN&guiLanguage=en.

[7] The Europa Website, Questions & Answers On Climate Change [Online], 30 September 2010. Available from : file:///Users/Nannie/Downloads/EUROPA%20-%20Press%20Releases%20-%20Questions%20&%20Answers %20on%20aviation%20&% 20climate%20change.webarchive.

[8] Europa website, Questions and Answers on Aviation and Climate Change [Online], 14 September 2010. Available from : http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO /06/506& format=HTML&aged=0&language=EN&guiLanguage=en.

increasing by 87% since 1990[9] as air travel becomes cheaper without its environmental costs being addressed. Having a small share of only around 2 percent in global carbon emissions, airlines are a high-profile target for regulators and environmental groups because their emissions are among the most intensive per kilometer of any traveling mode and the most damaging as they are released high in the atmosphere.[10]

Other gases produced during flights that also have some effects on the atmosphere include nitrogen oxide (NOx), water vapour and soot particles. Nitrogen oxides released into the atmosphere help reduces methane, another strong greenhouse gas but increases ozone, another greenhouse gas. The overall effect when combined, however, is that the ozone releases dominate the reduction in methane, causing global warming. Water vapour released from aircrafts also has a warming effect but as they can be easily removed by precipitation their contribution to the warming climate is small. However, the fact that they are released high up in the atmosphere they can interfere with clouds formation. Known as cirrus clouds, (clouds with ice crystals) they are suspected to have some warming effects but the result is still being debated. Condensation trails (dubbed "contrails") left by aircrafts can also cause the warming of surface temperature. Other known greenhouse gases byproducts from aviation include sulphate and soot particles. Soot particles absorb heat, causing warmer temperature while sulphate actually has a small cooling effect. Both sulphate and soot particles can also have effects on clouds formation.

On the global scale, aviation industry is experiencing record growth. The industry is moving one-third of world's population across the globe each year. Airbus and Boeing are also experiencing record sales. The two of world's fastest growing economies—China and

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[9] Ibid.

[10] Ibid.

India—plan to build 100 airports in 10 years to absorb the growing demand.[11]

Air transport is currently contributing 3.5% of the global gas emissions output. This percentage is expected to increase up to 15% in the year 2050 according to the IPCC (Intergovernmental Panel on Climate Change) if no actions are taken. In the United Kingdom alone projection for airline emissions will be up to 350% by 2030. The most recent United Nations Framework Convention on Climate Change (UNFCCC) report noted that international aviation emissions from developed countries rose by 65.8% between 1990 and 2005. If current levels of emissions are allowed to continue the threshold of temperature increase by 2°c will be crossed as early as the year 2050.[12]

Current estimates predict that by 2050, growth in aviation emission will exceed all the necessary reductions from all emission sources of the EU required to achieve the target set at 450 ppm. The figure shown below illustrates this situation. The graphical representation below shows what would happen if no action is taken by the airline industry or business-as-usual. The grey curve shows the rate of failure to act while the black curve just right below that seems to duplicate the motion of the one above but with significantly lower rate represents a success story in the effort to reduce aviation emission.[13]

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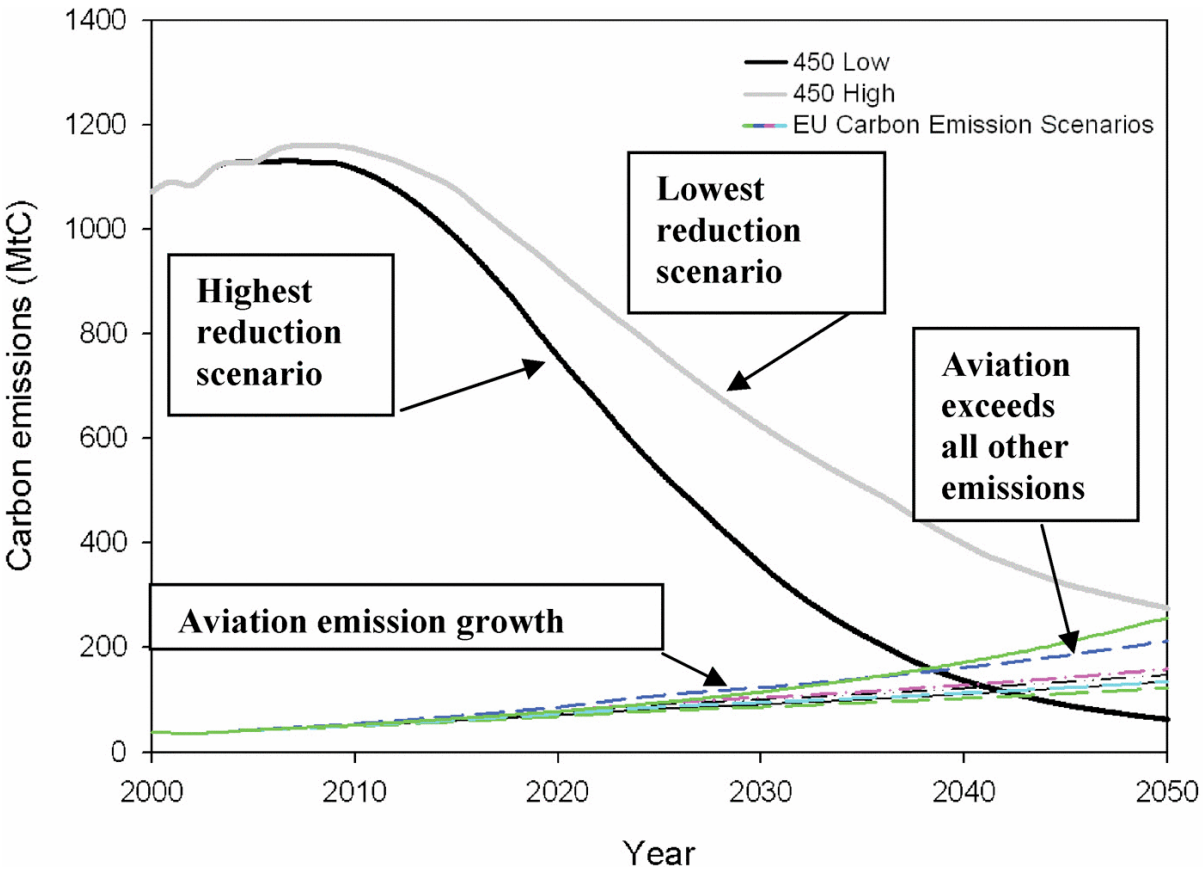
[11] Dan Elwell, Testimony—Statement of Dan Elwell [Online], 22 October 2010. Available from : http://www.faa.gov/news/testimony/news_story.cfm?newsid=10217.

[12] COM (2009) Pamphlet 29, p. 9.

[13] K. J. Winch[a]; P. N. Sharratt[a]; R. Mann[a], "Carbon-neutral jet-fuel re-synthesised from sequestrated CO_2." International Journal of Sustainable Engineering Volume 1 Issue 2, (June 2008): 142-150.

Figure 1.1: Emission Reduction Scenarios



Source: Informaworld[14]

Air travel taxes and other preventive mechanisms related to the airline industry are the issue being discussed within the EU and airlines from different nationalities including Asian airlines operating flights to and from EU who will also have to comply to the regulations and face the impacts of these regulations. At the moment the EU is pressing to levy higher taxes proportionate to the amount of pollution released into the atmosphere that causes damages to the environment and, according to scientists, rob the future generations of resources we ourselves have enjoyed. On the financial side airfares are seen as too cheap and does not account for the pollution being made and the resources flights consume, that we pay too little

[14] Ibid.

for the actual prices that will have to be paid off by our children and grand children.

The counter argument from habitual air travel customers is that their rights to enjoy the life style they are accustomed to are being limited by greedy government officials and airline shareholders. That being said, starting in 2012, any airline with flights to and from EU airports will require emission allowances to offset their emissions. According to the EU's plan all airline companies that have business in the EU will have to reduce their carbon emissions down to 97 percent of their average emission levels between 2004 and 2006 by the year 2012.

Further integration of the EU is expected and so is the increase in traveling between member states. Business trips and traveling for pleasure in Europe and elsewhere are seen as more common than ever before due to the cheaper airfares resulted from the effort to liberalize the airline industry within Europe over the past 20 years, the emergence of low-cost airlines and the Schengen agreement. The EU airline emissions today stand at 3% of all EU's CO2 emissions and 3.5% of the total global emissions.

The airline industry's contribution to air pollution are much more obvious to see due to the size and the distances traveled, however. For international flights, it is pollution across borders to many regulators. For domestic flights, emissions are being directly release into the EU's own backyard. Last year the EU began requiring airplanes operating within the EU to reduce their carbon emission by 3% by 2012 and 5% by 2013 from business as usual. A list of nearly 4,000 airlines, private jet owners, and air forces around the world had been revealed by the EU recently with the objective of reducing their emissions or face airport ban in Europe.

According to the European Commission's analysis the investment to avert climate change would cost around 0.5 % of world's GDP from between 2013 and 2030. The International Panel on Climate Change (IPCC)'s finding estimates that keeping emission lower than 2°c would reduce average global GDP by less than 0.12% per year up to 2050. These measures would create other benefits besides avoiding climate change including greater energy security and healthcare savings from less pollution.

The EU ETS treats carbon dioxide releases from aircrafts as commodities that can be exchanged across businesses and countries. It is believed to be the best way to reduce carbon dioxide emission most effectively and costs the least compared with other measures like carbon taxes or surcharges. Participation in the program of the airline industry will begin in 2012.

1.1 Issues and scope.

The EU's airline industry contribution to CO2 emissions have made it a target of criticism, and the trend is on the rise due to further integration of the EU and the effort to liberalize air travel over the past 20 years. This will be discussed in relation to the EU and its involvements in trying to tackle climate change within the transport sector with specific focus on the airline industry and the cooperation of efforts so far.

1.2 Motivations

I have chosen this topic because it is up-to-date and it is very appropriate to be studying this topic when the global community is also paying its full attention to climate change. The importance of the issue is no longer overlooked as countries agree that we must bear this responsibility, especially developed countries that have consumed most of the resources, or risk leaving the next generations with the consequences caused by climate

change. Transport has always been my topic of interest and I chose aviation because it is the mode of transport with the most potential to grow and any climate change regulation being introduced to air transport is likely to spread its impact across borders.

1.3 Questions

The research question is: What are the effects of EU Emission Trading scheme on THAI in terms of profit and changes in operations?

1.4 Hypothesis

THAI will have to adjust to the scheme and increase its resource efficiency and reduce its emissions to comply with the EU ETS. It also will have to invest a part of its profit in carbon emission reduction projects to safeguard its supply of carbon allowance.

1.5 Expected Benefits

I hope to gain insight into the aviation industry with respect to the environmental policies as well as study their probable impacts. It is also hoped that readers will have a better understanding of what we are dealing with when it comes to climate change regulations in the EU.

1.6 Theoretical Framework

EU air travel market is analyzed in terms of trends and potential. A SWOT analysis of the case study airline (THAI) will be provided. Impacts on both the airline industry and the consumers factored into business travelers and tourists will be analyzed through the use of Porter's Five-Force Model. The efforts are being spent to arrive at an understanding of the impact of the emission-trading scheme on THAI.

1.7 Limitations

It becomes more difficult when one tries to predict the likely future impact because there is more room for mistakes and wrong assumptions. It is also impossible to test the efficiency of the scheme with the time, data, and budget constraint. As such, this thesis attempts to assess the impacts in terms of changes in profit and operation of THAI only.

1.8 Chapter outline

Chapter 1 Introduction: Explaining Climate Change

- 1.1 Issues and scope
- 1.2 Motivations
- 1.3 Questions
- 1.4 Hypothesis
- 1.5 Expected Benefits
- 1.6 Theoretical Framework
- 1.7 Limitations
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- 2.5 Reforming EU competition law
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- 2.7 European Airline Industry

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6.10.4 Improvement of in-flight services

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CHAPTER II

LITERATURE REVIEW

It is predicted that over the next 50 years climate change is likely to have profound effects on many important economic sectors – particularly agriculture, energy, transport, tourism and health.[1] Ecosystem and biodiversity loss are also predicted to happen with accelerated growth. It will affect households and businesses, and certain sectors of society, notably the elderly, the disabled low-income households and other underprivileged homes. Impacts of the change will vary by region – coastal and mountain areas and flood plains are particularly vulnerable. There are two types of response needed to address climate change: **mitigation** (reducing greenhouse gas emissions) and **adaptation** (to deal with unavoidable consequences).

In February of 2010 the Commission announced the post of Directorate-General for Climate Action (DG CLIMA). The climate change issue has been previously included in the remit of DG Environment of the European Commission.[2] Its tasks would be to lead international negotiations on climate, to help the EU to deal with the consequences of climate change and to meet its targets for 2020, as well as to develop and implement the EU emissions trading system. DG CLIMA will be in charge of developing and implementing cost effective measures on the international level as well as within the EU climate change policies and strategies in order for the EU to meet its targets for 2020 and beyond with emphasis on reducing its greenhouse gas emissions. In leading the effort against global

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[1] European Commission Climate Action, Adapting for climate change: the framework for EU action [Online], 16 November 2010. Available from : http://ec.europa.eu/clima/summary /index_en.htm.

[2] European Commission Climate Action, What We Do [Online], 2010. Available from : http://ec.europa.eu/dgs/clima/mission/index_en.htm.

warming the DG CLIMA will be responsible for the respective Commission task forces on the international negotiations in the areas of climate change and ozone depleting substances and coordinate bi-lateral and multi-lateral partnerships on climate change and energy with third countries. The new policies to be created by the DG CLIMA will also aim at protection of the ozone layer and at ensuring that the climate change and its dimensions are appropriately present in all Community policies and that adaptation measures will reduce the European Union's vulnerability to the impacts of climate change.[3]

The DG CLIMA is directly responsible for the EU Emission Trading System or the EU ETS. It creates a global network of other carbon reduction systems with the eventual goal of creating international carbon trading market and monitors carbon emission trading activities in member states' sectors that are outside the EU ETS coverage ("Effort Sharing Decision").[4] It also promotes the development and demonstration of innovative low carbon and adaptation technologies under cost effective regulatory frameworks. This includes the deployment of carbon capture and storage, fluorinated gases, ozone depleting substances, vehicle efficiency standards and fuel quality standards as well as arrange an appropriate financial schemes to support them.[5]

Meanwhile, global warming and climate change are becoming more and more evident and arguments seem more and more like a waste of the little time we have to embrace the changes in our daily lives. The EU is very much aware of this and Europe, despite being a temperate zone, will be affected. That is why the EU is preparing to adapt to climate change.

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[3] Ibid.

[4] Ibid.

[5] Ibid.

Examples of adaptation measures include using scarce water resources more efficiently, adapting building codes to future climate conditions and extreme weather events, building flood defenses and raising the levels of dykes, developing drought-tolerant crops, choosing tree species and forestry practices less vulnerable to storms and fires, and setting aside land corridors to help species migrate.[6]

Due to different impacts in different geographical areas initiatives to adaptation will vary in degrees and are better taken at national, regional and local level. The ability to cope will also vary across population, economic sectors and regions across Europe. The EU can help complementing the efforts of its member states by building a support network aims to aid in greater cooperation and information sharing between the member states and ensure that climate change considerations are relevant within the decision-making processes and policies of the EU. EU's role will become more important when climate change impacts transcend national borders of its member states and manifest in different forms across regions of the same member state. The EU's role will be needed to enhance solidarity among Member States and prioritize help to where it is most needed and look also at the disadvantaged areas in Europe if they require any help the EU can provide. Known as a White Paper, a policy paper presented by the Commission in April 2009 presents the framework developed for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change with the following objectives:

- Building a stronger knowledge base since sound data is vital in the development of climate policy

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[6] European Commission Climate Action, Adaptation to Climate Change [Online], 2010. Available from : http://ec.europa.eu/clima/policies/adaptation/index_en.htm.

- Taking climate change impacts into consideration in key EU policies. Financing climate change policy measures to support wider international efforts on adaptation by helping for example non-EU countries to improve their resilience and capacity to adapt to climate change.[7]

And now we look at studies from previous years up to now in order to better understand the issue at hand. There have been quite a number of attempts to explain the phenomenal growth of the airline industry, why the liberalization was needed, and now that the progress on liberalization has been made, the public turned their attention to the airline industry's impacts on the environment. These changes and reasons behind their initiations are profound and have lasting impacts on the EU aviation industry. They have shaped the way airlines have become today starting with the liberalization of the industry itself to how the airlines compete (Reforming EU Competition Law) to conflicts and compromises (cooperation and alliances), and ends with the industry as it stands today. Today (*See:* 2.8 European Airline Industry) conflicting ideas emerged between airlines seeking to make more profit during these difficult times when competitions are fierce and airlines see their profit margin shrinking. Listed below are contributions of authors who explained this phenomenon in their work that helped getting me started when I did not know where to begin.

2.1 Background and reasons leading to liberalization

In *The Liberalization of State Monopolies in the European Union and Beyond,* Damien Geradin[8] provided the background of the liberalization process as well as historical arrangements that lead to a liberalized aviation market in the EU. The Commission was

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[7] Ibid.

[8] Damien Geradin, The Liberalization of State Monopolies in the European Union and Beyond (The Hague: Kluwer International Law, 2000).

given somewhat limited power to control air routes within the community but small and domestic airline remains under national control. The grandfather's right on the slots prohibit other airlines to use parking slots at a certain airport with such agreement previously arranged. Removal of this right will increase opportunities of having more operative slots through the use of proper assessment of capacity of each aircraft in much the same way airlines strive for to gain their competitive edge in the market. Transparency and tighter control of resource allocation were emphasized, again very similar to efficient resource allocation in both the fuel use carbon allowances. Ground handling monopolies presented another problem where the Commission set up directives for multiple handling ground services. Consumer protection is mentioned as an area of increasing importance. The structure of the airline industry had been discussed including alliances between airlines (Geradin 2000). These ideas are revolutionary in many aspects: it introduces capacity assessment to reduce wasteful space, transparency and consumer protection as areas of importance. It also chronicles the many changes happening over the past several years and how many regulations came about and the direction in which European airline industry is heading.

A large segment of commercial aviation still remains outside the scope of Community liberalization, however. The scope of the Commission's enforcement on the rules of competition is limited to intra-Community transport making it difficult to investigate infringements, impose sanctions and grant exemptions to beneficial agreements. As a result, airlines are not protected when they become victims of anti-competitive behavior in third countries.

Member states will manage air transport in the EU under common rules and the Commission has the right to intervene when it becomes necessary to ensure consistency with

the law and correct mistakes. Today, prices have gone down and the market has become more dynamic due to competitive regulations. In the opinion of the author it is now possible to put more emphasis on consumer protection and environmental objectives like the EU Emission Trading Scheme, for instance.[9]

2.2 'End- of-pipe' policies instead of changing consumption behavior

This book looks at the sustainability of the transport system, airlines included. The Author believes in the Single European Market. He believed that replacing obsolete national frontiers with common regulations, access, currency and opportunity would benefit the overall transport system.[10] He also believes that the key to avoid global warming is in changing consumers' consumption behavior. Consumers and policy makers need to be aware of the collective impact of the lifestyles they are accustomed to and what they will be committed to on the global level. Take Thai Airways, for example, the policy will affect its customers if the airline decides to push the cost responsibility to its consumer instead of or in addition to the ticket price and carbon donations. What about the airline itself, will it be able to compete in the EU market and still have to pay for the emissions as well? Lying at the root of the problem is consumers' disinclination to changing the pattern of their consumption. This is true in the airline industry where increasing number of passengers requires more resources to accommodate and more fuel to transport. Changing in mode of transportation, from flying to using speed train for short distances for example, will help reduce CO2 emissions from an aircraft and the travel time differences are minimal. Renewable energy that does not emit CO2 is being developed at the moment (see Chapter 4, Renewable Energy)

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[9] Ibid. 90.

[10] John Whitelegg, Transport For A Sustainable Future: The Case For Europe (London: John Wiley & Sons, 1994), 147.

but it is likely to take some time before it is ready to be commercialized. In the end, it is up to the masses of consumers, with their day-to-day decision-making, that will determine the outcome of the fight against global warming. There is much higher awareness of the general public about the issue today than it did over a decade ago that will make communications easier and people more receptive about the environmental issues. An attempt has been made to define sustainability in the context of transport. Guidelines will be presented in Chapter 4 to look at the sustainability of the EU ETS scheme.

2.3 Problems with communication

According to the book by Joseph DiMento and Pamela Doughman and their book *Climate Change: What It Means to Us, Our Children and Our Grandchildren*,[11] the biggest problem with climate change is communication. There are those who do not understand, do not take it seriously, or do not see it as a major public policy that requires their interest. Complex scientific explanations throw people off of trying to understand the issue. Geographical differences mean impacts of global warming are distributed in an unevenly manner making it incomprehensible for people living far away where the impacts are not felt. These reasons present difficulties for people trying to relate to climate change (DiMento and Doughman 2007), let alone do something about it. Aviation is a special case, however, owing possibly to the sizes of aircrafts and visible emissions, making the industry a target for environmental concerns as can be seen in the number of regulations included and discussed in Chapter 4.

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[11] Joseph F. DiMento and Pamela Doughman, Climate Change: What It Means for Us, Our Children, and Our Grandchildren (Cambridge, Massachusetts: MIT Press, 2007).

The book laid down the impacts of Climate Change including rising sea level and coastal land inundation that would affect coastal community residents and small islands. The effects of global warming will extend across the spheres of health, the economy, politics and international relations.[12] According to the Author, the urban population will be affected by higher humidity, which is perfect for the breeding of diseases carrying carriers such as mosquitoes. The frequent storms will put a strain on energy sources and water resources. Storms will damage agricultural products and affect food supplies. Natural ecosystems vulnerable to change will be the first to disappear along with their plants and animals and so will all other ecosystems be disrupted if not completely destroyed. We as humans and other more resilient species will adapt to the new climate given enough time. A sudden change in the world's climate will limit the capacity to the adaptation and planned strategies.

2.4 Different incentives and the prisoner's dilemma

Carraro[13] argues that there still exist some countries that have different incentives that may hinder the optimal outcome on climate change agreements. That climate change control is a public good and different parties stand to lose or gain benefits from climate change policies. With that in mind, assessment on international level must be made and there would emerge the equilibrium outcome. He also suggests that game theory be applied to predict the result of the eventual agreement. Early comments made (C.F Hardin and Baden, 1977) characterized the game as a prisoner's dilemma where everyone wants to protect their individual interests and no country will be willing to commit to reducing emissions beyond the non-cooperative equilibrium level. Airlines are the same: THAI would want to protect its

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[12] Ibid. 49.

[13] Carlo Carraro, Efficiency and Equity of Climate Change Policy (Dordrecht: Kluwer Academic Publishers, 2000).

investments in the industry and continue to earn profit using the least amount of resource as possible to stay competitive. Looking at airlines as corporations, none of them would want to decrease their emissions if business was good at usual or pay more for carbon credits than they have to.

Progress has been made, nonetheless, with countries and organizations and sub-organizations joining hands in environmental laws, which are linked to other areas in policy-making (trade, technological co-operation etc.) where solutions that are made could benefit all parties.[14] This will later be explored in details in later chapters.

2.5 Reforming EU Competition Law

The liberalized market of the aviation industry in the EU today owes their existence, legitimacy and accountability to the reformed Competition Law. There were obstacles to imposing competition regulation in the airline industry in the EU. The first obstacle went far back as the Treaty of Rome itself: there was no basis for a Common Transport Policy in the Treaty. The treaty only mention about transport in Title V (ex Title IV), which contains specific provisions relating to transport, and the provisions only concern about procedures leading to the creation of the common policy for transport by the Council. Article 80(2) only mention that air (and sea) transport be excluded from the Treaty's provision on transport. The Treaty left air transport regulation (if there occurred the necessity to) to be decided if and when by the Council.[15]

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[14] Carlo Carraro, eds., Efficiency and Equity of Climate Change Policy (Dordrecht : Kluwer Academic Publishers, 2000), 12-13.

[15] Catriona Daly, EC Competition Law – Its Effect on Air Transport Liberalisation [Online], 2003. Available from : http://www.elsa.org/fileadmin/user_upload /elsa_international/PDF/SPEL/3_ Air_Transport _Liberalisation_and_EC _Competition_Law.pdf.

During the years that followed the Treaty of Rome air transport was organized according to the basis of the public regulation of conditions of competition, not under the mechanisms of free market. The EU airline market was dominated by national monopolies, market sharing and very high tariffs. The Chicago Convention held in 1944, which the main purpose was to decide on how to regulate international air transport that was regulated by a series of bilateral agreements between Member States. This system left practically no scope for applying the competition rules.[16]

Regulation 17/62[17], adopted in 1962, implemented rules for the enforcement of competition rules by the Commission. The application of the Regulation was removed from the transport sector some months later by Regulation 141/62[18], however. The Commission has stated that notwithstanding Regulation 141/62, Regulation 17/62 still applies to activities that are ancillary to air transport including ground handling services, computer reservation systems and computerized air cargo information systems. It was clear that the competition rules would not be able to be enforced effectively without some measures of liberality been introduced first.[19]

The measures of liberality to be implemented up until then was the *French Seamen Case*[20] where the individual member states were oppose to the idea that the EU should intervene in the areas of aviation and maritime. The decision by the court would prove to be

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[16] Ibid.

[17] Regulation (EC) no. 17/62.

[18] Regulation (EC) no. 141/62.

[19] Catriona Daly, EC Competition Law – Its Effect on Air Transport Liberalisation [Online], 2003. Available from : http://www.elsa.org/fileadmin/user_upload /elsa_international/PDF/SPEL/3_ Air_Transport _Liberalisation_and_EC _Competition_Law.pdf.

[20] Commission v France ("French Seamen") (Case 167/73) [1974] ECR 359.

crucial to the long-term application of competition rules in air transport. The turning point in the EC effort to introduce liberating measures to EU air transport came when the court ruled in favor of liberalization in *Nouvelles Frontiéres*. The European Court of Justice's decision confirmed that the EC Treaty competition rules on transport applied to air transport as well. The Court held, however, that Articles 81 and 82 were needed in implementing legislation. Seeing as this legislation had not yet been adopted by the Council, competition must be regulated by the "transitional provisions" of Articles 84 and 85.[21]

The *Nouvelles Frontiéres case* gave momentum to the Commission's efforts to liberalize European air transport and to establish detailed rules for the application of Articles 81 and 82 in the air transport sector. The first package of liberalization measures arrived in December 1987. It was adopted by the Council of Ministers. Looking in terms of competition in the EU aviation market, Regulation 3975/8715 that applied the competition rules of the EC Treaty to air transport between Member States was essential. However, the Regulation has yet to apply to air transport between the EU and non Member States and so this remains subject to Articles 84 and 85.

The first package of measures has finally arrived to be followed by the second package in 1990 and the third in 1992. Liberalization measures are an important backdrop against which the competition rules can be applied in the air transport sector. The Commission states that the purpose of competition rules must be to secure and protect the increased opportunities made possible by liberalisation. It must be emphasized too that the measures adopted by the EU to open up the market do not assume the application of the competition rules in the EC Treaty.

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[21] Adkins, B., Air Transport and EC Competition Law (London: Sweet & Maxwell, 1994), pp.6-7.

Regulation 1/2003[22], known as the Modernization Regulation, removes the cumbersome notification system and, for the first time, allowed Article 101(3) TFEU (formerly 81(3) EC) to be applied by national competitions authorities and the court.[23] The Commission gained more power to investigate and punish any infringements at the time when Eastern expansion of the Union was happening and the Commission is left to do its job with more resources in which it put to good use.

Regulations on the rules of competition were passed amidst fear of restrictive agreements and abuses through domineering positions that could undermine the effort to liberalize the airline industry. Such were regulations No.3975/87 and No.3976/87. The first regulation allows the Commission to carry out investigations, terminate infringements and grant individual exemptions. It has been complemented by a procedural regulation to deal with applications to the Commission and hearings.[24]

Regulation No.3976/87 mainly involved with granting block exemptions with respect to certain categories of agreements defined in the Regulation. Cooperation between airlines, especially in matters of commercial relevance, was viewed to be essential part of the liberalization process.[25]

National competition authorities are subject to consent of the national court and are required to provide the Commission with 'necessary assistance, requesting where appropriate

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[22] Regulation(EC) no. 1/2003.

[23] Andreas Stephan, "Editorial-Reforming EU's Competition Law," The Competition Law Review, vol.6, Issue 2, (July 2010), 139-143.

[24] Damien Geradin, The Liberalization of State Monopolies in the European Union and Beyond (The Hague: Kluwer International Law, 2000), 81.

[25] Ibid.

the assistance of the police or of an equivalent enforcement authority so as to enable them to conduct their inspection' (Art 20(6)).

Article 7 of the Modernization Regulation gives the Commission the power to impose structural remedies in order to bring an infringement of competition law to an end. The potential use of structural remedies is limited, however, to situations where 'there is a substantial risk of a lasting or repeated infringement that derives from the very structure of the undertaking' and where 'there is no equally effective behavioral remedy or where any equally effective behavioral remedy would be more burdensome for the undertaking' (recital 12, Regulation 1/2003), it nevertheless constitutes a significant addition to the Commission's powers.

Article 9 of the Regulation allows the Commission to accept commitments in lieu of a full or formal decision: a form of direct settlement. They are appropriate for 'where the Commission intends to adopt a decision requiring that an infringement be brought to an end and the undertakings concerned offer commitments to meet the concerns expressed to them by the Commission in its preliminary assessment' (Art 9(1)), but not where the Commission would otherwise intend to impose a fine (recital 13). Fundamentally, these decisions do not constitute an admission of guilt; they do not prevent European competition authorities from perusing an infringement; and they do not require undertakings to waive their rights of appeal.[26]

The EU Competition Laws were meant to ensure that businesses do not abuse the freedom that has been given to them or to avoid distortion of the competition by a handful of

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[26] Ibid.

companies. They also set up guidelines in which to follow after the industry has been turned into a free market environment.

2.6 Alliances

One of the practices airlines adopt in response to shrinking profit margin due to market decline (especially in Europe) is through forming alliances. These are mainly designed to achieve fleet rationalization, expansion and rationalization of network structure, greater exploitation of cost-side economies of scale and reduction of costs through joint purchasing, joint marketing, etc.[27]

Although the scope and nature of these alliances differ, there is a trend towards deeper alliances involving co-operation on ALL aspects of airline business, amounting to virtual merging of the alliance members' activities. The trend toward consolidation in the EU airline industry was a result of tumultuous times in the global airline industry during the past couple of years due to the oil crisis of 2008 and the economic meltdown in 2009.[28] Alliances give airlines in the same alliance more leverage, efficiency in resource usage and reach into new markets.

Airline alliances' effects on competition depend upon the nature of the allied networks. There are certain benefits to an alliance; it can significantly reduce competition on overlapping non-stop routes and overlapping connecting routes where the allied airlines were once competing. Even where the two networks do not overlap in the markets they serve, the

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[27] Joos Stragier, Current issues arising with airline alliances [Online],1999. Available from : http://ec.europa.eu /competition/speeches/text/sp1999678_en.html.

[28] EUbusiness, EU Clears Major tie-ups in the Ailing Airline Sector [Online], 2010. Available from : http://www.eubusiness.com/news-eu/competition-airline.5jz/.

alliance can have serious anti-competitive effects by reducing or eliminating competition on the hub-to-hub route(s) between the networks.[29] Moreover, alliances between airlines operating hub-and-spoke networks will generally enhance demand for the network as a whole and increase the market power of the network, especially at its hub airports. This makes it even more difficult for new entries into the market.

2.7 European Airline Industry

In the paper *Analysis of European Airline Industry* the European airline industry is recognized to be a complex network divided by two categories of airlines: traditional (flag) airlines and low-cost airlines. According to the Paper, the competition in the European airline market is intense and growth is slowing down, adding more pressure to operators.[30] Product differentiation seems to be a problem as airlines look to define themselves and settle on a niche market. New investor looking to join the market will face difficulties of obtaining high investment to cover fixed assets and handling complex logistics of the industry. The "open skies" policy was briefly mentioned with the opinion that the policy would result in market penetration by low cost airlines. Development of alternative transportation like a web of speed railway commissioned in 1996 would be substitutes for short European city-to-city flights. In short, airlines operating in the EU market will have to have strategies to deal with such a complex environment, attract and retain their customers, comply with environmental policies and find more innovative ways to reduce costs and enhance profit.

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[29] Joos Stragier, Current issues arising with airline alliances [Online], 1999. Available from : http://ec.europa.eu /competition/speeches/text/sp1999678_en.html.

[30] IATA official website, European Airlines [Online], 2007. Available from : http://www.iata.org/NR/rdonlyres /957AB093-DCAB-43C9-A952- A97E48ABC8C4 /0/Avery_EU_Airline_Cycle.pdf.

2.8 5-Force Industrial Analysis

One of the tools used in this study is the five-force analysis by Harvard professor Michael E. Porter. Here is a look at how and why should the five-force analysis be applied to assess an industry. The analysis is divided into 5 parts: bargaining power of buyers, bargaining power of sellers, substitute products, threats from new entrants and industry rivalry. The analysis is used extensively by firms and by business school students when they want to assess how a firm or an industry is doing and how it interacts with its immediate environment. The model was used in this thesis to assess the competition in the EU airline industry. The example of how the model can be applied to industries is the analysis of the NBA and basketball as an industry.

Industry Analysis would not be an effective tool if all that is done with it is to determine how strong a supplier is, or how much rivalry exists among firms. It becomes a valuable framework if the analysis is undertaken to answer two important questions: 1) What is valued by the customer? 2) What are the key success factors in a given industry? Industry Analysis can provide insights into why some firms are high-performing in their industry, while others are relatively low-performing.

Industry Rivalry

NBA teams are characterized by market maturity, well-balanced competitors, high fixed costs and high exit barriers.[31] First, **market growth**, as measured by attendance at NBA games, has leveled recently, thereby increasing competition among teams for a static number of fans. Second, the industry is structured by the NBA to have 30 **equally balanced**

[31] Karen Schnietz, et al., 5-Force Industry Analysis [Online], 2010. Available from : http://gbr.pepperdine.edu/2010/08/5-forces-industry-analysis/.

competitors because the distribution of ability across teams must be relatively equal in order to maintain a good game with suspense and thus to attract fans. The NBA promotes competitive balance with measures such as salary caps, reverse-order draft choices, revenue sharing, and maintaining authority over league expansion. Third, the main **fixed costs** for teams, such as labor contracts and physical assets, are very high, which creates pressure for teams to fill capacity. Finally, the NBA **prohibits firms from exiting** the industry at will. These four factors combined sparks high rivalry among teams chasing fans, sponsors, and licensees for a consistent pool of revenue with which to cover high and often growing costs.[32] A solution for this is to differentiate. One way is through acquiring star players on the team and another are NBA Championship wins.

Customer Power

There are three types of customers served by the NBA. First are the fans, whose tickets sales contribute 35% to the team's revenue. Next is the media outlet, who bid over rights to broadcast game. The third type of customers is corporations who purchase box seats and season tickets. Sponsorships are a big business with multi-million-dollar deals and naming rights to a stadium (i.e. Staples Center).

Supplier Power

The main suppliers to the teams are players. Factors determine the salary of players: interest in the players, their performance, and free agent status.[33] The players hold relatively low power with the exceptions for a few superstars. There are exceptions for super star

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[32] Ibid.

[33] Ibid.

players whose salary is absurdly high and sometimes not proportionate to the player's achievements.

Substitute Product

Because 70 percent of NBA fans are casual entertainment seekers, rather than die-hard fans, substitute products strongly impact the dynamics of the professional basketball industry. Basketball fans are mostly casual fans that have very low switching costs compared to fans of other sports such as football, baseball, or hockey.[34] Moreover, of the other professional sports, only football has a higher average ticket price than basketball (Figure 5). It is thus not only easy, but also cost-effective for the casual basketball fans to switch to another sport.

New Entrants

New entrants into this industry are rare since NBA League approval and a steep franchise fee stand in the way of prospective new team owners. Moreover, attempting to circumvent the NBA would put the following obstacles into an entrepreneur's path: 1) massive capital costs, 2) lack of brand reputation, 3) lack of TV revenue, and 4) steep competition for talent. Expansion teams occasionally do get approval, such as the Charlotte Bobcats founded in 2004. However, the competition that so many other industries face from new entrants is virtually non-existent in professional basketball.[35]

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[34] Ibid.

[35] Ibid.

2.9 SWOT Analysis

SWOT analysis is simpler than the 5-force model but quite useful nevertheless. It assesses the strengths, weaknesses, opportunities and threats for a single firm in a given business environment. It is commonly used by corporations as well as small business units. The framework was described by Edmund P. Learned, C. Roland Christiansen, Kenneth Andrews, and William D. Guth in the late 1960's in *Business and Policy, Texts and Cases* (Homewood, IL, Erwin :1969).[36] Because it looks at issues that have the most impact it is useful when one is asked to analyze a situation with a limited amount of time.

2.10 Value-Chain Analysis

The Value Chain Analysis was created by Michael E. Porter in his book, *Competitive Advantage* (1980). It is a tool for mapping development of competitive advantage. The chain is composed of different activities that add value to the product/services of the firm. The activities are categorized into 'primary activities' and 'support activities'. Primary activities include activities that directly affect the output of product/services while supporting activities include activities like administration and procurement. A company's profit margin is depicted as an area at the end of the chain where firms derive their profit. An example case in applying value chain analysis presented below analyzes the value chain of Toyota Indus Motors Co.:

Primary activities:

Inbound Logistics

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[36] NetMBA.com, SWOT Analysis [Online], 2010). Available from : http://www.netmba.com /strategy/swot/.

Goods are received from the company's suppliers and are distributed to various departments in order to manufacture the product/services. Unused raw materials find their way into the storage. Toyota uses the JIT (Just In Time) approach so there are very little raw materials that take up space and inventory costs. Toyota maintains good relationship with its suppliers to ensure the availability and quality of raw materials used in production.

Operations

Goods are manufactured or assembled at this stage of production. For a car manufacturer like Toyota it may means putting together the different parts on the assembly line and fine-tuning the engine.[37] Toyota is known for its reliability, which comes from its efficient operations.

Outbound Logistics

The finished products are delivered to the end customers through supply chain and Toyota maintains its own showrooms[38], which gave customers easy access to its cars.

Marketing and Sales

Toyota is customer-oriented and at this stage it prepares its offerings to targeted group of consumers through marketing communications and promotions mix.[39]

Services

Toyota provides final-checking services, after-sale services, and handle complaints. It

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[37] Scribd.com, Value Chain Analysis of Toyota Indus Motor Co., 2010. Available from : http://www.scribd.com/doc/22372540/Value-Chain-Analysis-of-Toyota-Co.

[38] Ibid.

[39] Ibid.

also provides training to its employees who will be interacting directly with customers.

Support Activities:

Procurement

Toyota purchases its goods, services and materials at this function. The aim is to secure the minimum price for maximum quality. Outsourcing (let other organizations perform the tasks at the least cost) and e-purchasing (online orders and customs fit) will be done at this stage.

Technology Development

Technology development is an important step in creating competitive advantages. Companies need to innovate cost-reduction methods and maintain protection and sustainability of competitive advantage. Toyota implemented production technology, internet marketing activities, lean manufacturing, Customer Relationship Management (CRM) and other technology breakthroughs to maintain its competitive edge in the market.

Human Resource Management

Human resource is an essential part of a company. Toyota manages recruitment, selection, training and development, and rewards and numerations. They consider their employees as human capital. The mission and objectives are the driving force for its HRM strategy.[40]

Firm Infrastructure

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[40] Ibid.

This process includes of and is driven through corporate and strategic planning. Toyota adopts the Management Information System (MIS)[41] and other tools to plan and control each department.

Summary

In this chapter we have reviewed the opinions and projections on the EU airline industry. These issues will be used to increase the readers' as well as my own understanding of the complex industry and which topics should be touched on and how relevant they are to the present analysis.

It can be seen that since airline liberalization happened in Europe many things have changed. Voluntary or otherwise, the liberalization forces airlines to finally come to terms with efficiency. Collateral damage to the environment now begins to surface and worried the scientific community and this concern is spreading to the public at large. The policy-making level of the EU is faced with unprecedented pressure, and this time it is the environment that takes the toll. The EU responded to the challenge with a number of new regulations as we will see. Will they be enough or are they merely tools to fix matters in the short-run? It is difficult enough to pass new regulations to appease the public; it is an entirely different task to make them work while there are those who do not believe in the real danger of global warming and those governments who, with heavy lobbying from their industrial sector, agree that making profit is more relevant.

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[41] Ibid.

CHAPTER III

OVERVIEW OF THE AIRLINE INDUSTRY MARKET CONDITION IN THE EU

Airline industry in Europe and elsewhere remains a large and important mode of transportation and is growing at a rapid rate. Aviation makes globalization possible through the ability to move passengers from one country to another whether it is business traveling, leisure traveling, or cargo. It therefore facilitates world trade, economic growth, international investment and tourism.

It is imperative to give readers understanding of the aviation market in the EU. Much has changed over the last two decades in regulations in air transport and the following events have contributed to those changes. Asian airlines operating flights to and from Europe are directly affected by these changes to differing degrees depending on the strength of their capital structure and the speed of responses to the changes. The most immediate regulation to affect airlines operating in Europe is the EU Emission Trading Scheme (EU ETS), which will be discussed in length later in Chapter 4. Operational environment will be discussed in details the problems and issues at hand that any airline operating in Europe will have to face.

There are many factors involved in operating air travel industry and they will be discussed in this chapter. The focus remains at their impact on the industry as a whole. Fuel and costs, for example, are two of the most important and immediate issues being faced by airlines. Low-cost carriers have been introduced in the European aviation market and elsewhere and they are causing major changes in the structure of the industry. Major airlines are forced to be more efficient and waste the least amount of resources as possible to compete in such a cutting edge environment.

The Open Skies agreement liberates the traffic over the Atlantic. Travel from one city in US to another in the EU was made possible. This leads to an increase in traffic size and, consequently, more slots to be filled by airlines. Low-cost airlines have emerged as a strong competitive sector of the airline industry with rapid growth and expansion to cater to the more price-conscious consumers by way of fulfilling the needs of traveling into other regions. 9/11 has had a certain impact on air travel in EU. The event changes people's perception of safety in flying. It does very little to change the industry's structure, however. The airline industry's demand has gone up in October 2010, possibly signaling an upward trend in the industry's earnings.

As the operational environment is concerned, maneuverability in the area of costs remains tight. The rate of fuel usage is not sustainable and the costs unstable as can be demonstrated by oil crisis in 2008. The problem with congestion is being fixed through expansion of airports and their infrastructures. Bilateral relations continue to impede the development and management of global scale aviation.

3.1 Liberalization of Air travel in the EU

Since the end of WWII the airline industry in the EU and elsewhere (i.e., US) took off and experienced rapid expansion. In Europe, national airlines, flag carriers as they were called, had many ties of special arrangements from the governments' support and carried over 70% of passenger traffic.[1] At the international level the airlines operated in a cartel-like behavior while there was usually one airline dominating domestic air travels. Institutional

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[1] J.P. Hanlon, Global Airlines: competition in a transnational industry [Online], 1999. Available from : http://www.google.com/books?hl=th&lr=&id=b1x0HEZ sQ4C&oi= fnd&pg=PR7&dq= competition+in+the+EU+airline+industry&ots=AKDWNudkQE&sig= qKLJV4dwCU863rGgCdatBvHEB80#v=onepage&q=competition%20in%20the%20EU%20airline% 20industry&f=false.

politics in the EU make policy-making difficult and confusing with so many stakeholders lobbying for their own interests. Thousands of bilateral agreements are made between airlines and nations and their effects include protection of the domestic market, restrictions on competition, too few market incentives, market mechanism that did not function, and restricted choices for consumers.

According to Pedler and Van Schendelen[2] the principle motivations to liberalize the airline industry in Europe were to make them more competitive once their operation becomes more efficient. The other motivation was a greater number of choices and cheaper airfares for the consumers. In addition to the benefits mentioned above the liberalization was perceived as inevitable due to the establishment of the single market.

The Single European Act of 1986 was significant for two reasons. Firstly, it would allow free access to previously closed EU national markets for any EU airline. Secondly, competition rules would have to be applied to prevent limitations on competition being introduced.[3]

The liberalization of the aviation industry has been an important part of developing a single market in the EU. It has resulted in some rationalization and consolidation in the industry and also created significant new markets and growth opportunities for airlines. Its

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[2] R.H Pedler and M.P.C.M. Van Schendelen, Lobbying the European Union: Companies, Trade Associations and Issue Groups (Aldershot: Dartmouth, 1994).

[3] Catriona Daly, EC Competition Law – Its Effect on Air Transport Liberalization [Online], 2003. Available from : http://www.elsa.org/fileadmin/user_upload /elsa_international/PDF/SPEL/3_Air _Transport _Liberalisation_and_EC_Competition_Law.pdf.

objective was to help to improve the competitiveness of the sector by removing artificial barriers to their operation.[4]

3.2 The Open Skies Agreement

The creation of a Single Market in aviation in 1992 has enabled airlines within the community all access to the EU aviation market. The move is seen as a positive change for the airlines themselves and their customers who would take the advantage of more available choices of flights and services to their desired destination. The EU-US "open skies" agreement has opened up a lot of opportunities for both sides of the Atlantic, allowing for intercontinental flights from any city in the US to fly to any city in the EU and vice versa. The Agreement is now in its second stage and now includes minimizing environmental impacts from aviation. In Stage II, the agreement calls for close international cooperation on environmental issues, including emissions. Both sides agree to ensure consistency and avoid duplicate projects from their respective emissions trading schemes. This will be good for the environment and the customers and airlines will have to pay less for environmental damages. The agreement goes further in its commitment to innovations in green technology, alternative fuel and air traffic management and plans to join the effort with the ICAO to address the impact of climate change regulations on international air services.[5]

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[4] Interview with Mrs. Delphine Brissonneau, Programme Officer, Representative at European Delegation, 2010.

[5] EUbusiness, Second Stage EU-US "Open Skies" agreement and existing first stage air services agreement—briefing [Online], 2010. Available from: http://www.eubusiness.com /topics/transport /open-skies.2.

3.3 9/11

Since the attack on World Trade Center in 2001 all Western airlines have been suffering from the excessively high insurance cost, additional investments that go to enhancing safety features in addition to the high costs of fuel and shrinking revenue due to the competition from low-cost, no-frills airlines operating the same routes. The prior two were results from the attacks on US's landmarks using commercial airlines that not only reduced demand for flying in the US and its allies but also caused changes in the operations relating to safety on board and around the airports anticipated to be the next targets.

The overall revenue of the entire airline industry leading from 1998 to 2004 had already been on the decline, 30 percent to be exact, before and immediately after the attack happened. The decline could already be seen in the cargo traffic and regional commercial airlines in Europe prior to the attack. They were affected in much the same way the United States, Canada, Europe and Australia were finding it difficult to compete in a stagnant or declining market.[6] Although experts say the recession was moderate and could have been avoided, the decline in the market was much pronounced because of the attack than it would have been from the recession. It was also the winter season when air traffic in Europe is traditionally low and deep discounts failed to stimulate the demands. Traffic was more depressed in September and October of 2001 and even though it did pick up in November the average was still well below what it was in 2000. The total losses of profits of world airline

[6] Peter Spence Morell and Fariba Alamdari, The impact of 11 September on the aviation industry: Traffic, capacity, employment and restructuring [Online], 2002. Available from : http://www.ilo.org /public/english/dialogue/sector/techmeet/tmica02/tmica-wp181.pdf.

industry since the attack in 2001 and afterwards until 2004 were estimated at more than US$30.9 billion.[7]

The attack did little to affect fundamental strategies of airlines but it did speed up structural changes that were already on their way. The newly emerging low cost airlines were still able to maintain their expansion at a rapid rate that would otherwise have faced slower growth in market share and more constraints. Some airlines filed for bankruptcy in the effort to re-emerge in the market rather than face the inevitable decline. Unlike US carriers who were most effected, European airlines did not receive the much-pressured help from their governments in the form of compensation and reduced taxes and have to fend for themselves in the market where pressure to be competitive is high. Even though we are now in the recovery phase where airlines once again enjoy pre-9/11 demand as the graph below illustrates, the attacks had left their mark on the airline industry as every domestic and foreign airlines operating in the EU must remain vigilant in maintaining their safety standards.

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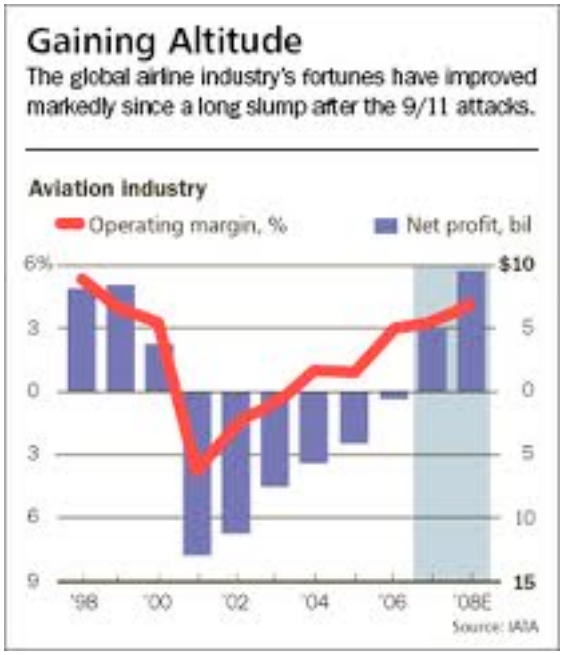
[7]Willie Chen, Stan Shih, and Po-Young Chu, Business Growth Strategies for Asia Pacific (John Wiley & Sons Asia Pte Ltd, 2005), 54.

Figure 3.1: Global Airline Industry Growth Post 9/11



Source: IATA

3.4 Low-Cost Carriers (LCCs)

It is very likely that 9/11 and the economic crisis had been the catalyst to the birth of low-cost airlines. Since their entry into the European aviation industry efficiency has become the name of the game. Low-Cost Carriers have different operating models that enable them to operate and a very low cost. Such models, regrettably, are not suitable for major operators like British Airways and Lufthansa. The average cost of LCCs' tickets is just 3% of EU's average industrial wage.[8] Such low price is affordable to almost anyone and had made LCCs popular with the masses. To date (2010), the capacity share (seats) of LCCs within EU states

[8] Debarshi Datta and Subham L. Chakravarty, European Airline Industry – Strategies for the New Millennium [Online], 2001. Available from : http://www.skytechsolutions.com /pdf/researchPapers/ European%20Airline%20Industry%20-%20Strategies%20for%20the %20New%20Millennium.pdf.

is 36.1%.[9] The three major LCCs in Europe: Ryanair, EasyJet and Air Berlin have between them handled 9.7 million passengers in February of 2010, a year-on-year increase of 7.4%. This was preceded by an increase in passenger number of 9.5 million and growth of 7.3% in January 2010, of which the total comes down to more than 19 million passengers for the first two months of 2010 alone.[10] LCCs have also played an important role in growing interest in flexible, self-packaged holidays and weekend getaways.[11] The increasing market share of LCCs in Europe in sharp contrast with the contracting market of traditional airlines of which have to fend for their losses has led to flag carriers wanting to share in the profit. Major flag carriers have found a solution in launching their own brands of low-cost airlines to compete in this new sector.

3.5 Demand

With the liberalizations of airlines seen everywhere, emerging new markets in Asia and the birth of low-cost airlines the volume of air travel will be likely to increase, so does the degree of competition among airlines. While collectively air travel relies on the state of the world economy, other factors also effect passengers' decisions to fly. Demands for travel are usually categorized into 3 groups: business, leisure, and cargo. Business-related air travels are highly sensitive to the growth in business activities that require face-to-face

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[9] Center for Asia Pacific Aviation, European LCCs now carry a third of all pax. Can full service airlines confine damage to short-haul? [Online], 2010. Available from : http://www.centreforaviation .com/news/2010/03/12/european-lccs-now-carry-a-third-of-all-pax-can-full-service-airlines-confine-damage-to-short-haul/page1.

[10] Ibid.

[11] Debarshi Datta and Subham L. Chakravarty, European Airline Industry – Strategies for the New Millennium [Online], 2001. Available from : http://www.skytechsolutions.com /pdf/researchPapers/ European%20Airline%20Industry%20-%20Strategies%20for%20the %20New%20Millennium.pdf.

contact such as managerial, administrative, professional, technical and sales. Leisure travelers are more price-sensitive than the business and cargo sectors. Costs have a lot to do with their decision to travel and which airline they choose to fly while for the cargo sector, volume and time constraints dominate this decision.

Measured in RPKs (Revenue Passenger per Kilometers), air traffic in Europe had increased 3.7% according to ICAO and 1.8% according to IATA in 2008.[12] These levels of growth are considered moderate. The later half of 2008 spelled disaster to the EU aviation market, however. Changes in growth level between 2007 and 2008 were owed to many factors that negatively impacted the overall EU demand including the fluctuating oil price, the credit crunch and recession that affected not only the EU but also other regions, leading to a slump in the global demand for aviation. The decline in EU's air traffic was evident and airlines had adjusted the number of seats offered to reflect the current demand. The full service network carriers had reduced the number of seats offered by 1% and the regional carriers by 5%. Charter carriers had reduced their service offering by as much as 25% to cope with the afore-mentioned conditions. Low-cost carriers were an exception: they have increased their seat capacity and had added new routes as well. The expansion was seen as a business move at a time when the aviation market was the most price-sensitive. Examples included Ryanair and EasyJet who had added an average of 14% increase to their seat capacity to their Europe-wide service. Demand forecasts by Airbus and Boeing from 2008 through to 2027 were 4.9% and 5.0% RPKs on average.[13]

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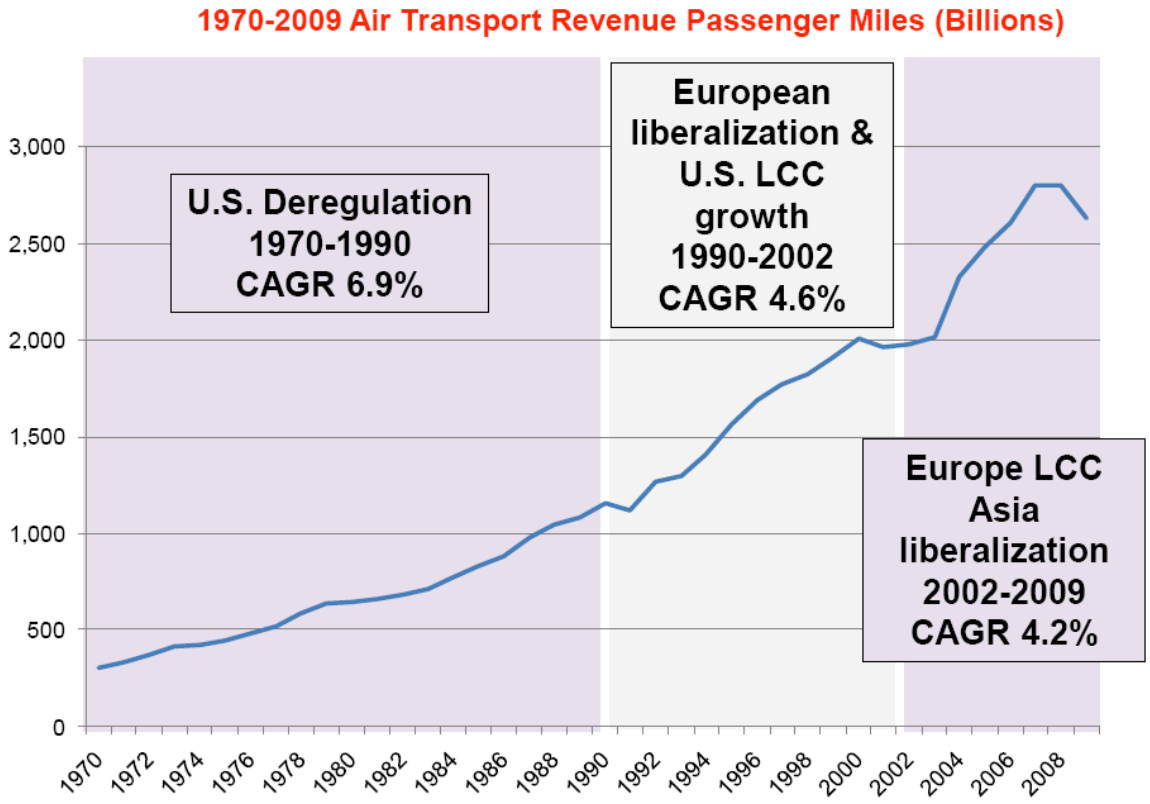
[12] German Aerospace Center, Analyses of the European Air Transport Market: Annual Report 2008 [Online], 2008. Available from : http://ec.europa.eu/transport/air/observatory_market/doc /annual _2008_ summary.pdf.

[13] Ibid.

Figure 3.2: 1970-2009 Air Transport Revenue Passenger Miles (Billions)

Passenger Miles

(No. of passengers times the miles traveled)



Source: ESG Aviation[14]

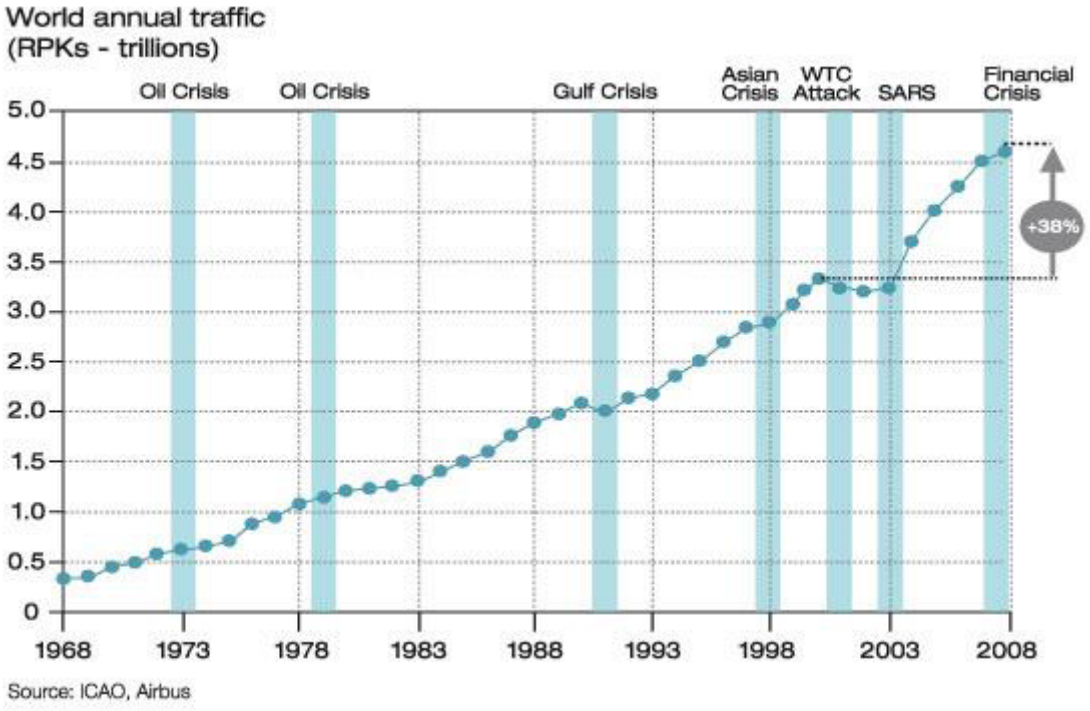
Looking at the big picture, the graph above demonstrates the demand for global air transport that had been on the rise since the US deregulation of the air space in the 70's with the Compound Annual Growth Rate (CAGR) of 6.9%. The next period (1990-2002), saw the demand increased further due to the European liberalization of the airline industry and the birth of low cost airlines in the US. The skies over Europe and the transatlantic routes are now open when previously they were restricted by national regulations that allowed only the

[14] Dr. Kevin Michaels and Jonas Murby, Air Transport Demand Growth At An Inflexion Point? [Online], 2010. Available from : http://www.aerostrategy.com/downloads/speeches /speech_86.pdf.

preferred airlines (national airlines) to operate. Together they were responsible for a 4.6% of CAGR. The years following 2002 Europe LCCs, as well as Asia's liberalization of air travel, had pushed the graph higher to more than over 2.5 billion of passenger miles and the CAGR at 4.2%. But as the graph also tells us that in 2008 the passenger miles have gone down due mainly to the bad economy and as we know would continue to fall further into 2009 before picking up again in 2010.

The graph below represents the resilient nature of global air traffic. Despite hostile circumstances from several oil crises to the recent financial meltdown and 9/11 the industry had bounced back and continue to grow.

Figure 3.3: World Annual Traffic (RPKs-trillion)



Notes: RPK=Revenue Passenger Kilometers

Shown below are factors affecting growth in the airline industry by regions where all will be impacted by the rises in oil price and where the costs of fuel is as high as 30%-40% of airlines' cost structure. For the airline industry in Europe socio-cultural and infrastructure

seem to have medium to low impact on growth since infrastructure in Europe have been established and continue to expand. In a matured market like Europe the market maturation will have significant impact on demand and the need for capacity expansion. Finally, substitutes of air travel like the already existing and planned high-speed rail (HSR) will pose a medium impact on air travel demand as customers have more choices in the modes of traveling without having to sacrifice their travel time.

Table 3.1: Constraints To Air Travel Growth: Medium-Long Term Impact

	Europe	North America	Asia	Rest of World	Notes
Cost of Fuel	High Impact	High Impact	High Impact	High Impact	30%-40% of cost structure
Socio-Cultural	Medium to Low Impact	Low Impact	Low Impact	Low Impact	Primary Impact with a very small segment of European Consumers
Market Maturation	Medium Impact	Medium Impact	Low Impact	Low Impact	Key concerns are North America and Europe
Infrastructure	Medium to Low Impact	Medium to Low Impact	Low Impact	Low Impact	Key concerns are North America, Europe and India
Substitutes	Medium Impact	Low Impact	Medium Impact	Low Impact	HSR(high-speed rail) will compete primarily in Europe and China

Source: AeroStrategy[15]

In response to the impacts created by high cost of fuel airlines are replacing their old aircrafts with new ones that are more efficient and monitor the availability of alternative

fuels. In the socio-cultural aspect public relations between airlines and the general public have improved due to the airlines' commitment on being more "green". The airline and the HSR industries can work together to plan multi-modal transport instead of competing with one another. New aircrafts and airports will hopefully improve customers' experience in air transport.

Traveling with the speed of equal or more than 250 km, HSR offers an alternative to flying for those traveling within Europe. High-speed rails are viewed as time efficient on routes up to 500 miles and more of them are being built to accommodate intra-Europe city-to-city travels. They are perceived by many as comfortable and affordable compared to air travel. Since the introduction of HSR air traffic on key routes has decreased 40%-50%.

The EU ETS is expected to have a small impact on ticket prices, so it will not significantly alter the demand for travel. A single ticket from the EU to Bangkok would increase by up to €9 each way, which is a small proportion of an overall ticket price.

In the end, costs control continues to be the main strategy of airlines anywhere and airlines have seen profit—albeit tiny. Airlines operating in the EU are exercising great prudence in managing their resources due to present and future competition and despite the uncertainties in the economic climate people continue to fly.

3.6 Growth

The past two years (2008-2009) have seen the global airline industry entered an ailing state due to economic downturn and an oil spike earlier. Rebound, however, is on its way as IATA changed their prediction outlook of the airline industry and expects $560 billion annual revenue for the year 2010, more than tripled its earlier prediction at $2.5 billion as airline companies are deploying different strategies to reduce cost including add-on revenue streams,

low fares, network expansion, optimizing routes, partnership alliances, etc.[16] The numbers are based on the ongoing improvement in passenger traffic and fare. This number could fall if airlines are adding seats too quickly. The balance is very delicate that any external event can put the entire industry back to crisis.[17]

IATA expects a tough year ahead in 2011 with the estimated decline of 40% in industry earnings. This is due to the fast rate of expansion in capacity that will outpace the demands. Nonetheless, conditions in the aviation market are expected to improve over the next four years as the economy gains its momentum and lead to increases in spending and demand.[18]

In Europe, losses are expected to come down from $2.8 billion to $1.3 billion during 2010, most of them a result from traffic in Europe and a boost in the weaker currency in the cargo sector. The economy in Europe is still looking grim and faltering consumer confidence continues to depress originating passenger traffic.[19]

Improvements in profit earned by airlines are not expected to continue into 2011. The impact created by post-recession bounce is not expected to have a lasting effect into the next

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[16] Zacks Equity Research, Airline Industry Outlook- Sept. 2010 [Online], 2010. Available from : http://finance.yahoo.com/news/Airline-Industry-Outlook-Sept-zacks-4152583590.html?x=0&.v=1.

[17] Steve Rothwell, Airline Rebound Hinges on Growth, Security and Seats, IATA Says [Online], 2010. Available from : http://www.bloomberg.com/news/2010-11-25/airline-industry-rebound-hinges-on-growth-security-and-seats-iata-says.html.

[18] Douglas A. McIntyre, Airline Industry to Post An Improbable Profit [Online], 2010. Available from : http://247wallst.com/2010/06/07/airline-industry-to-post-an-improbable-profit/.

[19] Airlines and Aviation News Resource, 2010 Airline Industry Outlook - Improved Profitability - But Europe Still Lags in the Red [Online], 2010. Available from : http://www.airlinenewsresource.com/article48825_____Airline_Industry_Outlook___Improved_Profitability___But_Europe_Still_Lags_in_the_Red.html.

year. Unemployment remains high while consumers' confidence falls in Europe and North America. Passenger traffic and freight are picking up in Asia, the Middle East and South America but by no means are they expected to sustain the global airline industry. Oil prices are expected to remain at $79 per barrel. The slow down in economic growth implies that prices will be kept in check. Growth is expected to fall to 5% as historically has been. 1,400 aircraft deliveries will be made next year and will account for 6% of the capacity expansion in excess to improvements in demand. Decreases in the load factor means improvements in yield will not be possible for 2011 and the airline industry remains a challenging environment. Profits in 2011 are estimated to be at $5.3 billion and profit margin at 0.9%.[20]

The EU aviation industry of today is a rapidly changing and dynamic marketplace. International extra-EU passenger transport by air into EU per 1000 population was 547 in 2007 and 567 in 2008, both years more than half of EU nationals.[21] Demand for affordable air travel is increasing at a rapid rate. Evidence can be seen in global passenger growth is exceeding IATA's expectations, registering a 20 percent jump for the first six months of 2004.[22] It is also characterized by a combination of former national flag (legacy) network carriers and LCCs. Consumers and our respective economies need both types of service. Low-cost carriers now account for nearly a 30 percent market share in the U.S. and close to 20 percent in Europe. Like Southwest and JetBlue in the U.S., Ryanair and EasyJet are

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[20] Ibid.

[21] Eurostat, International Air Transport of Passengers Per 1000 Population [Online], 2010. Available from : http://epp.eurostat.ec.europa.eu/portal/page/portal/globalisation/indicators.

[22] Jeffrey N. Shane Under Secretary for policy U.S. Department of Transportation, American Bar Association 2004 Annual Meeting Aircraft Financing Subcommittee Atlanta, 2004, 4.

changing the landscape of air travel in Europe with perhaps one important difference – European low-cost carriers face very real additional competition from Europe's expanding high-speed rail network.[23]

Given the close relationship of air travel and economic activities, a small change in the economy could have substantial impacts on both the level and composition of consumers as well as pricing by airlines. Slower growth in the economy, for instance, would primarily result in a decrease in leisure customers and an increase in business travelers with the prior being deterred from air travel while the later who would be fighting with the tighter budget and would take advantage of the low price usually offered to leisure customers. In contrast, if the world economy is doing well, there will be an increase in the number of passengers who travel for leisure and those who travel for businesses' upgrades as well.

The continuing improvements in other modes of transportation, especially high-speed trains being developed in Europe, Japan and the US could also have a negative impact on air transport. Diversion from congested air travel facilities can occur when total trip time by air transport (from actual origin to actual destination) is equal to trip time by train or by road. For up to the distances of 400 kilometers, high-speed trains offer as high or higher door-to-door speed than air transport. Aside from high energy-efficiency of trains over air travel and less noise pollution, rail terminals can handle much more passengers in a smaller space than airports. The buildings of more high-speed railways linking short distances instead of building new airports are being done worldwide. This may in fact benefit air transport by reduction in short distance flights where there are losses in operation so airlines can focus on more profitable, long-haul flights.

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[23] Ibid.

3.7 Operational Environment

The following are issues to be dealt with by airlines operating in the EU. Fuel price and the costs in financing air service operation are monumental. Some issues are being faced by airlines operating in other region as well while some is characteristic of the European market like congestion and bilateral relation in the matured air travel market that is Europe.

3.7.1 Congestion

Air traffic congestion and airport congestion have been causing problems for air transport environment. Due to the increases in passenger numbers over the years there is a need to expand air travel facilities including buying new aircrafts and building new airports. Air traffic estimates for the US in the year 2010 alone shows an increase of up to 240% in passenger numbers. These numbers, it must also be noted, did not include the impact of future environmental regulations. Land-intensive nature of airports added to the problem due to first, the difficulties in acquiring enough land to build extra runways. Second, greater concerns of the adverse effects on the environment, CO2 emissions from plane engines in particular, by air transport and expansion of airports can lead to oppositions from environmental groups.

3.7.2 Bilateral Relations

Globally speaking, bilateral relations are made between countries and airlines to facilitate flying of each individual airline and the respective countries, especially in Europe. Healthy, competitive bilateral relations are encouraged but they can become obstacle for global actions, once it is agreed from all sides, to climate change.

3.7.3 A Single European Sky.

National governments from most countries have been guarding the right to fly over their countries. Numerous bilateral agreements have been signed and put into effect to limit the rights to fly over national airspace and restrict foreign ownership of airlines. Often times these agreements have been made regardless of economic sense.

The average air traffic management costs per flight in Europe are EUR 771, compared to EUR 440 in the US. This is a EUR 5.0 billion competitive disadvantage for Europe that affects everybody who flies or ships goods by air.[24] Reluctance by the member states' authorities to create a single regulatory body to deal with European air transport is slowing down growth and is anti-productive. The European Commission needs support from member states in building a more competitive Europe, where serious performance targets and a modern cost-efficient approach to air traffic management are encouraged.

Liberalizations in air travel have generated more competition including the "open-skies" agreement that allows airlines unlimited traffic into many countries and created the "Five Freedoms" (*see* Appendix C*)* recognized by all parties involve.[25] Unlike the Single European Sky which liberates air traffic within the EU, the Open Skies Agreement frees up the air traffic over the Atlantic so that aircrafts from any city in the EU can fly to any city in the US and vice versa. The current trend towards deregulation and privatization of airlines is very likely to continue as airlines battle to stay in business.

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[24] IATA, Monthly Traffic Results [Online], 2010. Available from : http://www.iata.org/pressroom /facts_figures/traffic_results/Pages/2010-11-25-01.aspx.

[25] David Grossman, Airlines Get Creative To Skirt Foreign Ownership Rules [Online], 2009. Available from : www.usatoday.com /travel/columnist/grossman/2009-10-06-multinational-airlines_N.htm.

3.7.4 Costs

As mentioned earlier, airlines will be forced to invest in new fleet and facilities to keep up with increasing demand. The additional costs incurred during the past 20 years also included aircraft acquisitions, which could add up the airlines' financial burden and offset any benefits gained from efficiencies in operation. National governments that used to subsidize for flag carriers are gradually pulling their funds back and let the market mechanism decide which airline can be most effective while still be able to generate enough profit beyond the break-even point under such tough circumstances.

Progress in technology, however, has been enjoying rapid growth and is hoped to improve the efficiency of airlines and airports' operations on ground control and during flights. These include improvements in aerodynamics, airframe structure, engines and electronics as well as information technology and air traffic control equipments. As a result, air traffic in 2009 was expected to be 40% more fuel-efficient than it had been in 1989, reducing the industry's fuel-dependency and effects due to the fluctuating fuel price. Cost-savings will also be achieved in other areas like maintenance, as new planes require less attention than older ones.[26] According to a reliable source, the EU ETS is expected to add €3bn to costs by 2012.[27]

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[26] Airports Council International, New ACI Europe Report Hints At Slow Recovery in 2010 [Online], 2010. Available from : http://www.centreforaviation.com /news/2010/06/30/new-aci-europe-report-hints-at-slow-recovery-in-2010/page1.

[27] Dr. Kevin Michaels and Jonas Murby, Air Transport Demand Growth At An Inflexion Point? [Online], 2010. Available from : http://www.aerostrategy.com/downloads/speeches /speech_86.pdf.

3.7.5 Fuel

Fuel is indispensable in an aircraft's operation. The oil shock in the 70's to the more recent one in 2008 illustrates how important they are to aviation. Some airlines chose to push the additional costs to their consumers while some streamline their operation and reduce weight of their aircrafts in every way possible. The choice of routes taken by an airline is also a factor that helps to reduce fuel used.

The rise in fuel prices affect the airline is two-fold; the cost of fuel has a more obvious and direct impact on the cost of operation but the increases in the costs of fuel have in the past and continues to trigger economic recessions, which in turn result in a substantial decline in demand for air travel and air cargo.[28] Euro-zone countries are highly dependent on oil imports and would suffer the most in the short term if there is an increase in oil prices. According to the latest statistics from the General Aviation Bureau, the cost of fuel has accounted to 31% of the cost of major business of airline companies in the first half of this year (2010) from 22% due to the fuel price surge.[29]

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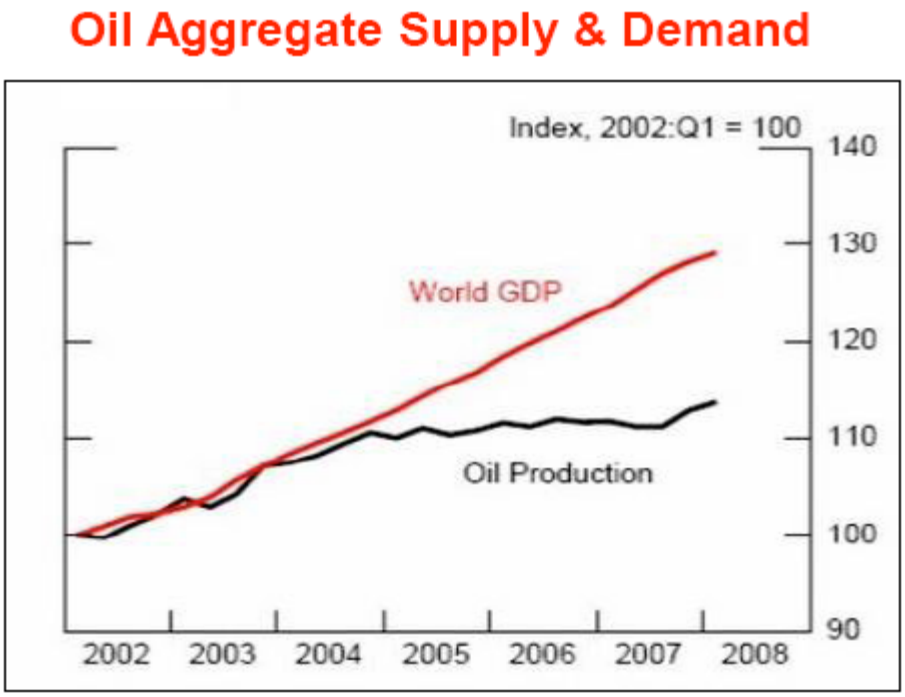
[28] Sarah Algoe, How a rise in fuel prices affect the airline industry [Online], 2010. Available from : http://hubpages.com/hub/rise-in-fuel-prices-airline-industry.

[29] Ibid.

Figure 3.4: Aggregate (World) Oil Supply and Demand



Source: AeroStrategy[30]

The graph above represents the total global demand for oil. From the chart one can gather that, historically, oil prices had been on the rise and seemed to be correlated to world GDP before it leveled off in 2004 and oil production level more or less has been remaining at approximately the same level since. The price of oil, however, still fluctuates with the times and, while the majority of oil used in the EU is from imports, this can lead to lower profit margin. With oil prices rising to over $70 per barrel during the current global recession experts expect the price to climb to $100 per barrel in the long run.

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[30] Dr. Kevin Michaels and Jonas Murby, Air Transport Demand Growth At An Inflexion Point? [Online], 2010. Available from : http://www.aerostrategy.com/downloads/speeches /speech_86.pdf.

A new aviation market structure is emerging in Europe, as network carriers remain under pressure to revise their business models and low-cost carriers continue to grow to become a threat. With airlines increasingly able to flexibly deploy and relocate their aircraft and crews at the most competitive location, airports need to focus on the long term and invest in new infrastructure in order to accommodate the expected traffic growth in the coming years. Access to finance, a supportive regulatory environment an constructive collaboration with the airlines are therefore fundamental to tackle the challenges of the years ahead and to contribute to a sustainable growth of the aviation sector in Europe.[31]

Given these current conditions, the airline industry in the EU (see appendix D for list of airlines of Europe) and those with different nationalities that operate within EU (Asian airlines included) will have to pay attention to possible regulations that can affect their operations. Advances in aviation technology will help improve passenger flow and safety, delaying a new facelift for air terminals and airlines. The next deadline will be in 2012, the beginning of emission trading regime where airlines will be tested on how well, or rather how efficient, their operations are under the EU's pressure to reduce emissions.

Sustainability and environmental responsibility will hopefully be achieved through the EU ETS scheme and other similar regulating mechanisms as airlines are doing everything they can to create a sustainable environment for themselves in air traffic. This is the same for Asian airlines operating in Europe who will also have to be held accountable for the GHGs they release into the atmosphere. Current conditions in the European air travel market serve as an example for the Asia-Pacific region where the fastest growth in air transport is

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[31] Airports Council International, New ACI EUROPE report hints at slow recovery in 2010 [Online], 2010. Available from : http://www.centreforaviation.com/news/2010/06/30/ new-aci-europe-report-hints-at-slow-recovery-in-2010/page1.

expected, especially in China and India, of the steps it takes to develop a sustainable and competitive environment and the support needed to achieve the goals in emission reduction set for them by the European Commission.

CHAPTER IV

REGULATIONS BY THE EUROPEAN COMMISSION AFFECTING AIR TRANSPORT TO AND FROM THE EU

The EU's involvement in climate policies began over 2 decades ago. It began with concerns over scientific report of the IPCC. While responses from other industrialized countries were lukewarm at best the European Council had adopted a target to stabilize CO2 emissions at the 1990 levels by the year 2000 and called for other industrialized countries to adopt early targets for GHG limitations. Later that same year the UN General Assembly established the Intergovernmental Negotiating Committee (INC) to negotiate a convention addressing climate change.[1]

The next period the efforts continued in what looks to be a flurry of EC and national initiatives to implement the set objectives. The initiatives included the *Special Action Programme for Vigorous Energy Efficiency (SAVE)*, a framework directive on energy efficiency; *ALTENER*, a program to promote alternative and renewable energy; and the establishment of a mechanism to monitor EU-wide GHGs emission. These initiatives were to complement the combined package of the carbon and energy tax seen as the main driver for the EU to achieve its stabilization target.[2] The tax fell short of gaining approval from some member countries that view the plan as unacceptable despite the Commission's effort to convince them otherwise.

Aviation's share of overall EU greenhouse gas emissions is still modest at about 3%, but its growth, faster than any other sector and risks undermining progress achieved through

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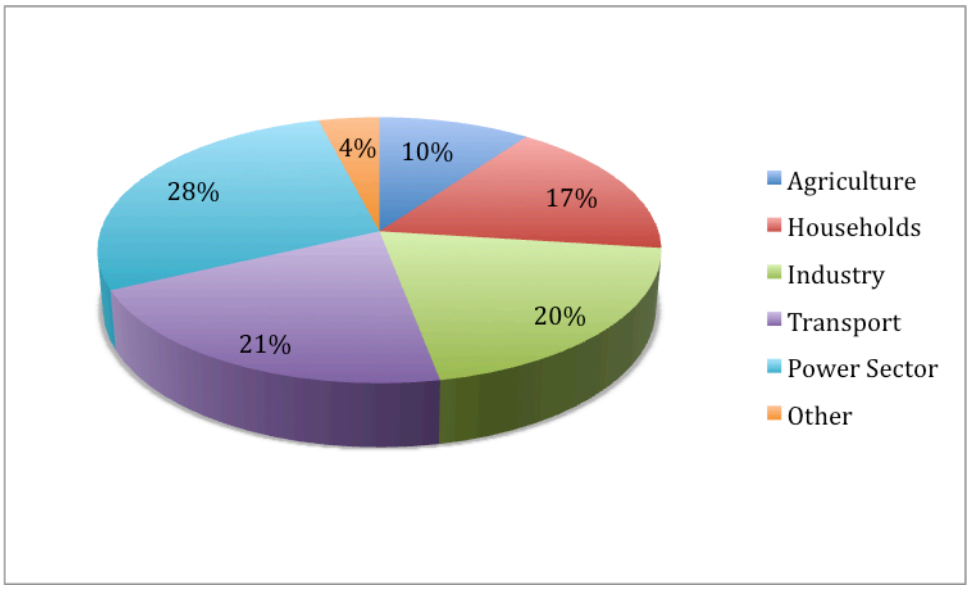
[1] Ibid. , 48-49.

[2] Ibid. , 49.

emission cuts in other areas of the economy, worries policy makers. EU emissions from international flights grew by 73% from 1990 to 2003. This increase could rise to 150% by 2012 unless action is taken. Such growth would cancel out more than a quarter of the 8% reduction in total greenhouse gas emissions that the Kyoto Protocol requires the EU-15 to achieve between 1990 and 2012. The chart below shows how emissions from transport is ranked only below the power sector and together with emissions from industry account for 41% of all EU's emissions.

Figure 4.1: Emission Released from various sources in the EU



Source: European Environment Agency

It can be seen from the chart above that transport is responsible for almost one-fourth of the CO2 emissions being released in the EU and the growth is projected to continue if no actions are taken. In 19 of the 25 Member States Emissions from all flights departing from EU airports alone exceed total verified emissions from activities covered by the EU Emissions Trading Scheme (EU ETS). Emissions from aviation are also higher than from certain other entire sectors covered by the EU ETS, like refineries and steel production,

which are heavily blamed for CO2 emissions.[3]

Preliminary estimates based on modeling exercises by the Commission suggest that the impact on ticket prices would be modest and will range between zero and an increase of up to €9 per return flight within the EU. This level of increase will only slow down aviation demand slightly than otherwise. Any effect on tourism or peripheral regions relying on aviation is likely to be very limited.[4]

The Kyoto Protocol was the initial reaction of world governments toward the report on impacts on the environment by the IPCC. The Copenhagen Accord was the following consensus after the protocol has expired. Carbon tax, an idea born to the Commission after examples of the measure in the Scandinavian countries, will be discussed even though the plan has been rejected. As for the ETS scheme that will start in 2012, which will directly affect air travel in the EU, preparations are being made both by the airline industry and the European Commission, who will be overlooking the scheme. Each airline has their own strategy to cope with the regulation and the EU Commission is keeping their eye on implementing the policy and making sure all airlines despite of their nationalities will be treated equally under the scheme at both the national (each airline will be registered to the authority of one of the member countries) and then report to the Community level (enforcements will be carried out by the European Commission). Other related regulations with the same objective to reduce carbon emissions are climate and energy package that combine concerns for climate change with alternative and sustainable energy to make Europe a truly carbon-free society.

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[3] Ibid.

[4] COM (2005) "Climate change: Commission proposes strategy to curb greenhouse gas emissions from air travel".

Despite its failure the Kyoto Protocol brought the issue of climate change to the attention of world leaders and environmental groups; non-renewable energy policy and renewable energy policies were passed as an effort to reduce reliance on oil and decrease CO2 emissions from burning fuel while exploring new sources of alternative 'clean' energy to replace fossil fuel including jet fuel.

4.1 Kyoto Protocol

The Kyoto protocol gave an objective for industrialized countries to reduce emission of greenhouse gases by an average of 5.2% between 1990 and 2012. The EU's 15 member states at the time went further and committed to 8% reduction in emissions. Emission trading and other flexible market-based mechanisms were put in place to achieve the reductions at the least cost and provide incentives for clean energy projects in developing countries and economies in transition. Most countries that have joined the EU since 2004 have their own individual targets negotiated under the Protocol. The European Climate Change Program (ECCP), managed by the European Commission, was set up to develop European-level policies and lay down measures to reduce GHGs. These are made to complement actions each EU member takes at home. Currently the EU-15 countries have not met their target goal of 8% yet but projections show possibility of success if the actions planned are put to the test. So far the EU has had some success in breaking the link between economic growth and greenhouse gas emissions[5].

[5] COM (2008) "Combating Climate Change: The EU Leads the Way", 10.

Table 4.1: Emissions and commitments in the Kyoto Protocol.

Country		Commitment (% below 1990)	1995 emissions (%)
Australia		+8	+4.9
Canada		-6	+6.3
European Union*		-8	-2.3
Japan		-6	+6.5
United States		-7	+4.3
	Base yr		
Czech Republic	1990	-8	-19.1
Hungary	1985-8	-6	-24.1
Poland	1988	-6	-19.1
Romania	1989	-8	-27.12
Russia	1990	0	-22.7
Ukraine	Tbc	0	-35.6

Source: see[6]

Table 4.1 shows the commitment numbers by percentage of emission in 1990. Next column are the real numbers they have actually achieved in 1995. Pluses and minuses sign indicate the differences between committed level and the actual number that have been achieved. Some countries are allowed different base years due to the developing stage of their economies.

One of the problems of the Kyoto protocol is a gap between signing a treaty and getting it ratified by national legislature. As of 2009, the US had not yet ratified the Protocol

[6] Michael Grubb and Joyeeta Gupta, Climate Change and the European Leadership: A Sustainable Role For Europe? (The Netherlands: Kluwar Academic Publishers, 2000), 8.

and the chance that it would is very much in doubt. The problem of ratification brings up the skepticism regarding the seriousness of the problem and the hidden political motives behind them. Second problem is related to the first: whether countries put their commitments to implementation. Arguments abound that some countries may not have the ability to do so and that the problem requires a change in lifestyle and the need for new technologies some countries may not yet possess. Only few countries have a coherent strategy that is accepted across political hierarchies. Questions about national implementations, specifically in the energy sector, remain at large.[7] Third problem is about the plan itself. Many question the role of institutional structures agreed by Kyoto. Finally, there are areas of the issue that have not been significantly developed. The inclusion of developing nations in the agreement is one that requires both deepening in policy of existing members and some success demonstrated by the plan. The overall compliance mechanisms still remain to be addressed.[8]

The Law of Treaties under the Vienna Convention require countries that have signed a joint agreement to refrain from actions that would defeat the objective and purpose of the Treaty pending ratification.[9] The Kyoto Protocol is still being fiercely debated in the US where Congress opposed measures that will likely lead to implementation of the protocol. Given also the uncertainty that remains regarding rules and their implementation, the regime is still in a formative stage where it is under threat from parties that oppose taking action.

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[7] Ibid., 9.

[8] Ibid., 10.

[9] Ibid., 17.

In March 2007 the EU heads of state and governments made a commitment to cut down 30% of their emissions from 1990 levels in the spirit of global cooperation, provided other developed countries also make the comparable contribution to stop global warming.[10]

4.2 The Copenhagen Accord

Delegations at the Copenhagen Accord have agreed that climate change is a real threat and agreed with the scientific community that the threshold of 2 degrees Celsius increase in global temperature should not be reached and the objective has to be consistent with science and on the basis of equity. The Accord sees the need to include international support. According to the Accord, eradication of poverty reserves high priority and goes hand in hand with sustainable development and low-carbon strategy. It was agreed that deep cuts in global emissions should be made. Annex I countries that are parties to the protocol should further strengthen their emission reduction commitment they have made at the Kyoto Protocol. Non-Annex I countries were urged to take action voluntarily. Reports should be submitted every 2 years through the National communication consistent with Article 12.1(b) to be verified, measured and reported in accordance to the guidelines provided by the Conference of Parties. The Accord recognizes the crucial role in carbon dioxide removal of forests and emissions that came from deforestation and degradation. Approaches to mitigate climate change will be varied and there will be the use of market mechanisms to ensure that the actions put the least financial burden on national economies. Developed nations are to provide USD30 billion to provide new and additional resources through forestry and investments in international institutions for the period of 2010-2012 with balanced allocation of funds between mitigation and adaptation. Developed countries will commit to a goal of

[10] COM (2009) Pamphlet 29, 9.

jointly mobilizing USD 100 billion dollars a year by 2020 to address the needs of developing countries. Such funding will come from a variety of sources, public and private, bilateral and multilateral, including alternative sources of finance. A High Panel will be established under the guidelines of and accountable to the Conference of Parties. Their tasks include locating new sources of revenue to contribute to the fund against climate change to make sure the emission target is met. The Copenhagen will be managed using financial mechanisms of the Conference to support activities in developing countries related to mitigation including REDD-plus, adaptation, capacity- building, technology development and transfer. Technology Mechanism will be established for the purposes of accelerating technology development and transfer to support mitigation and adaptation. The effort will be guided under a country-driven approach based on national circumstances and priorities. The assessment of the implementation of this accord will be completed by 2015.[11]

4.3 Carbon Tax

Carbon tax will not be implemented as mentioned above but its inclusion in this section is necessary to give a more complete picture of the evolution of climate change policies. It is necessary to add that the possibility of the carbon tax being implemented in the future is there and airlines should ready themselves for this as well as how they are preparing themselves for other climate change policies.

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[11] United Nations Framework Convention on Climate Change, Draft decision -/CP.15 Copenhagen Accord (Conference of the Parties fifteenth session 7-18 December 18, 2009) [Online], 2009. Available from : http://unfccc.int/resource/docs/2009/cop15/eng/l07.pdf.

Traditionally tax has always been the symbol of national sovereignty.[12] Doubt remains on the likely impacts and legitimacy of climate change regime and about the impacts of climate change itself since it would be very difficult to measure the effectiveness of climate change policies on the global scale. Human-induced climate change is unprecedented and it would be very difficult to predict the outcome.[13]

In the past, in most of the EU member states (with the exception of the Scandinavian countries), the pressure of economic growth in the EU had out-weighted the need to save the environment. Integration efforts have its negative effects on the economy due to differences in economic conditions between existing members and new ones where economic stability and growth took priority. That belief is now shifting towards the idea of sustainability where economic effects on the environment are incorporated into the overall costs of running businesses and making profit. The European Commission and other actors in the Committee have come to view taxes levied on environmentally damaging agents as a sensible means to achieving sustainability.[14]

Since the early nineties individual or groups of countries in the industrialized countries have begun to impose tax control on energy products. Examples include carbon taxes in the Scandinavian countries, carbon/energy and energy taxes in the Netherlands, the energy charge in Belgium, and the carbon/energy tax proposal adopted by the European

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[12] Nadine Gouzée and Stéphane Willems, "Carbon/Energy Tax For Sustainable Development" Environmental Policies and Societal Aims 2, 1999, 58.

[13] Anthony R. Zito, Creating Environmental Policy In the European Union (Great Britain: Macmillan Press Ltd., 2000), 121.

[14] Ibid. , 90-91.

Commission.[15] The EU proposed utilizing 'economic instruments to ensure that market prices give appropriate signals to consumers and businesses to limit and reduce emissions of greenhouse gases.[16] According to Zito, the use of market efficiency principles in assigning a price equal to marginal environmental damage per unit of pollution created:

1. Flexible means for polluters to control their own emission
2. Costs equal to the amount of pollution, fair and discriminatory
3. The need for less information on the part of regulators
4. The plan itself represents the continuing economic incentive to reduce GHGs through new technology and innovative use of resources
5. Taxes have less potential to become an issue to co-opt the regulator
6. Tax revenue is versatile and can be spent in many ways to support climate change policy and implementation.[17]

Carbon tax by definition means an excise tax on the carbon emitted in the manufacturing process of a product. The carbon content from the fossil fuels used will determine the price businesses have to pay and it is only restricted to carbon-based fuels. Instead of a fixed charge the EU Commission had decided to charge by marginal damage per unit of pollution emitted. This approach makes better sense than to levy taxes on energy use because different types of fuels release different amounts of carbon emissions so calculating

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[15] Nadine Gouzée and Stéphane Willems, "Carbon/Energy Tax For Sustainable Development," Environmental Policies and Societal Aims 2, 1999, 36.

[16] United Nations 1997b: 49.

[17] Anthony R. Zito, Creating Environmental Policy In the European Union (Great Britain: Macmillan Press Ltd., 2000), 90.

marginal costs of carbon across a range of fuels is a more direct way of trying to reduce CO2 emissions while minimizing costs.[18] Carbon tax is a way for government to retain some control over emissions by adjusting the tax rates progressively according to emissions forecasts. Emissions limits could be allocated to larger firms while carbon tax could be levied on small businesses and individuals.[19]

The carbon tax is obtained by multiplying the emission volume during flight to the per unit price of carbon. For example, a Boeing 747 flying from Shanghai to London will be taxed over €10,000 based on the carbon prices of €14.4 per unit at the time. Emissions target is tied with energy objectives to turn the EU into a highly energy efficient and low-carbon economy.

The energy-intensive industries are alarmed, believing that the carbon tax would raises costs and reduce their competitiveness and have been lobbying very hard against the effort to reduce emissions. In fact, the lobbying activities on the climate/energy policy have been and still are the most intense in EU's history.[20] Competitiveness, however, depends on many factors other than production costs alone[21] and the carbon/energy tax will only make sense when it is applied, and coordinated on a global scale for it to have enough impact.[22]

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[18] Lucas Assunção and ZhongXiang Zhang, Domestic Climate Change Policies and the WTO, United Nations Conference on Trade and Development discussion papers No. 164 November 2002, p. 14.

[19] Nadine Gouzée and Stéphane Willems, "Carbon/Energy Tax For Sustainable Development," Environmental Policies and Societal Aims 2. (1999), 49.

[20] Anthony R. Zito, Creating Environmental Policy In the European Union (Great Britain: Macmillan Press Ltd., 2000), 118.

[21] Nadine Gouzée and Stéphane Willems, "Carbon/Energy Tax For Sustainable Development," Environmental Policies and Societal Aims 2,(1999), 55.

[22] Ibid. , 37.

Some fear the uneven distribution of carbon/energy tax would cause national macro-economic shocks where some would gain and other lose. Technical progress will serve as a buffing zone of macro-economic shocks in the short run. In the long run, they can also become beneficial if their prices come down. With respect of the same principle, countries should not attempt to gain from levying the tax at the expense of its neighbors nor carbon/energy tax should increase poverty. Compensatory measures for low-income households are therefore needed. The current debate, it must be noted, represents heightened concerns and awareness toward environmental issues, which form the core of sustainable development.[23]

Even though small European countries had already adopted and implemented specific taxation measures of their own on the energy-intensive industry, these may prove to be obstacles to carbon/energy tax on the regional and global scales. They can distort competition within the same national industry or between nations that adopt a different system.[24]

4.4 The EU Emissions Trading Scheme (EU ETS)

The EU ETS has been operating for 6 years and will be extended to include aviation from 1 January 2012. The policy is important and it enables the EU to meet its climate change goals as agreed in the Kyoto Protocol in a cost effective way and it also provides a model for the introduction of emissions trading that other States may seek to emulate.[25]

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[23] Ibid. , 40.

[24] Ibid. , 55.

[25] Mrs. Delphine Brissonneau, Programme Officer, Representative at European Delegation, 2010.

The Emissions Trading Scheme or the EU ETS actually started on January 1, 2005 and did not include aviation--domestic nor international. Prior to the date the EU ETS covered only energy and carbon intensive industries. Emissions from domestic flights in developed country were kept under control according to each nation's commitment under the Kyoto Protocol. International air traffic, which makes up the most of the emission, was excluded. The Kyoto Protocol places international aviation emission control including reduction and limitations to the International Civil Aviation Organization (ICAO), whose job was to deal with global aviation matters. Another way aviation did not help in fighting global warming was the jet fuel used in international operation was historically tax-free. With this given situation the Commission has done extensive analysis to come up with a way to reduce and limit international emissions at the least cost.

After much analysis and many alternative solutions to reducing emission as well as consultations from the wide-ranging groups of stakeholders the Commission announced in September of 2005 to put the aviation under the EU ETS scheme as the scheme will result in reduction of emissions at the least cost to the economy and most effective in reducing global emissions.[26] The scheme is also in line with ICAO's emissions trading following by endorsements from the Council of Ministers and the Parliament. The Commission then proposed that aviation be brought under the EU ETS scheme.[27]

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[26] Europa Press Releases Rapid, Questions and Answers on Aviation and Climate Change [Online], 2006. Available from : file:///Users/Nannie/Downloads /EUROPA%20-%20Press%20 Releases%20-%20Questions%20&%20Answers%20on %20aviation%20&%20climate %20change.webarchive.

[27] Ibid.

According to the interview with the programme officer at the EU Delegation in Bangkok, the EU ETS should have limited impact on competition in the aviation industry. It has been designed in such a way to minimize impacts on competition by applying to all carriers that operate on route within and to and from the EU, irrespective of nationality. Those airlines with the most fuel-efficient fleet and operating practices should benefit slightly more than those operators with older aircraft.[28]

In terms of legitimacy, the EU ETS is in line with the 1944 Chicago Convention, which states that airlines have to comply with the regulations of the countries it came from or going to: reporting emission and surrendering allowances are included. The scheme costs the least and creates the most impact on carbon emission compared with other methods like taxes or surcharges. The rationale is to reduce more emissions and do it with the least cost or more impact on the reduction with the same cost. Impacts on ticket prices and other charges on the customers, airlines and the overall economy will be minimized while maximizing environmental improvement.[29]

Under Directive 2008/101/EC, which was an amendment by the Parliament and the Council on Directive 2003/87/EC to include aviation in the ETS scheme legitimize emission trading program for all airlines flying into, depart from, have connecting flights in EU airports.[30] Very light aircrafts, military aircrafts, police, customs and rescue flights, flights on state and government business, testing and training flights will be exempted from the

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[28] Interview with Mrs. Delphine Brissonneau, Programme Officer, Representative at European Delegation, 2010.

[29] Ibid.

[30] Europa Website, Aviation and Climate Change [Online], 2010. Available from : http://ec.europa.eu /environment/climat/aviation /index_en.htm.

scheme.[31]

The allocation of allowances to each airline is based on common practice in the form of harmonized efficiency benchmark where each operator will be allocated with emission allowances according to their overall share of passengers and cargo on routes covered by the scheme.[32] Should they exceed the limit they will either have to change their operation methods to ones that releases less GHGs or they will have to buy emission allowances from a more efficient business who has not exceed their allowances and put them for sale in the market. This will include businesses in other sectors as well. Under the Kyoto Protocol clean development mechanism (CDM) and joint implementation (JI) agreement companies in the EU are allowed to buy carbon credits from successful emission-reducing companies outside of the EU beginning in 2012. This will help with reducing emissions in other countries as well.[33]

Under the EU ETS, large emitters of carbon dioxide within the EU must monitor and report their CO_2 emissions annually and are obliged every year to return equal amount of emission allowances of their CO2 emissions in that year. Emission allowances for any plant operator subject to the EU ETS are given out for a sequence of several years at once in order to neutralize annual irregularities in CO_2-emission levels that may occur due to extreme weather events (such as harsh winters or very hot summers). Each such sequence of years is

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[31] The Europa Website, Questions & Answers On Aviation & Climate change [Online], 2006. Available from : file:///Users/Nannie/Downloads/EUROPA%20-%20Press%20Releases%20-%20Questions%20&%20Answers%20on%20aviation%20&%20climate%20change.webarchive.

[32] Europa Press Release RAPID, Questions & Answers on aviation & climate change [Online], 2006. Available from : file:///Users/Nannie/Downloads/EUROPA%20-%20Press%20Releases%20% 20Questions%20&%20Answers%20on%20aviation%20&%20 climate%20change.webarchive.

[33] COM (2008) "Combating Climate Change: The EU Leads the Way", 12.

called a Trading Period. The 1st EU ETS Trading Period expired in December 2007 and it had covered all EU ETS emissions since January 2005. With its termination, the 1st phase of EU allowances became invalid. Since January 2008, the 2nd Trading Period is under way and will remain valid until December 2012. Currently, the installations get the allowances for free from the EU member states' governments under plant-by-plant basis. An operator may purchase EU allowances from others (installations, traders, the government) as well. If an installation have more allowances than they need they can sell them to anybody.

As for airlines operating in or between EU airports, they will be obliged to report the fuel used each year and multiply it by a standard emission factor (roughly 3 times the amount of fuel consumed[34]). Actual data on fuel intake of each flight will be used, if it is available. If such data cannot be obtained or available an alternative standardized method for calculating fuel consumption will be used. Each aircraft operator is responsible for reporting its fuel consumption to the designated member state within March 31 of the following year where it will be verified by verifiers to ensure their accuracy.[35]

Emitters covered by the EU ETS may satisfy their commitments by surrendering allowance in an amount equal to their emissions or may supplement the EU-ETS allowance with Joint Implementation (JI), which allows airlines and companies to join hands with other Annex I countries in environmental projects that help reduce CO2 emissions.

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[34] Interview with Ms. Vichuda Sthalanand, Department Manager for Aviation Pollution/Emission Trading, 2009.

[35] Europa Press releases RAPID, Questions & Answer on aviation and climate change [Online], 2006. Available from : file:///Users/Nannie/Downloads/EUROPA%20-%20Press%20Releases%20-%20Questions%20&%20Answers %20on%20aviation %20&%20climate%20change.webarchive.

Clean Development Mechanism (CDM) credits created for non-Annex I countries (developing economies including Thailand) by businesses and airlines through launching domestic projects contributing to reducing of CO2 in their respective home countries. They will also be allowed to sell unused credits for that year to other businesses as well.[36] The credits from CDM and JI projects are not allow to be exchanged for EUAs until 2012.

The ETS scheme follows the framework of the Kyoto Protocol in implementing environmental projects to earn more ETS credits, the difference being the status of Annex I and non-Annex I countries. Under Article 6 of the Kyoto Protocol, any Annex I country (*see Appendix A)* can invest in emission reduction or emission removal projects in any other Annex I country to earn Emission Reduction Units (ERUs). An Annex I countries are those that have agreed to fulfill their obligation to reduce CO2 emission reduction commitment under the Kyoto Protocol, this way Annex 1 countries will be able to find the most cost-effective ways to fulfill their commitments under the Kyoto Protocol.[37]

The credits earned for emission reduction in the JI projects are called Emission Reduction Units (ERUs). One ERU unit represents an emission reduction equivalent to one ton of CO2. In the EU ETS, a participant with an ERU can exchange it with the national authority for EUA allowance.

Under Article 12, Non-Annex 1 countries can earn credits for investing in emissions reducing or emissions removal projects in developing countries through the Clean

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[36] Janaki Ramakrishnan, EU ETS – An Introduction [Online], 2008. Available from : http://www.internationalprofs.org/iesc/index.php?option=com_content&view=article&id=118:eu-ets&catid=908:eu-ets&Itemid=88.

[37] Ibid.

Development Mechanism (CDM), where all other businesses in non-Annex I countries including airlines from non-Annex I countries, can also take part. The credits earned for CDM projects are called Certified Emission Reduction Credits (CER) and one unit of CER is equivalent to one ton of CO2 emission reduction. The flexibility of the scheme allows CERs to be traded for EUAs.

It must be noted, however, that each member state has their own limits in using CERs or ERUs to pay for their emission. Germany, France, the Netherlands and the UK for example, put their limits of CERs and ERUs being used for allowances at 22%, 13.5%, 10% and 9.3 for large electricity producers and 8% for all other installations respectively. Germany and France will keep at this level from 2008-2012 while the Netherlands and the UK will increase the limit to 11% from 2008-2020. [38]

Enforcement of the EU ETS scheme for aviation is no different from other sectors of the economy participating. If an operator fails to surrender sufficient amount of allowances for that year it will be subject to a fine of €100 per each ton that their allowance cannot cover. The fine will be given to the national authority responsible for that airline where it will be used in the fight against global warming. In addition to fining, the operator will no longer be able to sell their allowances. The most extreme of punishments comes in the form of revoking or suspending authorization to operate within the EU by the administering member state.[39]

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[38] Martin Brechter, Which CERs will the EU Accept After 2012? : To What Extense Will Airlines Be Able to Use CERs Under the EU ETS? [Online], 2011. Available from http://www .tgo.or.th/download/seminar/presentation/310111/CERs_TGO.pdf.

[39] Europa Press releases RAPID, Questions & Answer on aviation and climate change [Online], 2006. Available from : file:///Users/Nannie/Downloads/EUROPA%20-

Directly effected by market mechanisms the price of allocation for carbon emission does fluctuate with the times. The recent financial crisis in 2009 meant that investments and productions in the cement, energy, and construction sectors were facing with a low demand. This means that they will produce less and will release less emission as a result. This leads to a deep fall in the price of carbon emission, €39.20 in 2006 to €10.81 in 2009. The price somewhat recovered at €12 per ton at the time **Table 4.2** came out. Inclusion of aviation into the EU ETS scheme is projected to have no impact on allowance price.[40]

Table 4.2: Carbon Price Fluctuations

AC Type	Flight Time	Fuel Use/t	CO2/t	High 04-06	Low 01-09	2009	Exp DEC-2012
737-800	1 hour	2.2	6.9	228	75	80	173
737-800	3 hours	9.5	29.9	985	323	345	748
747-300	4 hours	41.1	129.5	4,259	1,400	1,493	3,237
747-400	7.5 hours	73.3	230.9	7,596	2,469	2,662	5,772
747-400	13.5 hours	131.6	414.5	13,638	4,481	4,780	10,364
Actual Fuel Consumption From Selected Flight/carbon price:							
				32.9 EUR/t	10.81 EUR/t	11.5 EUR/t	25.00 EUR/t

Source: Green Aviation International[41]

The first column specifies the type of aircraft while the second gives the duration of the flight that aircraft type operates. The next column renders the amount of fuel used by that aircraft. The CO2 level resulting from fuel burning (roughly times three the amount of fuel used) is shown in the next column. The next two columns represent the amount of emissions

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%20Press%20Releases%20-%20Questions%20&%20Answers %20on%20aviation %20&%20climate%20change.webarchive.

[40] European Commission, European Commission Climate Action [Online], 2006. Available from : http://ec.europa.eu/clima/faq/transport/aviation/index_en.htm.

[41] Green Aviation International, EU ETS [Online], 2010. Available from : file:///Users /Nannie/Downloads/greenaviation.webarchive.

released times the current price of carbon emission at the time from the highest level from 2004 to 2006 and lowest level from 2001 to 2009. The second to last column shows the current (2010) price times the amount of carbon released and arrives at the level each aircraft is responsible for in 2010. Finally, the last column represents the amount of emission credits due in December of 2012. Right at the bottom are prices used to calculate the results in each column. From the table it can be seen how much emission prices affect the amount airlines have to pay.

It is expected that this scheme will lead to installations cutting emissions where they are the cheapest so they will cause minimum impact on the economy. This scheme could also lead to new technologies to further reduce emissions.

Phase I

Phase I of the EU ETS started from 1 January 2005 and lasted until 31 December 2007 and did not include aviation. The announcement to include aviation into the scheme was made in September of the same year but the actual implementation will be in effect from 2012 onwards. It was considered a trial phase covering only emissions of carbon dioxide emissions from energy intensive activities (combustion installations with a rated thermal input exceeding 20MW, mineral oil refineries, coke ovens), production and processing of ferrous metals, mineral industry (cement clinker, glass and ceramic bricks) and pulp, paper and board activities.[42]

The carbon dioxide emissions were capped at 2.1 billion tons per year, covering more than 10,000 facilities in 27 EU member countries. Private marketplaces for trading the EUAs,

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[42] European Commission, European Commission Climate Action [Online], 2006. Available from : http://ec.europa.eu/clima/faq/transport/aviation/index_en.htm.

developed quickly to seize the opportunity to be firsts in the market and be prepared for the future. A spot market was launched in 2005 just prior to the launch of the first national registries. Exchange-based futures trading began in the middle of the year.[43]

Trading volumes were small in 2005 at 321 MtCO2e (million tons of CO2 equivalent) but have grown rapidly since. In 2006, the trading volume increased four fold and ended at 1101 MtCO2e. The EU ETS trading volume was about 2061 MtCO2e in 2007. According to the World Bank, global carbon markets were worth $64 billion (€47 billion) in 2007, up from more than $31 billion in 2006. Transactions of 2.9 billion tons of CO2e had occurred and the EU ETS was accounted for 70 per cent of the volume and over 78 per cent of the value.[44]

Establishments covered by the EU ETS phase I submitted their verified emissions data to Member State registries, which in turn forwarded it to the Community Independent Transaction Log (CITL). According to the information received by the CITL from national registries, the total amount of verified emissions from EU ETS establishments in the EU-25 (excluding Malta), a 1.9% increase in emissions had occurred from the period of 2005 to 2007. Trading and tracking only carbon emissions in the trial phase simplified data and technology requirements.[45]

One of the most significant criticisms of Phase I of the EU ETS has been the way the EUAs have been allocated. The unavailability of quality data at the start of Phase 1 was to blame. In the "trial phase", 95% of allowances must be allocated freely and 5% can be

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[43] Ibid.

[44] Ibid.

[45] Ibid

auctioned. Only Denmark chose to auction the full 5%. The allocation of emission allowances was not set centrally, but by the NAPs (National Allocation Plans) of the 25 individual member states (excluding Malta). Although these NAPs were subject to the approval of the Commission, the total EU allocation was an outcome of decisions made at different levels, making it difficult to ensure scarcity of allowances.[46]

Many experts believe that "banking" or "borrowing" allowances should be made available across trading phases and that allowances are assets that can have significant value. Currently, facilities can "bank" (save some allowances for the next year) or "borrow" (use some of next year's allowances now and not have them available next year) within each phase. But when the allowances became invalid at the end of Phase I issues of asset management for those required to hold allowances will be raised.[47]

Phase II

Phase II of the EU ETS began in January of 2008 and will last until December 2012 when aviation will be included. This phase is also known as the "commitment period" for meeting emissions target under the Kyoto Protocol. Like the "trial period" the "commitment period" also covers only CO2 emission. But member states can "opt-in," or include reductions of other greenhouse gases. The Netherlands, for example, has "opted-in" NO2 as well for Phase II. As with phase I, majority of allowances will be allocated freely: 90% allowances to be allocated freely and 10% to be auctioned. An amendment to the ETS directive, known as the Linking Directive, allows companies in the second trading period to

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[46] Ibid.

[47] Ibid.

use credits from Joint Implementation (JI) and the Clean Development Mechanism (CDM), up to a certain proportion of their allocation of emission allowances. During this phase, airlines will be able to submit their allowances obtained from environmental projects. Annex I countries may submit their ERUs while non-Annex I countries may submit their CERs, both units being equivalent in terms of value per 1 ton of CO2 emission released and can be exchanged for the EUAs.

Three non-EU members -Iceland, Norway and Liechtenstein have joined the EU ETS scheme for the 2008-2012 period. The NAPs for phase II were approved by the Commission on November 29th, 2006. An amendment to the EU ETS Directive has been agreed in July 2008. There will be two steps in bringing the aviation sector into the EU ETS system. The first step will occur in 2011 where domestic and international flights ***between EU airports*** will be subject to the scheme. Beginning in 2012, ***all*** domestic and international flights ***to or from anywhere*** in the world to and from EU airports will be included.[48]

Phase III

Phase III of the EU ETS will run from 2013 to 2020. According to the European Commission's decision, the third-phase of the EU Emissions Trading Scheme emission allocations will be cut by 21% from what they were in 2005. The plans for phase III of the ETS include cutting greenhouse gas emissions by 20% below 1990 levels and 20% of power will come from renewable sources. The proportion of total EU emissions covered in the ETS will rise to 50% from around 40%.[49]

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[48] Ibid.

[49] Ibid

The National Allocation Plans (NAPs) will be abolished in favor of one EU-wide emissions allocation under Phase III, with each installation's individual allocation to be decided by the EC directly. Another development is that starting in 2013, 60% of the EUAs will be auctioned, up from the 10% for phase II. This percentage will be increased later in the phase. Allowances can be "banked" but not "borrowed" from Phase II to Phase III.[50]

On January 2008, the European Commission proposed a number of changes to the scheme, including centralized allocation (no more national allocation plans) by EU authority, a move to auctioning a greater share (60+ %) of permits rather than allocating freely, and inclusion of other greenhouse gases, such as nitrous oxide and per fluorocarbons. These changes are still in a draft stage; the mentioned amendments are only likely to become effective from January 2013 onwards, i.e. in the 3rd Trading Period under the EU ETS.[51]

Fixing emissions limits on the medium term in advance helps strengthen confidence in the investments of large-scale industrial emission reduction technologies including new aircrafts. The EU cap on emissions will be adjusted again as necessary to pair with the global level once a global agreement has been made. It is currently around 6.5% below the level in 2005 and will be 21% lower by 2020.[52] The scope of the system will also be expanded to include big industrial emitters such as the chemical and aluminum sectors whose per fluorocarbons from production will be treated in the same way as CO2 emissions. A single EU-wide cap on emissions will replace the current system of 27 national caps in 2013. Industries covered by the system will no longer receive emissions allowances for free and

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[50] Ibid.

[51] Ibid.

[52] COM (2009) "Climate Change", 4.

have to buy them at a progressively higher price at auctions. According to the plan, close to 50% of allowances will be auctioned in 2013 and the percentage will continue to rise to full auctioning in 2027. At the moment, however, energy-intensive sectors whose competitiveness are judged to be at risk from the reduction in emission will continue to receive up to 100% of their allowances for free in the absence of a global agreement, provided they use state-of-the-art technology. Auctioning will raise new income for governments of member states who had agreed to spend at least half of the revenue in combating climate change at home and abroad. The EU hopes that the scheme will be linked to other cap-and-trade systems under development in other parts of the world and establish a network of countries through international carbon market to combat climate change at the least cost.[53]

According to the European Commission, including aviation in the EU ETS is projected to have only a marginal effect on airlines' profitability assuming they would be able to pass on most or all of the extra cost to customers and will have no effect on EU ETS prices according to projections.[54] Since all airlines will be treated equally, competition resulting from the EU ETS regulation is not expected to be significant. However, carriers traveling shorter distances within the EU or using older aircraft, carrying fewer passengers or less cargo would feel the impact of the regulation to a greater extent than more fuel-efficient carriers.

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[53] Ibid. , 11.

[54] Europa website, Questions & Answers on Aviation & Climate Change [Online], 2006. Available from : http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/506&format=HTML&aged=0&language=EN&guiLanguage=en.

Other sectors not included in the EU ETS (transport with the exception of aviation, buildings and households, agriculture and waste) represent almost 60% of EU's overall emission will be cut by 10% of 2005 levels by 2020 while the ETS countries are expected to have reduced emission by 21% by 2020. The result will be achieved through national emission targets that will be different according to relative wealth and growth opportunity of each member state. This means that EU member countries going through different stages of development can all contribute according to their ability. The emission reduction ranges from 20% in Denmark, Ireland and Luxembourg to 20% increase in emissions from Bulgaria to allow for economic growth. This approach voices the international principle that all countries have "common but differentiated responsibilities (CBDR)" in tackling climate change.[55]

Emission trading is best suited to businesses of a substantial size that have more options than their smaller counterparts to choose the most appropriate alternatives to reduce emissions. For smaller businesses, which represent a majority of emissions, however, the costs of implementing emission control will be far too great for them to absorb. The use of intermediaries/distributors/producers are more appropriate given that they do not raise their prices according to the increased demand to 'convince' consumers to use less energy.

The EU ETS will experience further change and expansion when the Kyoto protocol expires in 2012. From 2013 onwards two-thirds of emission reduction planned for 2020 will have been achieved. Emission allowances in power generation, energy-intensive manufacturing industry, and aviation (begins in 2012) will be cut steadily every year

[55] Ibid. , 12.

beginning in 2013. If the program is successful emission allowance in 2020 will be 21% below the 2005 levels.[56]

4.5 Climate and energy package

80% of EU's energy consumption is from fossil fuels such as oil, natural gas and coal. Fossil fuels are finite in their quantity and the EU is relying more and more on imports. 50% of EU's gas supplies are from Russia, Norway and Algeria while it imports about two-thirds of its oil from OPEC and Russia. In 2006 the energy imports account for 53.8% of all EU's energy consumption[57].

In January 2008 the European Commission, after much analysis and discussion with member states, put together a package of legislation aimed at limiting emissions and improving energy usage efficiency. The deal came through in December of 2008 and it was signed and implemented in April 2009. The EU is the first region in the world to have adopted such ambitious targets as well as the first to put in measures designed to achieve them. The plan also demonstrates how measures averting climate change can be compatible with long-term economic growth and prosperity. The investment in the package will help stimulate Europe's economy through creation of new jobs and innovation in the short to medium terms and help set the basis for a low-carbon economy in the long run[58].

Emissions target is tied with energy objectives to turn EU into a highly energy efficient and low-carbon economy:

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[56] COM (2009) Pamphlet 29, 10-11.

[57] COM (2008) "Combating Climate Change: The EU Leads the Way", 14.

[58] COM (2009) Pamphlet 29, 10.

1) A 20% reduction in energy consumption through improved efficiency.

2) An increase in the market share of renewable energies from 9% today to 20%.

3) A 10% market share for sustainably produced biofuels and other renewable fuels used in transport in each member state[59].

The climate and energy package also sets up a legal framework for carbon capture and storage (CCS) technology to be developed. CO2 emissions from production processes will be captured and stored underground instead of releasing it into the air to prevent it from causing global warming. The proceeds from the carbon-trading scheme will help fund the development of CCS technology. The technology is expected to be commercially viable in 2020.[60] The package is expected to reduce the cost of oil and gas imports to drop by €50 billion per year in 2020.[61]

4.6 Non-renewable energy policy

Because GHGs come mostly from the use and production of energy, energy policies can have a big impact on cutting emissions. Realizing this, the EU has pulled together a climate change and energy objectives into a single integrated policy for Europe. The key elements are as follows:

- More efficient power and gas markets
- Diversification

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[59] Ibid. , 9.

[60] COM (2009) Pamphlet 29, 13.

[61] Ibid. , 15.

- An ambitious renewable energy policy
- Saving energy
- International cooperation

Rises in the price of jet fuel will lead to the need to reduce consumption. This is what happened to THAI. The EU airline industry, however, enjoys tax-free jet fuel, unlike motor vehicles that are taxed on their carbon emission. The recent rises in the price of fuel does not concern the industry much because they have a tax-free advantage. If, hypothetically speaking, jet fuel were taxed at a minimum, the additional cost will still only be a fraction of that tax. Oil prices will have to increase much more to put the cost of jet fuel anywhere close to the tax on automobile fuel.[62]

EU citizens are now free to buy energy from any companies including those who specialized in renewable energy, making the energy market more efficient and providing lower prices for consumers. Cross-border trade of power and gas within the EU is now possible[63].

4.7 Renewable energy policy

Since the 1990's the EU has been considering replacing fossil fuels with alternative and renewable energy. It tried to diversify its energy sources so as not to risk relying on one or a few sources, increasing EU's energy security. The EU is determined to increase the

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[62] Europa Press releases RAPID, Questions & Answer on aviation and climate change [Online], 2006. Available from : file:///Users/Nannie/Downloads/EUROPA%20-%20Press%20Releases%20-%20Questions%20&%20Answers %20on%20aviation %20&%20climate%20change.webarchive.

[63] COM (2008) "Combating Climate Change: The EU Leads the Way", 13.

percentage of renewable energy use to 12% by the year 2010. In order to achieve this, new laws were passed setting national targets for renewable energy to be used in the transport sector. Other sectors are also encouraged to do the same. The target percentage was pushed in 2007 to 20% by 2020, including assigning 10% of renewable fuels and biofuels to be used by 2020. What this target implies is that there will be growth in the use of biomass, biogas, and biowaste in power plants, co-generation of electricity where steam generated in the process of making electricity will be captured and used in public heating systems, for example, instead of letting it go to waste, oil and electric water heating systems will gradually be replaced by biomass boilers. Drawing geothermal heat from the ground is also expected to increase along with harnessing solar energy. The biggest growth, however, will come in the form of wind power with next generation of more efficient wind turbines[64].

Bioenergy is derived from solid biomass, biogas or liquid biofuels. These are available throughout Europe. Biomass comes from forestry, agriculture and organic waste and their residues. Biofuels come mainly from crops. They can be stored quite easily and can be turned into bioenergy when needed. They can be used to generate electricity, deliver direct heat and used for transport. As of now bioenergy already accounts for half of the total energy consumed in Europe. They represent the only large-scale substitute for petrol and diesel in Europe. In the future the EU hopes to have biofuels be made from a higher variety of agricultural and forest products and organic wastes and phase out fuels that are derived directly from plants as not to interfere with food and feed production. Production of biofuels within and outside of the EU must be sustainable and does not lead to deforestation or loss of

[64] Ibid. , 16.

biodiversity, or undermine food production[65]. The issue of deforestation and forest degradation must be addressed to developing countries who need to further reduce their emission by 15-30% below their usual level if we are to keep the average global temperature from increasing beyond 2°c.[66]

As of now the use of biofuel for aviation is being researched at the Masdar Institute of Science and Technology under the collaboration of Boeing, Etihad Airways, and Honeywell's UOP. The Sustainable Bioenergy Research Project (SBRP) was recently launched on 18th January 2010 to turn saltwater agriculture into biofuel for aviation. An aquaculture approximately 0.8 square miles in size is dedicated to growing mangroves and salicornia, a plant that thrives in salty condition. Biomass will be collected sustainably to generate clean energy as well as produce biofuels for aviation and other products.[67] If successfully managed, this biofuel can be introduced as an alternative fuel for the aviation industry that will lead to carbon emission reductions.

Also present were the nationally differentiated targets for switching to renewable energy based on wealth and potential for renewables. This ranges from 10% for Malta to 49% for Sweden. These actions will not only reduce greenhouse gas emissions, the EU will benefit from increased energy security. A 10% target is set for the transport sector in every

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[65] Ibid. , 18.

[66] COM (2009) Pamphlet 29, 21.

[67] Giles Clark, Aviation Bioenergy Research Programme Launched [Online], 2010. Available from : http://www.biofuelreview.com/content/view/2061/.

EU member country along with criteria that biofuels must meet to be counted towards the target.[68]

Combined with other measures to promote sustainable development, carbon-trading scheme may bring society to an entirely different path to development with different mindset, consumption, and production patterns once all countries agree to one standard.[69] Climate and Energy Package will give EU a focus as well as a goal to become a low-carbon and efficient manager of resources, of which is what it is working on at the moment, and can provide as an example to other modern cities. Non-Renewable and renewable energy policies are part of the package where the EU will provide the world with examples of energy-efficient model and lifestyle. The Kyoto Protocol, while being fiercely debated in trying to find a common ground, represents a genuine effort by nations who supports the idea, unfortunately the cooperation has to come from all sides to achieve a global impact. The Copenhagen Accord, while endorsing the continuation of the Kyoto Protocol after it expires in 2012, lacks legal binding. Countries have no commitment to the Accord so that even though there will very likely to be a continuation for Kyoto Protocol, more cooperation is needed to tackle the issue of climate change.

The EU emission-trading scheme will most directly affect the airline industry in the EU that operates using old aircrafts that emit more CO2. It specifies exactly how each airline is going to pay for their emission where as other policies aim to reduce carbon emissions with no enforcement mechanism and no binding legal action. The EU emission-trading scheme is expected to force airlines to be more efficient with reducing their CO2 output so it has the

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[68] COM (2009) Pamphlet 29, pp. 13.

[69] Ibid. , 53.

same goal as other climate change policies mentioned above. This is a first step toward global green movement and energy security. The EU ETS has the potential to be applied world wide leading by Europe. Alternative renewable jet fuel is now available and is on its way to the EU from Indonesia. It is derived from a local plant and the MOU between the EU and the energy company Waterland International has been signed.[70] It must be noted, however, that the new biofuel has to be obtained at a reasonable price and that it would have to prove that it actually reduces CO2 emissions. Otherwise the technology will not be viable in the market.

[70] The BioenergySite.com, Waterland Supplies Jatropha Oil to EU Airline Industry, (The BioenergySite.com 2010), <file:///Users/Nannie/Downloads /Waterland%20Supplies%20Jatropha%20Oil%20to%20EU%20Airline%20Industry.webarchive> (Last Updated July 7, 2010 and accessed September 16, 2010).

CHAPTER V

METHODOLOGY

Qualitative research method and textual analysis were used as the main tools to gather information. Literature review on the publications relating to air travel covered opinions on global warming, EU regulations and their effectiveness, and air travel operations were done in Chapter 2. Issues and problems relating to air travel management and viability were raised and explained in terms of effects on the airline industry in the EU in Chapter 3. Chapter 4 includes details of environmental regulations being put in place for the airline industry. In Chapter 5, Porter's Five Forces analysis was used to assess on current situation and future projections.

The focus of this chapter will be methodology. Primary (the European Commission documents and THAI's annual report) and secondary data were studied and interpreted in terms of impact on the airline industry. In-depth interviews with two of THAI's executives on their plan for 2012 were successfully conducted. The structure of THAI's business from fleet plan strategy, fuel efficiency and revenue structure were used to explain THAI's current situation and its readiness.

5.1 Guidelines on sustainable contemporary transport policy

Using guidelines developed in 1992 by John Roberts and other commentators on sustainable contemporary transport policy shown below, word for word, can be applied to the new EU ETS regulation for the airline industry to test the new policy for fairness and transparency as the issue was brought up by both consumers and airlines.

1. Transport is a vital element in economic and social activities but must serve those activities rather than be[ing] an end in itself.

-The EU ETS Scheme did not overlook the importance of air transport in the social and economic activities. The Commission hopes that, procedurally, airlines can cope with the changes taking place around them.

2. The consumption of distance by freight and passengers should be minimized as far as possible whilst maximizing the potential for locally based social interaction and locally based economic activity.

- Airlines already use routes that minimize fuel consumption and time. Air transport has helped connecting regions and countries and it does serve social interaction activities such as conferences and meetings (all of which by this time there are alternatives to flying for business like teleconference and the Internet that were not available publicly when the book was written). Nonetheless, local interactions have been increasing thanks to the convenience and reach of air travel. Local environmental projects aiming to reduce carbon emissions (CDM, JI and CBDR) have gone further—teaching the importance of forests in absorbing carbon dioxide to local economies and encourage sustainable development.

3. All transport needs should be met by the means that is least damaging to the environment.

- This is exactly what EU ETS and many local projects resulting from the scheme aim for.

4. There should be a presumption in physical land use planning against those activities, which by nature of their size and importance attract car-based users from a large area.

- Although designed for road traffics, this is still relevant with air transport. Airports require massive land use but necessary as long as air travel remains the fastest and the most convenient mode of transportation and there are businesses depending on them.

5. All transport investment plans be subjected to a full health audit not withstanding the uncertainties surrounding epidemiological proof. Proposals which are potentially health damaging should be rejected.

- The modern day air transport had been held responsible for spreads of diseases like HIV Aids and the more recent, the SARS epidemic. The EU ETS takes considerations for other health risks and that is why it tries to reduce harmful emissions and encourage others to follow in their green footsteps.

6. All transport investment plans should have a clear objectives designed to cover social, economic and environmental concerns and be evaluated by an independent authority with sufficient expertise to comment on value for money, costs and benefits and the availability of alternative strategies to achieve the same objectives.

-The objectives of the EU ETS were clear right from the beginning. Although its main concern is environmental, the social and economic aspects have been considered. "An independent authority with sufficient expertise" in this case would be the IPCC who had formed commitments with the regulation.

7. All transport investments should be monitored over their lifetime to check on the degree to which they meet their stated objectives and their contribution to environmental damage.

- EU ETS is still in the early stage of implementation and the evaluation will commence in 2020 when Phase III will have been completed.

8. All transport policy matters should be dealt with in a transport policy directorate that has no direct responsibilities for the management of individual words. The

responsibilities of the directorate are to deliver sharply focused policies that minimize danger, minimize air and noise pollution, maximize social interaction and urban quality of life and oversee the non-policy making executives (for road, rail and air) whose role is to implement the directives of the transport policy directorate.[1]

- The European Commission will promote and take control of the implementation in these regards. Standard regulation is still up for debates as national governments try to safeguard their countries' economic interests.

Now that we have established that the EU ETS fulfills all the criteria of sustainable contemporary transport policy and is legitimate in its own rights, we will analyze the EU airline industry using Porter's Five-Force Model.

5.2 Porter's Five-Force Model

Porter's five forces provide a framework for the industry analysis and business strategy development crucial in analyzing the complex aviation market environment of the EU. It was developed in 1979 by developer Michael E. Porter of Harvard Business School who draws upon Industrial Organization (IO) economics to derive five forces that determine the degree of competitive intensity and attractiveness of a market, in this context refers to the overall profitability of an industry. An industry is deemed "unattractive" when the combination of these five forces acts to drive down overall profitability. An industry that is categorized as "pure competition" refers to an industry where all firms has zero profitability.

Three of Porter's five forces assess competition from external sources. The two remaining are threats within the firm. Porter's five forces is useful when used in conjunction

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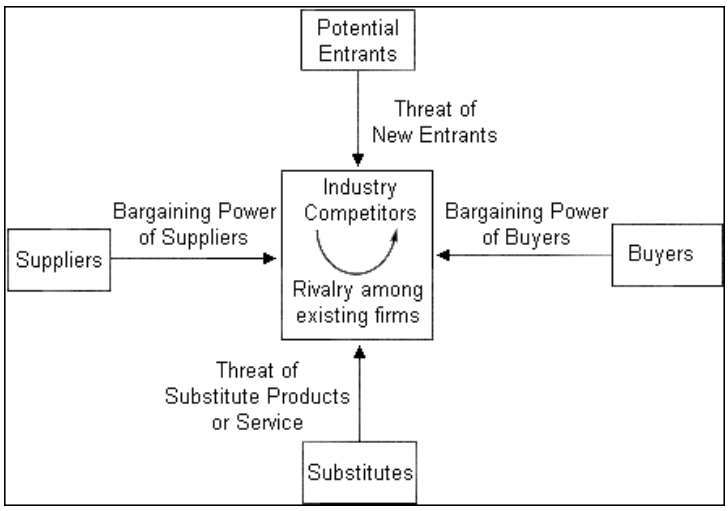
[1] John Roberts et al., Travel Sickness: the need for a sustainable transport policy for Britain (London: Lawrence and Wishart, 1992), 157.

with SWOT analysis (**S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats), which had been done on Thai Airways International's prospects in the EU market and is included in this thesis.

Porter referred to these forces as the microenvironment. They consist of those forces close to a company that affect its ability to serve its customers and make a profit, one of which are airline regulations. A change in any of the forces normally requires a business unit to re-assess the marketplace to derive the overall change in industry information. The overall industry attractiveness does not imply that all individual firms in the industry will return the same profitability. Firms capable of applying their core competencies, business model or network, tend to achieve a profit above the industry average. A clear example of this is the airline industry where profitability is low with many uncertainties that could affect profit, yet individual companies, applying unique business models, have been able to make a return in excess of the industry average. Michael E. Porter's Five Force Model is thus used here to assess the EU aviation market environment:

Figure 5.1: Five-Force Analysis



Source: Porter 1985

5.2.1 Threat of New Entrants

Threat of new entrants in the EU airline industry with the presence of the Emission Trading Scheme is minimal. All airlines with flights to and from the EU bear equal responsibility in the sense that the costs of emission is proportional to the amount of emissions release so there is no discrimination against any group of airlines whether they be airline alliances, the nationalities of the airlines, or lobbying from private enterprises.

At the moment all existing airlines with routes to the EU are forced to evaluate their performance and reduce their emissions with the goal to minimize their emissions in time when the ETS becomes effective in 2012. These procedures made up the addition to other barriers to entry to one of the most fiercely competitive airline markets in the world. These include economies of scale where mass production becomes cheaper than by the unit production due to the scale of operation. Capital requirements are high within the airline industry and may also represent high exit barrier.

Switching cost between one to another airline can be frustrating to consumers who expected no additional cost to their travel except under extreme circumstances. Some consumers have brand loyalty towards a certain airline (or airlines). They feel most comfortable flying with the airline of their choice and it can be very difficult to convince them to fly with a new airline. First comer's advantages, or the advantages held by those entered the market first, also include brand recognition, expertise, experience, distribution channels, established relationships with suppliers, all of which will have negative impacts on firms looking to enter the EU airline industry.

That having been said, a special reserve of allowances have been set aside according to the Directive to ensure access to the market for new aircraft operators and to assist aircraft

operators which increase sharply the number of tonne-kilometres that they perform to even out the competition. Aircraft operators that cease operations will continue to be issued with allowances until the end of the period for which free allowances have all been allocated. [2]

5.2.2 Bargaining power of buyers

Bargaining power of buyers in the airline industry is at its highest due to intense competition among the airlines themselves that had made many changes to their operations to ensure their survival in the market. Tickets can now be purchased online with ease and changing from one airline to the next is done on a normal basis that air travel services became more like commodities. Demands for air travel are met by adding more destinations, code sharing (where tickets can be purchased at any of the allied airline's counter and customers can be seated in an aircraft of any member of the airline that are available to reach their preferred destinations with the same tickets they have purchased), and better services on ground and during flights.

5.2.3 Bargaining power of suppliers

The single most important resource for an airline is fuel. Securing of jet fuel adds tremendous impact for airlines anywhere especially when their prices fluctuate to the extreme and airlines become burdened by them. The recent oil price crisis illustrates how fluctuations in fuel price can affect the airline business. The global airline industry has used means to minimize the impact of such crisis like price hedging, buying futures and additional surcharges on consumers, to name a few, to mitigate the potential impacts of higher fuel

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[2] Eur-Lex, Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community [Online], 2009. Available from : http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX: 32008L0 101 :EN:HTML.

prices. Fluctuations in oil prices still have much impact for the airline industry today and will always be while airline industries wait for a cheaper, environmental friendly and more abundant renewable alternative. As for new planes and parts, airline supply business is dominated by Boeing in the US and Airbus in Europe. Together they represent a worldwide oligopoly over aircrafts building, spare parts and aircrafts' maintenance equipments. For this reason there are not many cutthroat competition among suppliers in the EU and elsewhere.[3]

5.2.4 Threats of substitute products or services

Domestic flights are more vulnerable to substitutes than cross continental flights due to traveling distance. This threat of substitute is even greater in EU than anywhere else because of the short traveling distances and the high quality of the EU's infrastructure. The decision to fly or take an alternative transportation also depends on time, money, personal preference and convenience.

5.2.5 Intensity of the rivalry among firms within the EU airline industry

Post-9/11 airline industry all over the world suffered a blow to their profit due to decreases in air travel resulting from customers' lack of confidence in the security of air travel, and fear of terrorists' attack and hijacking. Competition among airlines became more intense especially in the United States. European airlines were affected as well as they became the second most likely targets. This is the point where low-cost air travel entered the picture.

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[3] Investopedia, The Industry Handbook: The Airline Industry [Online], 2010. Available from : http://www.investopedia.com/features/industryhandbook/airline.asp.

Air travel has become much more common and accessible to most over the years. Low-cost airlines created a new segment of the Air travel market in the EU where prices are more moderate and full-service is provided on board. They provide more choices for consumers who are more price-sensitive than others. They became efficient competitors to flagship airlines who have higher fixed costs. Aircrafts are leased and used at the most efficient level possible. The increasingly competitive nature of the airline industry lead to cost reduction among national airlines and privatization is seen as the means to make traditional airlines more efficient.

The Five Forces Analysis helped in assessment of the European airline market and THAI's viability. Competition is high and threat of new entrants is almost impossible. The high costs nature of the industry and economy of scale achieved by existing airlines reduce the threat of new competition, leaving THAI and other airlines in the EU to focus on reducing costs. From the analysis we have gathered that the bargaining of power of buyers is at its all-time high. Customers and choose and de-choose airlines with a few taps on the computer. This is why service on-ground and in-flight need to be consistent and memorable in order to retain repeat customers. Bargaining power of suppliers including jet fuel is high and changing all the time so price hedging and futures buying was recommended for THAI. Most of THAI's operation in Europe is long haul, intercontinental flights which have an advantage over European airlines that must fly between short routes connecting European cities while a foreign aircrafts like THAI can avoid flying over EU's jurisdiction as much as possible to reduce impact of EU ETS. It is also true that European national airlines are taking it hard with the emerging competition of their own low-cost airlines and speed railway that can take away market shares in the short-distance flights category.

As the topic of this thesis suggests, we will be focusing on Thai Airways International (THAI) as a case study on impacts of EU's environmental regulation on Asian airlines. The background information on THAI and impacts resulting from the emission-trading scheme will be discussed in the next chapter.

CHAPTER VI

ANALYSIS: IMPACTS OF THE EU ETS ON ASIAN AIRLINES, AVIATION EMISSIONS AND ON THAI

EU emission trading began since 2005 for exchanging carbon across industries without the participation of the airline industry. The year 2008 the 2008/101/EC directive that has been amended from Directive 2003/87/EC begun to include aviation in the scheme that will allow the Commission to put a price to the CO2 emissions from planes coming in or going out of and traveling between member countries in the economic zone. The Directive has given a deadline for all airlines operating in the EU to reduce their emissions by 2012. This is an emission-trading scheme, not emission tax as most understood.

Figure 6.1: Parts of the actual Directive emphasizing the objectives and rationale behind the scheme

- Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community.
- Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community…
- …established a scheme for greenhouse gas emission allowance trading within the Community in order to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner.
- The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC), which was approved on behalf of the European Community by Council Decision 94/69/EC [5], is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

Parts of the actual Directive emphasizing the objectives and rationale behind the scheme (continued)

- …the strategic objective of limiting the global average temperature increase to not more than 2 °C above pre-industrial levels.
- … until a global and comprehensive post-2012 agreement is concluded, made a firm independent commitment for the EU to reduce its greenhouse gas emissions to at least 20 % below 1990 levels by 2020. The limitation of greenhouse gas emissions from aviation is an essential contribution in line with this commitment.
- …economically more advanced developing countries to contributing adequately according to their responsibilities and respective capabilities.
- …reserved the right under the Chicago Convention to enact and apply market-based measures on a non-discriminatory basis to all aircraft operators of all States providing services to, from or within their territory.
- If the climate change impact of the aviation sector continues to grow at the current rate, it would significantly undermine reductions made by other sectors to combat climate change.
- Aircraft operators have the most direct control over the type of aircraft in operation and the way in which they are flown and should therefore be responsible for complying with the obligations imposed by this Directive, including the obligation to prepare a monitoring plan and to monitor and report emissions in accordance with that plan.
- In order to avoid distortions of competition and improve environmental effectiveness, emissions from all flights arriving at and departing from Community aerodromes should be included from 2012.
- …each aircraft operator will be regulated by a single Member State in respect of all their operations to, from and within the EU and by the non-discrimination provisions of bilateral air service agreements with third countries.
- …revenues generated from the auctioning of allowances, or an equivalent amount where required by overriding budgetary principles of the Member States, such as unity and universality, should be used to reduce greenhouse gas emissions, to adapt to the impacts of climate change in the EU and third countries, to fund research and development for mitigation and adaptation and to cover the cost of administering the Community scheme.

Parts of the actual Directive emphasizing the objectives and rationale behind the scheme (continued)

- …aircraft operators should be able to use certified emission reductions (CERs) and emission reduction units (ERUs) from project activities to meet obligations to surrender allowances up to a harmonised limit. The use of CERs and ERUs should be consistent with the criteria for acceptance for use in the trading scheme set out in this Directive.
- In the event that an aircraft operator fails to comply with the requirements of this Directive and other enforcement measures by the administering Member State have failed to ensure compliance… The administering Member State should therefore be able to request the Commission to decide on the imposition of an operating ban at Community level on the aircraft operator concerned, as a last resort.
- The provisions of the Community scheme relating to monitoring, reporting and verifying emissions and to penalties applicable to operators should also apply to aircraft operators.
- Member States shall ensure that any operator or aircraft operator who does not surrender sufficient allowances by 30 April of each year to cover its emissions during the preceding year shall be held liable for the payment of an excess emissions penalty. The excess emissions penalty shall be EUR 100 for each tonne of carbon dioxide equivalent emitted for which the operator or aircraft operator has not surrendered allowances.
- In the event that an aircraft operator fails to comply with the requirements of this Directive and where other enforcement measures have failed to ensure compliance, its administering Member State may request the Commission to decide on the imposition of an operating ban on the aircraft operator concerned.

Source: see[1]

As in the case of Thai Airways International (THAI), it will have to trade its carbon credits with other installations with other certified CDM projects where it can buy more CER credits in case of insufficiency. THAI also has its sponsored CDM projects where it plans to

[1] Eur-Lex, Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community [Online], 2009. Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L010 1:EN:HTML.

use the credits to offset its CO2 emissions. Representing a group of businesses with the highest stakes in the industry, airlines have no other alternatives as the plan includes all airlines to and from the EU regardless of the countries of origins or destinations but to comply with the scheme and are now preparing for the initial trading in 2012.

Carriers such as THAI, Singapore Airlines, Cathay Pacific and Qantas, some of major Asian airlines operating in the world's longest routes, already plan to curb or offset pollution in order to get ready for emissions trading with more efficient planes and other measures.[2] The International Air Transport Association (IATA) estimates that the EU emissions trading scheme will come with a price tag of EUR2.4 billion Euros (USD$3 billion) in 2012 for airlines operating in the EU, but admits the figure is a fast-moving target.[3]

In this Chapter the focus is on the EU ETS' impacts on THAI. We will first begin with the impact on Asian operators in the EU in general. The impact of the scheme on the level of CO2 emission itself will also be discussed. The background on THAI as a private enterprise will be given next following by SWOT analysis of the company. In section 6.5 the revenue structure of THAI will be shown to compare the impact of the ETS against THAI's profit where the profit is broken down into regions before moving on to the Value-Chain Analysis. The SWOT and the VCA will be the framework against which impacts of the scheme on THAI will be assessed. Compliance mechanisms will be laid down in section 6.8. Section 6.9 completes the competition outlook of the industry for THAI as it discusses competition from other Asian operators serving routes in the EU. The Chapter ends with

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[2] Reuters, Emissions Trading: Asian Airlines' Friend or Foe? [Online], 2009). Available from : http://news.airwise.com /story /view/1234945186.html.

[3] Ibid.

THAI's responses and possible responses by other airlines in dealing with the emission scheme.

6.1 Impact on Asian Operators in the EU

As far as flights to and from Europe by Asian operators are concerned, all airlines will receive equal treatment in the emission-trading scheme as proportionate to the amount of emission released into the atmosphere. Comparing between EU and non-EU airlines (focusing on Asian airlines), however, EU airlines usually fly short distances from one European city to another while non-EU airlines arrival to and departure from the EU are long-haul, intercontinental flights which are more resource efficient than short flights. Inclusion of short-haul flights under the EU ETS scheme can be a disadvantage for EU airlines. While EU airlines have obligation to transport passengers both from outside with long-haul flights and within the economic zone with frequent, short distance flights due to Europe's geographical characteristics and the European integration, non-EU operators transport passengers from overseas on routes that are not under EU jurisdiction and therefore have more allowances left. It means that while airline A from the EU which serves both long-haul and short-haul flights within the EU has to surrender allowances for both types of flights it operates non-EU airline B is only responsible for emission release when it carry passengers to or from the EU, leaving the rest of its emissions out of the ETS scheme unchecked and therefore free due to the fact that the Community reserved the right under the Chicago Convention to enact and apply market-based measures on a non-discriminatory basis to all aircraft operators of all States providing services to and from European airports or

within their territory[4] but does not give the Commission the right to monitor greenhouse gases in other regions that are not under its jurisdiction. This being the case, non-EU airlines are only responsible for a fraction of its entire operation while EU airlines bear a much heavier burden in terms of allowances. In this case non-EU airlines (including Asian airlines) are in an advantageous position.[5]

6.2 Impact on aviation emissions

The impact of this scheme on aviation emissions, which are growing rapidly, will result in the emissions being kept at their average level at 2004 to 2006 period. It is also estimated that by 2020, the emissions in the aviation industry will have been reduced by 183 million tons each year. The amount is tantamount to twice the level of emissions released from all sources in Austria, a 46% of CO2 emissions saved from business as usual. The flexibility of the scheme allows airlines to purchase their allowances from other operators in the market, to pay others for saving as much and to justify their own emissions. The flexible mechanism also allows airlines to invest in environmental projects under the Kyoto Protocol mechanisms aiming at carbon emission reduction because emission reduction is the same regardless of where they are made.[6] By treating emissions like commodities it serves to

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[4] Eur-Lex, Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community [Online], 2008. Available from : <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX :32008L0101:EN:HTML.

[5] Janina Scheelhaase et. al, The Inclusion of Aviation into the EU Emission Trading Scheme: Impacts on Competition Between European and Non-European Network Airlines [Online], 2009. Available from : www.elsevier.com.

[6] Europa Press releases RAPID, Questions & Answer on aviation and climate change [Online], 2006. Available from : file:///Users/Nannie/Downloads/EUROPA%20-%20Press%20Releases%20-%20Questions%20&%20Answers %20on%20aviation %20&%20climate%20change.webarchive.

reduce the confusion over who is paying for what and how much each operator is accountable for under the same regime.

6.3 Background on THAI

Thai Airways International Public Company Limited (THAI) was one of the first companies in Thailand to have received ISO 14000, a standard for environmental management systems that is applicable to any business, regardless of size, location or income to reduce the environmental footprint of a business and to decrease the pollution and waste a business produces, ten years previously. The Thai public was quite unaware until now as the green movement garners popularity from the Thai public. THAI has also been approved by EASA (European Aviation Safety Agency) under the EU and has acquired ISO 9001:2000 for its work in environmental management.

In 2008 THAI has experienced a heavy blow to their profitability, loss of 21,000 million THB (648 million USD/485 million Euros) due to two factors. First was the price of fuel, which had skyrocketed during the first half of 2008. Advance bookings required urgent actions by THAI as profit for an airline only takes form when an aircraft takes flight. Second are the closures of Don Muang and Suvarnabhumi Airports by the People's Alliance for Democracy (PAD), resulting in profit loss and loss of liquidity for THAI. An executive at THAI had admitted that at the time of the crisis THAI's cash reserve was almost dried up being used to maintain its operations. THAI's year-end status for 2008 was at a tremendous loss.

The year 2009 the world has experienced a financial crises and loss in consumers' confidence in banking institutions. The meltdown of the US economy had repercussions for THAI: there was a drop of 20% in air travel. THAI was again forced by external factor to

adjust. Adjustments being carried in 2009 included the streamlining of production, which for THAI translated into the frequency of flights and number of seats, matching demand with size of the aircraft in service to achieve the highest percentage of number of seats being filled. Distribution channels were being expanded to include online reservations. A cost reduction of 12,000 million THB (277 million Euros) against its budget was made possible through:

- Rebuilding confidence from financial institutions.
- Creating sustainable foundation for the company and put in place business strategies for a 5-year period.
- Fuel-burning reduction. Weight of the aircrafts had been reduced in every dimension (example include the replacement of synthetic blankets on board, which weighs less than their natural fiber predecessors).
- Canceling of unpopular in-flight magazines
- Reducing any unnecessary services

The result from the efforts of cost reduction was that the year 2009 marked a turnaround to profitability for THAI.

THAI services to Europe (winter schedule 2008/2009) include 81 weekly flights to 12 destinations in 10 countries ranging from Rome, Copenhagen, Frankfurt, London, Stockholm, Zurich, Munich, Athens, Milan, Madrid, Paris and Moscow. Reflecting demand service to Moscow has increased to 4 from 3 flights weekly and service to Athens down from 4 to 3 flights. THAI relies on its Star Alliance partners for transits with Lufthansa providing stops from Frankfurt to Munich; British Midlands from London; and Austrian airlines from Vienna

with a total reach of 54 destinations across 19 countries while THAI actually serves 12 flights with other 42 flights through code sharing which allows multiple airlines to sell seats on the same plane to passengers that book their reservations from any airline in the alliance for the same destinations and flights. Code sharing has enabled THAI to serve its customers to an additional of 42 destinations to Oslo, Helsinki, Gothenburg, Kiev, Amsterdam, Geneva, Vienna, Brussels, Barcelona, Lisbon, Budapest, Prague and Warsaw. THAI and its partner serve major cities in Germany including Nuremberg, Dusseldorf, Berlin, Stuttgart, Hamburg and Hanover. Destinations in Austria serve by THAI and its partner are Graz, Inssbruck, Klagenfurt, Linz and Salzburg. For Britain Star Alliance flights cover Ireland and Scotland for destinations to Dublin, Glasgow, Edinburgh, Belfast, Lidst, Manchester, and Tees Side. According to THAI, air travel demand in Europe remains strong despite the recent US economic meltdown and no changes were made to flight frequency to the stated destinations.[7] Flights to and from these destinations will represent emissions costs responsibility from THAI and its alliance partners in Europe beginning in 2012.

6.4 SWOT Analysis of THAI

SWOT analysis is a strategic planning method used to evaluate the **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats involved in a project or in a business venture. It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable in achieving that objective. Albert Humphrey, who led a convention at Stanford University in the 1960s and 1970s, was credited with this technique using data from Fortune 500 companies.

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[7] *Thai Airways International Public Company Limited Annual Report 2008,* 24.

A SWOT analysis must first start with defining a desired end state or objective, in this case to comply with air travel regulations of the EU and stay competitive in the market. The analysis may be incorporated into the strategic planning model as has been done by THAI executives. Below is a SWOT analysis of THAI obtained from 2 interviews and the author's own observation:

Strengths

- Good public image and strong customers' confidence
- Established position in Thailand, a world-class tourists destination
- THAI is the only National carrier of Thailand
- Services and products are enhanced by beautiful Thai culture
- Uniqueness of being Thai "First Choice Carrier With Touches of Thai"
- Star Alliances

Weaknesses

- Costs per unit of THAI are accelerated in comparison with growth in revenue
- Unclear market positioning
- Mismatched business and financial structure
- Outdated aircrafts compared with competing airlines
- Offering of products and services still not very consistent
- THAI management focuses on process instead of profitability
- Red tapes and lobbying
- Current IT and database management is lagging behind

Opportunities

- Thailand a popular tourists' destination and support from the Thai Government
- The Asia region is growing rapidly in terms of the economy
- Advancements in IT and communication
- THAI will be able to prove the quality of its services and possibly expand their network to include more European destinations.

Threats

- Competition from low-cost airlines
- EU ETS
- Competition from other airlines operating in the EU
- Unstable political situation and civil unrest at home
- Fluctuating fuel price and reliance on fuel imports
- Financial crises and more frequent natural disasters all over the world
- Threat of terrorism

6.4.1 Strengths

Good public image and strong customers' confidence

THAI's focus and dedication to quality services, safety standards, hygiene, and responsible practices have earned the Platinum Brand Award by Readers' Digest as the most trusted airline in the Asia region for the 10th year running. Although 2008 was a bad year for business but THAI had made a quick recovery and reclaimed its position and profit.

Established position in Thailand, a world-class tourists destination

Thailand is one of the most popular Asian destinations and caters to over 10 million tourists every year. THAI had recently won the Most Popular Destination In Asia Award from the 6th Go Asian Awards at the International Tourism Borse (ITB) 2009 held in Germany.

THAI is the only National carrier of Thailand

The Thai Government represents the majority shareholder and THAI is under the supervision of the Transportation Authority of Thailand. THAI operates commercial

domestic and international flights as a National carrier. This will change soon enough due to the pressure to privatize to better manage resources and stay competitive with higher competition.

Services and products are enhanced by beautiful Thai culture

THAI provides uniqueness in service with Thai hospitality and attention to details. Thai greeting: the "Wai" before and after boarding by crewmembers offers something that is difficult to emulate by other airlines.

Uniqueness of being Thai "First Choice Carrier With Touches of Thai"

THAI tries to embody the Thai culture into its services. Aircraft interior are being modified to reflect Thai craftsmanship. Flight attendants' uniforms are a simplified version of traditional Thai outfit. The Company's logo resembles a flower that is unique to Thailand and the purple and pink colors remind passengers of Thai orchids.

Star Alliances

THAI is one of the original five members who founded the Star Alliance. Today the Alliance's network represents 22 airlines and 3 regional airlines and covers 1070 destinations in 171 countries worldwide. THAI's customers now have more choices for their destination. Working together helps with costs reduction and lead to increases in productivity. Airline alliances can also offer benefits to the consumer by offering seamless travel and services between a more extensive range of city pairs, reduction in traveling time, joint lounges and co-ordination of Frequent Flyers Programs.[8]

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[8] Joos Stragier, Current issues arising with airline alliances [Online], 1999. Available from: http://ec.europa.eu /competition/speeches/text/sp1999678_en.html.

6.4.2 Weaknesses

Costs per unit of THAI are accelerated in comparison with growth in revenue

In the past THAI had enjoyed its monopoly of the Thai air travel market and rapid growth of the economy. At present, however, per unit costs such as fuel consumption and increases in volume of production had elevated and the economy is in a recovery mode. A combination of these factors and fierce competition cause a dip in per unit profit and increases in per unit costs for THAI.

Unclear market positioning

THAI positions itself as a Premium Service Airline but often times seem inconsistent with that image due to its old aircrafts and equipments, outdated on-board entertainment system and some of the products are not up to standards adopted by competitors.

Mismatched business and financial structure

Due to the sheer size and the nature of being partially government-owned of the Company, approval of plans and budgeting come from the top down approach and takes longer time and more difficult than privatized airlines. For these reasons the company cannot response to changes in the market quickly enough or efficient enough to compete with other airlines. Limited budget due to less profits forces the airline to add to its capital and obtain loans from financial institutions. Increasing liabilities lessens THAI's potential to compete.

Outdated aircrafts compared with competing airlines

As of September 31, 2009 THAI has a total of 88 aircrafts with the average operation period of 11.8 years while Singapore Airlines and Cathay Pacific's average operation period are 6.2 and 11.5 years respectively. Older aircrafts require more maintenance and more fuel than a new fleet.

Offering of products and services still not very consistent

From a survey taken in July of last year on customers' satisfaction in marketing and services revealed that the majority of passengers' complaint about the aircrafts being too old and there is no in-seat video. The second most-complaint-about issues are inefficiency of flight attendants' response to requests and their politeness.

THAI management focuses on process instead of profitability

Due to large organizational structure and being partially supported by the government, procedures and management at THAI are process-oriented instead of being driven by profitability. This resulted in slow responses to implementation and decision-making that render THAI unfit to compete in the airline industry.

Red Tapes and Lobbying

Being a registered, previously state enterprise in the SET, THAI is still managed through massive lobbying and red tapes due to its the top-down, hierarchical structure. The result is many decisions made by THAI reflect outside influences that hold back the process

and inhibits growth in the international market. One of the solutions suggested by its "DD", or the managing director, is to reduce the government's stakes in the enterprise.[9]

Current IT and database management is lagging behind

This prevents the company from competing on an even playing field with other airlines.

6.4.3 Opportunities

Thailand a popular tourists' destination and support from the Thai Government

The Thai Government fully supports tourism in Thailand and plans to liberalize air travel in Thailand to make Suvarnabhumi Airport a hub for travelers coming into ASEAN. This has the potential to increase THAI's benefit in the commercial air market.

The Asia region is growing rapidly in terms of the economy

From the IATA's report in the later half of 2009 indicates the recovery of air travel industry in the Asia-Pacific region since June 2009. The trend is likely to continue and growth of air travel in the Asia-Pacific region was the highest at 2.1%.

Advancements in IT and communication

There have been many applications of IT technology by THAI to provide customers with full-circle services such as Royal e-booking, ticketing and Internet sales. The pace of development in the field of information technology is rapid and THAI hopes to gain from it.

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[9] Than Setakij Newspaper, "THAI Invests Hundred Billion to Acquire New Fleet," Than Setakij Newsaper, (6-8 January 2011).

THAI will be able to prove the quality of its services and possibly expand their network to include more European destinations.

THAI has an opportunity to make up for its losses through compliance with EU climate change policy. It is crucial that THAI follow the emission regulation to prove the effectiveness of its operations and attract even more customers traveling the EU route.

6.4.4 Threats

Competition from low-cost airlines

Due to the shrinking state of world and domestic economy the airline industry had experienced a decrease in the number of passengers. At the same time market penetration by low-cost airlines and the aggressive competition in the industry in general had seen THAI's profit margin also shrinking. Low-cost airlines are expected to continue to gain more shares in the market. Differences in management and operational models prevent flag carriers like THAI to compete directly with LCCs.

Unstable political situation and civil unrest at home

The political tension in Thailand has a negative impact on the airline and the Thai tourism industries. From the airport closures during Thanksgiving and violent anti-government activities had deterred many tourists who had planned to come to Thailand and many more who decided not to come back until the dust settles. A change in the country's administration will also have some implications for THAI as the company's majority shareholder is the Thai government.

EU ETS

The European Commission has passed the new emissions trading scheme with measures to prevent/alleviate the effects of global warming as explained in Chapter 4. The new scheme also applies to air travel as it grants free allowance credits of CO2 emissions to all airlines operating in the EU proportionate to the emissions released. The initiating credit is at €20 per ton of emission released. If the emissions from any airline exceed the amount specified by the allowance limit the airline will be forced to buy more carbon credit from other airline or business that releases less CO2 in their operation than their allowance. The free allowances given by the Commission will be applied at a regressive rate until there is none. Any environmental projects that contribute to emission reduction and mitigation by airlines within its home country using the framework of the Clean Development Mechanisms (CDM) introduced by the Kyoto Protocol will be awarded with more carbon credits and they can make up for the extra credit to cover the required allowance. So far THAI has 2 environmental projects under CDM framework that have already been passed by the Board decision. Each project costs roughly 400-500 million baht, a small percentage when compare to THAI's annual profit. They will help THAI to secure the carbon credits it needs in the long run. THAI can derive its CER credits from these projects to make up for its allowances beginning in 2012. More projects are expected to take shape in the future.

The Clean Development Mechanism (CDM) allows industrialized countries (Annex I countries, *see appendix 1*) to be involved in emissions reduction ventures in developing countries that costs less than the reduction of emissions in their own countries. The opportunity to obtain more credits through the CDM is given to companies in the host developing countries as well. CDM projects can lead to the net global reduction of greenhouse gases at a much lower price.

Certified Emission Credit (CERs) are climate (carbon) credits issued by the CDM Executive Board for emission reductions achieved by CDM projects as verified by the Department of Energy under rules of the Kyoto Protocol. They are worth the same as EUAs and can be exchanged interchangeably to cover allowances for businesses and airlines that have invested in such projects. CERs can be held by governmental or private entities on electronic accounts.

CERs create trade while EUAs (EU Emission Allowance) create auction. They come in 2 phases: Phase I will begin in 2012 and Phase II will begin in 2013 and end in 2020. TG flight to Frankfurt provided an example of route distortion to Dubai to reduce fuel use and emission, and also to avoid having to pay the full amount had the route flown over Europe alone. Emissions trading market aims to achieve worldwide reduction. Free allocation from national governments is based on how much emissions can be reduced. Auction of 15% from base year will be made. The scheme hopes to gradually increase more annual percentage in auction until there is no free allocation once airlines have adjusted.

Fluctuating fuel price and reliance on fuel imports

Aviation fuel is THAI's main expense. The price of fuel had gone up in 2008 and drove the fuel's share to 40% of THAI's operating expenses. THAI was forced to get involved in fuel price hedging and introduced fuel surcharge to passengers in addition to the ticket price to cover its operating expenses and stay competitive in the market.

Financial crises and more frequent natural disasters all over the world

The recent financial crises affected THAI in terms of number of passengers, which had gone down during the crisis. Natural disasters are becoming more violent and more frequent, as they stroke many regions indiscriminately. This has and continues to affect air

travel in the particular regions as priority in flying was given to aids from the international community. Spread of diseases like the 2009 new strain of influenza that swept the Asian region discouraged traveling to the area.

Threat of terrorism

Since the attack of the World Trade Center buildings in 2001 safety procedures in air travel was never the same again. Now is 2010 and the standard security measures are more strict and increased in thoroughness that it takes much longer at the security checkpoints. Airlines are also affected by the event: there is a need to upgrade its safety equipment, emergency protocols, and safety training of crewmembers.

6.4.5 Assessing impacts on THAI using the SWOT Analysis

Assessing impacts of the EU ETS on THAI requires that we know all the strengths, so we will be able to enhance and use them to the benefits of THAI, weaknesses, so as to concentrate the effort in turning them into strengths or at least opportunities. Opportunities, to be able to benefit from certain aspects of the environment, and lastly, threats, to be able to safeguard the company's profit and reputation and handle them accordingly. In short, SWOT analysis allows the company to identify and put its resources (human or capital) to the best use possible in a given situation, in this case the EU emission trading scheme.

As can be seen above, most of THAI's strengths have a lot to do with its image and reputation, but not its operations, with the exception of its joining Star Alliances. THAI cannot rely on its reputation alone and expect consumers who are more aware of their choices now than ever to choose them over other more competitive airlines with the arrival of the emission-trading scheme. It is true that THAI is an established airline in Thailand, but to truly become a world-class carrier like it aspires to be THAI has to get over the hurdle that is

the EU ETS and more stringent environmental regulations that are expected in the near future.

THAI's weaknesses, however, are a different story. Here all the weaknesses seem to come from operations, marketing and even the administrative levels of the company. Problems like accelerated cost against its growing revenue and mismatched business and financial structure are much more fundamental and require immediate attention, especially when they are going to add to THAI's financial responsibility over its emissions. The elevated unit costs means that for every seat sold more and more capital is needed to maintain THAI's ability to serve its customers and consequently its position in that particular market. THAI's aspiration is to become a premium airline but it still serves its customer with old aircrafts and outdated equipments. This creates confusion to customers expecting better service from a premium airline, not to mention its damaged reputation, the very thing THAI has so diligently built its business around, resulting from dissatisfied customers. A top-down approach of the company, legacy of being government-owned, and limited budget due to decreasing number of customers (due to the bad economy and other uncertainties in the competitive environment) hamper THAI's abilty to respond to changes rapidly occurring in the EU market and also its ability to adjust and turn things around.

According to the European Commission the burden created by the ETS will not be overwhelming that airlines will not be able to fulfill it, but other airlines operating in the EU do not have the same existing problems as THAI, whose response to this scheme will likely to be to upgrade or buy new planes which release less CO2 and further streamline its operations, the first of which requires huge amounts of capital. Buying new planes is not only a strategic move but also a common sense since THAI has on the average older planes than many airlines operating in the EU. If THAI chooses to push the additional costs to its

consumers then a better and more consistent marketing plan and positioning for the EU market will be needed.

As far as opportunities are concerned, growth in the business sector in Asia is expanding very rapidly and so is air travel. The profits in air travel in the Asia-Pacific region is expected to reach $2.5 billion and customer increase of 22% in 2010 compared to the same period the year before.[10] Thailand being a popular tourist destination, it might be possible for THAI to gain more customers in this region to make up for the losses in the more mature EU air travel market. The EU market's contribution to THAI's profit cannot be ignored, however. The revenue from this sector is second only to the Asia region (*see*: Table 6.4). Buying new planes, upgrading its service and equipment will be sound investments in the long run. The benefits include reduced cost in fuel because of the newer and more efficient engines and aircrafts, a more consistent image the airline is trying to create, satisfied customers, better reputation and of course less emissions per plane per year which will add up to the total savings in emission for that period, just to name a few.

Providing travel to more than 80 destinations in Europe, THAI also operates city-to-city routes in the EU and will have to look for possible competition from low-cost airlines as well as leading airlines in the region.[11] Threats from fluctuating oil price is more of an issue for THAI than other European airlines because there is no taxation imposed on air transport fuel in the EU. While THAI can still buy futures and perform hedging, its reliance on

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[10] Mary Ann LI Reyes, Asia Pacific leads air travel growth, with profits to hit $2.5 billion [Online], 2010. Available from : http://www.philstar.com/Article.aspx?articleId=603033 &publicationSub CategoryId=66.

[11] Interview with Mr.Chokechai Panyayong, Executive Vice President, Strategy and Business Development Department, 2009.

imported fuel is still a threat to the company: THAI cannot yet find a sustainable solution to the problem.

6.5 Revenue Structure

Composed of:

1. Revenue from passengers and excess baggage for each route including charter flights
2. Revenue from freight by weight, category, size and destination
3. Revenue from mail
4. Revenue from business units and supporting activities
5. Revenue from subsidiaries
6. Other income

Table 6.1: Revenue Structure[12]

Type of Revenue	2008		2007		2006	
	MTHB	**%**	**MTHB**	**%**	**MTHB**	**%**
Revenue- Domestic Transportation						
Passengers and excess baggage	16,080	7.94	13,434	6.72	12,030	6.59
Freight	376	0.18	392	0.19	397	0.22
Mail	3	-	-	-	8	-
Other Activities-Domestic						
Business Units	7,976	3.94	8,156	4.08	7,388	4.05
Supporting	692	0.34	787	0.39	772	0.42
Total Operating Revenue-Domestic	**25,127**	**12.4**	**22,769**	**11.38**	**20,595**	**11.28**
International Transportation						
Passengers and excess baggage	148,238	73.19	147,124	73.55	131,372	71.96
Freight	25,464	12.57	25,665	12.83	25,252	13.83
Mail	911	0.45	978	0.49	1,028	0.56
Total Operating Revenue-International	**174,613**	**86.21**	**173,767**	**86.87**	**157,652**	**86.35**
Revenue from Subsidiaries						
Thai-Amadeus Southeast Asia	387	0.19	373	0.19	360	0.2

[12] Thai Airways International Public Co., Ltd Annual Report 2008, 15.

Co.,Ltd.						
Total Operating Revenue	**200,118**	**98.8**	**196,909**	**98.44**	**178,607**	**97.83**
Other Income						
Share of Profits from associated companies	-65	-0.03	101	0.05	256	0.14
Interest Income	493	0.24	745	0.37	317	0.17
Others	1,994	0.99	2,267	1.14	3,388	1.86
Total other income	**2,422**	**1.2**	**3,113**	**1.56**	**3,961**	**2.17**
Total revenue	**202,540**	**100**	**200,022**	**100**	**182,568**	**100**

It can be seen from the table above that the majority of THAI's revenue still depends heavily on regular and business travels despite its many operations. Business travelers travel frequently throughout the year and tend to buy upgraded services with higher profit margins for the airlines. Regular travelers, on the other hand, are very price sensitive. In times of economic uncertainties and a drop in consumers' confidence in air travel the number of leisure travelers will be expected to decrease sharply. It is important that airlines pay attention to any changes that might affect their business travelers and regular customers. Once an airline has reached its break-even point profit will increase with every seat sold.[13]

Breaking down to region-by-region the revenue in the foreign transportation segment of THAI yields:

Table 6.2: Break Down of Foreign Transportation Revenue into regions

Foreign Transportation Revenues	**2008**	**2007**
Regional Asia	62,645.95	69,665.76
Europe	49,164.40	50,925.38
North Pacific	5,249.29	7,303.42
Australia and New Zealand	16,931.35	17,670.64

[13] Investopedia, The Industry Handbook: The Airline Industry [Online], 2001. Available from: http://www.investopedia.com /features/industryhandbook/airline.asp.

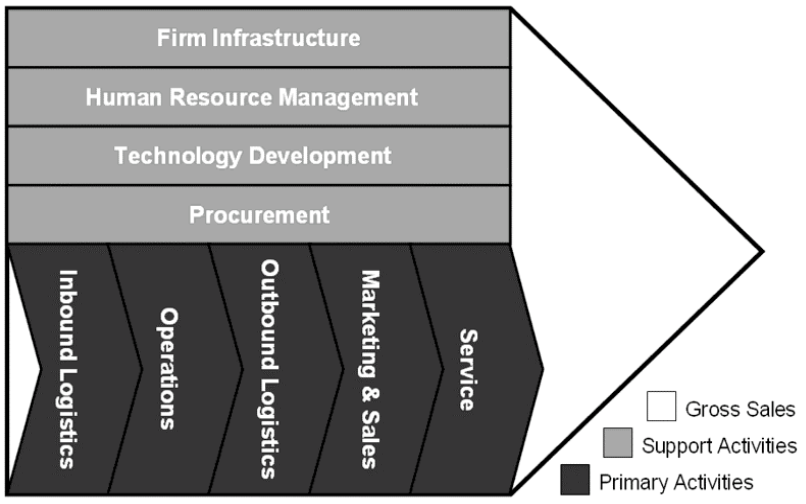
Africa	1,193.75	1,341.22
Total foreign transportation revenues	**135,143.74**	**146,906.42**

***Units in MTHB**

Source see[14]

As shown above, flight services to Europe represents the second biggest category of foreign transportation revenue for THAI, behind only the Asia region. The benefits of adapting to the ETS far exceeds the costs incurred and the opportunity to penetrate the EU market so it is not likely that the services will be shut down. The Commission is likely to pursue their goal of a globally harmonized carbon regime if after what can be called the trial regime within the European Community finds success. That being the case, THAI's preparation for the scheme in the European market will prepare it for what is coming on a bigger scale. The bottom line is this: THAI has to adapt to the new carbon-trading regime if it wants to continue to serve in the European air travel market and the rest of global aviation.

Figure 6.2: THAI's Value Chain Analysis



Source: Porter 1985.

[14] Thai Airways International Public Company Limited Annual Report 2008, 152.

6.6 Value Chain Analysis

The Value-Chain Analysis assumes that a business, whether manufacturer or service provider, can be looked at as a set of value-creating activities from the procurement of raw materials (inbound logistics), manufacturing processes (operations), finished products (outbound logistic), distribution channels (marketing & sales) and caring for the product (service). These are called primary activities as they are directly involved in making of a product/services. The supporting activities, on the other hand, include organizational make-up (firm infrastructure), management of personnel (human resource management), know-how (technology development) and obtaining of resources (procurement). The purpose of the analysis is to examine a firm's overall profit-making activities of an establishment. Here the analysis is used to identify and study the possible impacts by functions of EU ETS on Thai Airways International. We start by identifying what activities constitute THAI's value-chain:

6.6.1 Primary Activities

Represents main activities in earning profits of THAI.

1. Inbound Logistic

Aircraft services, aircraft parts and maintenance, fuel imports, training of flight attendants and on-board crew members, transportation control services, passenger crew and baggage services, acquiring quality ingredients for in-flight catering, boarding checks, and measures to ensure flight safety.

2. Operation

Includes route planning and weather checks, check-in counters, take-off and landing, communication to air traffic control, loading and unloading of baggage, in-flight services,

safety protocols, passengers' manifest, transfer of passengers and crew between terminal, aircraft via ramp bus, and transfer of passengers' baggage between terminal and aircraft, food and beverages services on board, report on time remaining to destination and weather condition to passengers, the actual flying and emergencies handling crew.

3. Outbound Logistic

Includes reservations (online, at the counter, or through travel agents) and ticketing, public relations, handling delays, permission to take-off and landing, permission to operate in foreign countries, keeping inventory and monitoring demands.

4. Marketing and Sales

Include service positioning in different markets, advertising campaigns, market research, strategic marketing plan, defining target market, alliances with other established airlines to provide convenience for its customers and better coverage of routes, pricing and sales channel relations.

5. Service

THAI derives its strength from this area where it is able to provide superior service in comparison to its competitors in the market and secure repeat customers. THAI's service is based on Thai's culture of hospitalities as the new marketing campaign suggests: "First Choice Carrier With Touches of Thai."[15]

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[15] Ibid. , 35.

6.6.2 Support Activities

1. Firm Infrastructure

Represents the day-to-day general management, accounting, finance, and strategic planning at the head office near Don Muang Airport and another one at Suvarnabhumi Airport.

2. Human Resource Management

Represents recruiting, training, and development of all personnel, career path planning, performance assessment, succession planning, general knowledge enhancement program, seminars and training related to commercial airline business and its many dimensions are provided to THAI employees. External training by outside institutions are also provided for THAI employees.[16]

3. Technology Development

Capability enhancements in the field of technology are being developed on an ongoing basis. THAI gives its priority to safety as has been observed by the FAA (Federal Aviation Administration) of the United States and the EASA (European Aviation Safety Agency) of the European Union. THAI has also acquired ISO 9001:2000 for its work in environmental management and ISO 14001:2004. For 10 years THAI have been providing maintenance services to other airlines. As of 2008, 50 customer airlines have entrusted THAI to perform maintenance services for them.

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[16] Ibid. , 35.

4. Procurement

THAI has divided its procurement in 8 categories: tools and equipment, catering, office supplies, construction and decoration, services, in-flight supplies, uniform and textile and others. Each category has both domestic and overseas suppliers who compete for a bid with THAI.

At this point we have established the legitimacy of the EU ETS as a sustainable transport scheme, and that the competition in the airline industry of Europe is fierce and that EU ETS has the potential to add to the pressure, especially for airlines with low fuel efficiency. Efficiency has become the name of the game where alliances are made to expand flying routes with less costs and more profit. Barriers to entry have become almost impossible to overcome. A new sector in air travel has emerged with lower costs for passengers expecting to fly at a cheaper price with full service. Alternative modes of transportation like speed trains are becoming more attractive due to Europe's geographical nature, which have shorter routes connecting each city than in any other regions. Now we look at ETS's impacts on THAI by operations.

6.7 Impacts of EU ETS on THAI According to Value-Chain Analysis and Suggested Responses

The inbound logistic that will be most affected by the trading scheme is fuel imports. During the past few years, fuel accounted for over 30% of THAI total expense due to the oil crisis and economic meltdown.[17] The situation was further worsened by sticky political situation at home that had resulted in the closing of Suvarnnabhumi Airport, canceled flights

[17] Information from interviews with THAI Executives.

and stranded and upset passengers. When the situation escalated the unrest has either halted or turned away foreign direct investments and undermined confidence in the business sector. In the short run where alternative energy is still in developmental stage the costs of fuel import will remain high due to the high and increasing demand. Keeping fuel inventory and monitoring demands will have to be more responsive to changes in the market so THAI can act in a timely manner. Matching capacity to demand is crucial in the effort to reduce fuel burn and the resulting emissions. The objective to save the environment and to save its own profit now becomes the same.

Inbound logistics also include aircraft parts and maintenance will also be subject to change whether in the case of purchasing new planes or modifications to old ones to make them more fuel-efficient and attractive to potential customers, if not merely to play catch up with other airlines, especially the ones working in the same Asia region providing the same kind of transport to Europe. This new facelift represents a big investment for THAI but it is necessary as the majority of THAI's fleet are ten years or older (while Singapore Airlines' average age for its fleet, for example, is only six). As has been mentioned, THAI also oversees the maintenance of other 50 airlines. THAI's ability to continue operation in this area depends on its aggressiveness in learning about new technology in aircraft building and maintenance, especially in the context of fuel efficiency. Not to do so would put THAI further behind in the field of aviation technology in addition to its archaic IT system. This time, however, other customer airlines are involved and they have the choice to shop around and find other, more technological-relevant airlines/aircraft services, which will result in losses in profit for THAI.

Clever and well-informed route planning during **operation** can also minimize the use of fuel and the resulting amount of emissions released into the atmosphere, as it is the main

objective in making all the changes. Being expensive, when compared with other costs in the case of THAI (30-40% of their operating costs in the EU market), another way of avoiding to pay the high price of fuel is price hedging, which THAI has been doing extensively since 2008 originally to manage the oil shock.

There is the possibility that the routes into/from Europe will have to be reconfigured to save distance, fuel, and take advantage of the alliance between THAI and other European airlines. At the moment, however, the price increases in tickets (estimated at €9-€27 per route) are not high enough to encourage airlines in the EU to reconfigure their routes. To avoid having to exceed allowance THAI and its Star Alliance partners can operate connecting flights where passengers can share available seats on another partner‘s aircraft and allow customers to travel to their desired destination with the same tickets they have purchased. This is how alliance partners share routes and unused capacity to be more efficient and avoid under utilizing of resources.

Demand in the leisure sector is likely to come down initially during the beginning of the scheme in 2012 as it is the most price-sensitive, but not by much, as some travelers who have the option of waiting can wait until the price comes down or become more stable, which is expected to be sooner than later than other regions because one, the European Community is very concerned about the impact of CO2 emission on the environment and there are many who support the measure to reduce CO2 emissions at all cost and two, Europeans are already familiar with the carbon trading as installations in the EU have been under the regime for some time before the inclusion of aviation into the scheme. Asian travelers, on the other hand, will be more sensitive to the changes in ticket price and will be more difficult to manage, as it is truly a new introduction of carbon trading that will take effect in the Asia to Europe route. The public relations department involved in **outbound logistic** will have to

keep the public informed about the situation in the event that higher operating costs could be pushed to customers at one point. The question of how soon will depend on THAI's ability to manage its cost structure. THAI may never have to resort to raising their fees or collect additional surcharges separated from the price of their tickets if its management team is versatile enough to handle the extra costs but a well-informed public will make for less hostile customers about having to pay more than they used to traveling by air and be more understanding regardless. THAI's decision to put carbon footprint on their in-flight menus is a step into keeping their customers informed. It must be mentioned, also, that permission to operate in the EU market also depends upon THAI's level of achievement in carbon trading. Failure to deliver enough allowances or infraction of contract with the authority (for THAI's case is the German DEHST who will be reporting to the Commission) will result in revocation of their permit to fly and carry passengers in the European air space.

THAI, like many other airlines in the EU market, will be experiencing slow growth during the EU ETS introductory phase when some operators are beginning to charge the extra costs onto their tickets and effect the average ticket price in the market. This is only temporary. Holding other factors constant, there is no discrimination of any kind on the airlines operating under the scheme so once customers are familiarized with the scheme growth is expected to be at its normal rate. **Marketing and sales** will have to be done more aggressively in the EU market due to the intense competition and the beginning of the EU ETS scheme for aviation. Initially customers will look for flights that will cost the least after the implementation of the ETS. Prices will be different across airlines because some airlines will choose to absorb the costs while others push this responsibility to their customers. THAI needs to be clear in its market positioning and targeting different groups of customers so it will be able to set prices accordingly. This effort is being done through positioning THAI as

a premium airline separated from Nok Air, of which THAI also owns, that competes in the low-cost domestic market.

In order to achieve its planned position as a premium airline **service** will have to remain above average and be consistent with the image THAI is trying to project. It is expected that THAI will have to learn to adapt to the current environment in the different markets whether it be at home in Thailand or abroad as it is the nature of air travel operations. Its training of crewmembers is not an exception. The most important being safety of passengers on board THAI may have to revise its plan for training to turn out new batches of better-trained and more consistent flight attendants and other crew members as there have been complaints about service inconsistency if THAI's decision to compete as a premium airline is going to be realized. Problem with inconsistencies in this area can be magnified once THAI enters the premium market: comparisons with other existing premium airlines will either reveal that THAI does not truly belong there or that customers were deceived in paying for premium tickets and end up with mediocre services, both of which can severely effect THAI's reputation and chance of survival in the highly competitive EU market.

Support Activities

Strategy and finance will be directly affected and will have to manage the increased expense sprung from the amount exceeding their allowance for the year as well as financing CDM projects. "Banking" and "Borrowing" including how to best spend additional allowance credits from the projects or save them for the future. These options will be available in 2012.

Technology Development

As has been mentioned, THAI provides maintenance services to 50 airlines. This will be affected once the new generation of equipments and engines and the complete aircrafts themselves begin to arrive in 2010. Standards will have to be met as maintenance personnel acquire knowledge about the new planes and equipments.

Procurement

Procurement will be affected when all the attention is focused on acquiring jet fuel and the high price and at the same time trying to comply with EU environmental regulations in air transport. These two issues are related and solving one (save fuel) will also lead to solving another (less emissions).

6.8 Compliance mechanisms

Preparations are underway by THAI in its obligation to report on its carbon emission on flight paths to the EU. So far THAI has already achieved the report part. Germany oversees free allocation (DEHST or the German Emissions Trading Authority who implement emissions trading and project-based mechanisms of the Kyoto Protocol[18]) of THAI as assigned by the EU due to flight frequency and number of destinations of THAI flights to Germany. Comparing fuel use and CO2 emissions of THAI:

Table 6.3: Fuel Use and CO2 emission by THAI aircrafts

	Fuel Use	CO2 (Tons)	ETS Allowance Costs
Base year 2004-2006:	703,345.84	2,215,539.40	€17,724,315.20
2012 projection:	771,579.77	2,430,476.30	€19,443,808.00

[18] DEHST website's Welcome page [Online], 2010. Available from : http://www.dehst.de/EN /Home/homepage__node.html?__nnn=true.

(Measure in cubic tons at the price of €8 per unit allowance)

Source: Information from the interview.

Like any other airline in the EU, emissions allowance given to THAI for free will be proportionate to the amount its aircrafts emit during each trading period, while the rest, depending on the trading period, will have to be auctioned. If THAI's emission exceeds its allowance it will have to either exchange some of its credits from its own CDM projects for EUAs or buy more allowances from other businesses under the scheme. The above table includes the rate of fuel used from 2004 to 2006 and projection of fuel use in 2012. This projection assumes that the allowance costs €8 (Given in Table 6.3) per one emission unit. The allowance price fluctuates, however, and all aircrafts going into and leaving from any EU airports will have to auction an estimated one-third of their emission come 2012.[19]

The decision has been made to use the average annual CO_2 emissions by the different carriers concerned for the years 2004, 2005 and 2006 as base years to compute the amount of total allowances against. Dubbed 'historic emissions', this adds up to 219,476,343 tons of CO_2[20]. Aviation in 2012 will account for around 10% of greenhouse gas emissions covered by the ETS. Below are formulas for calculating the cap for amount of allowances to be given for free and to be auctioned:

Example 1

Total Allowances $_{2012}$ = 0.97 * Historical Emissions $_{2004\text{-}2006}$

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[19] Martin Schaefer et. al, The Economic Impact of the Upcoming EU Emissions Trading System on Airlines and EU Member States—An Empirical Estimation [Online], 2010. Available from : http://www.springerlink.com/content/v8850v3w1426wr85/fulltext.pdf.

[20] Isabelle Smet, Aviation One Step Closer to Inclusion in ETS [Online], 2011. Available from : http://www.europolitics.info/aviation-one-step-closer-to-inclusion-in-ets-art297632-10.html.

= 0.97 * 219,476,343[21] = 212,892,052.71 tons

The cap will be kept at 97% of emission during 2004 to 2006 period in later phases. 10% of the allowance will have to be auctioned, calculating the amount of free allowances yields:

Free Allowances $_{2012}$ = 0.90 * Total Allowances $_{2012}$

= 0.90 * 212,892,052.71 = 191,602,847.439 tons

This amount will be multiplied with the current price of allowances to arrive at the amount in Euros. This is the **total amount** to be distributed to airlines according to their needs.

Example 2

Here we look at THAI on an individual basis:

THAI Emissions $_{2009}$ = 2,296,063 tons

Emission Price$_{2009}$ = €11.5 per ton

Total Allowances by THAI = 2,296,063 * €11.5 = €26,404,724.5

Free Allowances = 0.90 * €26,404,724.5 = €23,764,251

Allowances to be auctioned = €26,404,724.5 - €23,764,251 = €2,640,473.5

Source: see[22]

The calculation for allowances that will be given for free is quite straightforward: THAI's emission in 2009 was 2,296,063 tons (see Appendix E), and the price of emission at the time was € 11.5, so THAI is obligated to pay € 26,404,724.5 if there were no free allowances given. But we are in Phase II of the emission trading scheme (ETS), so the free allowances were given at 90% (€23,764,251) and 10% to be auctioned (€2,640,473.5), which means THAI only have to worry about the remaining 10% of its carbon output approximated at €2.6 million, less than 1% of its total revenue from international flights in 2008 (*See: Table 6.1: Revenue Structure*). THAI agrees to accept financial responsibilities that come with its plans to reduce emissions but carbon donations by passengers are welcome. The price of allowances as of January 31, 2011 is €14.00 or around 590 THB.[23]

Below is Table 6.4, which calculates the allowance for each airline in the EU using data from Appendix E. Note that this calculation is hypothetical because it uses data from the past but it will give readers approximations of how it will look like when the scheme is actually being implemented:

Table 6.4: The amount of free and to be auctioned allowances by airlines using data from 2009 (Appendix E) and the most current allowance price of €14.00 as of January 31, 2011.

Airlines	2009	Auction (Tons)	Free (Tons)	Value (Euros)
Lufthansa	19,045,017	1,904,501.7	17,140,515	26,663,023.8
British Airways	18,921,244	1,892,124.4	17,029,120	26,489,741.6

[22] Martin Schaefer et. al, The Economic Impact of the Upcoming EU Emissions Trading System on Airlines and EU Member States—An Empirical Estimation [Online], 2010. Available from: http://www.springerlink.com/content/v8850v3w1426wr85/fulltext .pdf.

[23] Martin Brechter, Which CERs will the EU Accept After 2012? : To What Extense Will Airlines Be Able to Use CERs Under the EU ETS? [Online], 2011. Available from : http://www .tgo.or.th/download/seminar/presentation/310111/CERs_TGO.pdf.

Air France	15,623,617	1,562,361.7	14,061,255	21,873,063.8
KLM	11,016,567	1,101,656.7	9,914,910	15,423,193.8
Ryanair	9,617,105	961,710.5	8,655,395	13,463,947
Iberia	8,944,872	894,487.2	8,050,385	12,522,820.8
easyJet	7,565,568	756,556.8	6,809,011	10,591,795.2
United Airlines	5,854,564	585,456.4	5,269,108	8,196,389.6
Delta Airlines	5,564,615	556,461.5	5,008,154	7,790,461
airberlin	4,877,073	487,707.3	4,389,366	6,827,902.2
Virgin Atlantic Airways	4,533,006	453,300.6	4,079,705	6,346,208.4
Alitalia	4,013,846	401,384.6	3,612,461	5,619,384.4
TAP- Portugal	3,592,512	359,251.2	3,233,261	5,029,516.8
SAS	3,575,975	357,597.5	3,218,378	5,006,365
Qantas Airways	3,464,762	346,476.2	3,118,286	4,850,666.8
American Airlines	3,317,744	331,774.4	2,985,970	4,644,841.6
Continental Airlines	3,305,588	330,558.8	2,975,029	4,627,823.2
Emirates	2,941,452	294,145.2	2,647,307	4,118,032.8
Aer Lingus	2,581,825	258,182.5	2,323,643	3,614,555
US Airways	2,570,936	257,093.6	2,313,842	3,599,310.4
Austrian	2,480,110	248,011	2,232,099	3,472,154
Finnair	2,458,971	245,897.1	2,213,074	3,442,559.4
Thai Airways International	2,296,063	229,606.3	2,066,457	3,214,488.2
Condor Flugdienst	2,090,105	209,010.5	1,881,095	2,926,147
Cathay Pacific Airways	2,008,373	200,837.3	1,807,536	2,811,722.2
Singapore Airlines	2,001,378	200,137.8	1,801,240	2,801,929.2
Air Canada	1,883,218	188,321.8	1,694,896	2,636,505.2
Air Europa Lineas Aereas	1,547,634	154,763.4	1,392,871	2,166,687.6
Air China	1,489,296	148,929.6	1,340,366	2,085,014.4
Vueling Airlines	1,222,530	122,253	1,100,277	1,711,542

The price of allowance is another important issue to explore. Changes in the price of allowance can impact an airline's bottom line to different degrees depending on the airline's financial structure. Taking a look at Table 6.4 it can bee seen that annual obligations for the allowances by airlines ranged from €26 million to €1.7 million while the percentage of free allowance remains the same for all airlines the percentage of the costs of allowances differ in comparison to each airline's revenue. THAI's overall profit should be used to measure its ability to cope with the costs, in which will be demonstrated here using information on

emission of THAI in 2009 from Appendix E multiplied with the most current price of allowances at 14.00 and account for 10% of allowances to be auctioned as we are in Phase II:

Example 3

Emission Auction $THAI_{2009}$ = (2,296,063 tons * €14.00) 0.10 = €3,214,488.2

Compared this to THAI's overall profit in 2009 of € 170,755,776.229[24] and we can conclude that emission allowance for THAI in the year 2009 is 1.9% of its profit. With THAI's effort to reduce costs including the ones from fuel and its sponsorship of environmental projects aiming at reduction in CO_2 emissions in its homeland, it is quite clear that THAI will be able to fulfill this obligation for 2012. But what about the future? What happens when the percentages in the mechanisms like the cap on total emission, allowance price and the percentage of free to auctioned allowances shift, holding THAI's revenue structure in the EU constant since we cannot speak for THAI in that area. Will THAI be able to handle its responsibility still? This brings us to the next phase in our analysis.

The percentages between free and auctioned allowances is on the increase since free allowances will only be given at the beginning of the scheme and the percentage of allowances that must be auctioned will grow until there are no free allowances available and ALL of the allowances will have to be auctioned. Airlines better prepare, get acquainted to the scheme, as there is a time limit on the free allowances. Here we take a look at how changes in price, cap limit and the percentages of free allowance affect THAI:

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[24] Bangkok Pundit, Thai Airways Returns to Profit [Online], 2010. Available from : http:// asiancorrespondent.com/29342/thai-airways-returns-to-profit/.

Example 4

As Example 2 shows, the allowances that had to be auction was €2,640,473.5. We want to know, other factors hold constant, what will happen when:

(a) Price reaches to €50

(b) Cap on total allowance changes to 95%

(c) Percentage of free allowance vs. auctioned allowance is 60% to 40% in Phase III.

(a) From Table 4.2 the rate expected for allowances in 2012 is 25$. Assume that, at one point, allowance price reaches €50. Using the same amount of CO_2 released by THAI in Example 2 we have:

$$\text{Total Allowances}_{THAI} = €50 * 229,606.3 = €11,480,315$$

Here the amount of THAI's allowances to be auction has risen to €11,480,315 from €2,640,473.5 in Example 2, a 77% increase in the amount THAI has to pay and represent 0.29 % of THAI's international revenue and approximately 1% of its revenue in Europe in 2008 from Table 6.3. So far things look optimistic for THAI. We move on to analyze the impact of changes in the overall cap.

From 2013 to 2020, representing Phase III of the scheme, emission cap will also be reduced to 95% of historical amount during 2004 to 2006.[25] This means the calculation of total allowances cap to be given in the calculation will change from 97% as seen in Example

[25] Brechter, Martin, Which CERs will the EU Accept After 2012? : To What Extense Will Airlines Be Able to Use CERs Under the EU ETS? [Online], 2011. Available from : http://www .tgo.or.th/download/seminar/presentation/310111/CERs_TGO.pdf.

1 to 95%. All airlines operating in the EU are subject to the increase in the amount of CO_2 being auctioned each year so the impact on THAI will not depend on the competition but rather its ability in managing its own resources. This is also true for the future while the ETS scheme still holds.

(b) From example 1 we can see that the cap on total emissions by all airlines under the scheme is 97% from average between the years 2004-2006. This percentage will be reduced to 95% in Phase III:

Example 5

Total allowances to be given = 0.95 * 219,476,343 tons = 208,502,525.85 tons

This 2% increase does not seem to affect THAI's cost structure since they will be distributed according to each airline's need, the same throughout the life of the scheme so there would be minimal competition resulting from the reduction in total cap on emission.

(c) During Phase III the percentage of free allowances to auction allowances will be raised to 60%. As to the question of whether THAI will be able to run its business in the EU once it has to auction 100% of the allowance the answer has already been given previous to this section with the comparison of €26 million against its revenue. Using emission data from Table 6.4 of THAI's emission from 2009 gives us:

Amount to be auctioned $_{THAI}$ = 0.60 * 2,296,063 tons = 1,377,637.8 tons

Now, we assume that the price of the allowance is € 14.00 as it is the most current price and we have:

Example 6

Auction Allowance $_{THAI}$ = €14.00 * 1,377,637.8 tons = €19,286,929.2

The result is the allowances that have to be auctioned by THAI is 0.4926% of THAI's total revenue in international operations and it remains under 1%. However, comparing THAI's allowance against its revenue neglects the affect on its profit-making ability, which various across airlines. In this case we have to look at its profitability to derive at a conclusion, which will enable us to recommend actions to be taken accordingly. This will be done in the next section where THAI will be compared with other Asian airlines.

The calculations in the Example 2 will only work until the end of 2012. New calculations with higher percentages of allowances that need to be obtained through auctions will replace this calculation at the end of 2012 as we enter into Phase III of the scheme on January 1st, 2013.

At this point it is appropriate to introduce the organization known as Thailand Greenhouse Gas Management Organization (TGO). The organization was set up in 2007 to monitor and approve CERs from environmental projects and others. The allowances gained through CDM projects in Thailand will have to be forwarded to the CDM Executive Board in Bonn to be traded for EUAs and would be meaningless if they are not approved by the organization first. Other tasks of the organization include promoting carbon market in Thailand, training and capacity building and an information center dedicated to greenhouse gas and related issues.

An interview with Deputy Director of the Organization revealed that, currently, there are only 3 certified CDM projects in Thailand and they do not generate enough CERs for all the establishments under the ETS in Thailand and it is very likely that THAI will have to buy the CERs from other countries instead. On one hand, THAI becomes another buyer that will

keep these projects going. On the other hand, this insufficiency of carbon allowances represents losses in business opportunities for the Thai economy. THAI wants to buy CERs from sources within Thailand. Unfortunately, there are not enough carbon credits in Thailand to go around due to increasing demand for them. There is also no government intervention. THAI was privatized some time ago and it is now responsible for its own fate. As far as the degree of effectiveness of the scheme goes, the measures taken by THAI will just have to work to ensure its survival in THAI's second biggest market that is Europe. These include weight reduction from everything from food, blanket, passengers' and crew's baggage and the effort to save fuel during take-off and taxiing[26]. She believes the scheme will be effective in using market mechanisms as well as regulations by the governments to reduce emissions. When asked if she thinks the scheme can be applied for aviation in Thailand she simply replied, "No" and went on to explain that Thailand does not have the same capacity in which to measure emissions and leverage against airlines from other countries like the EU, whose market represents 500 million of would-be-consumers: if there happens to be a scheme similar to the ETS in Thailand flights by international operators coming to Thailand will just simply divert to airports in the neighboring countries that are not subject to the scheme instead.[27]

Measures to control CO2 emissions were initiated and taken by THAI to reduce the impacts of global warming. These include renewing its fleet with more fuel-efficient aircrafts that produce less emission and enhancing its management of fuel consumption through consideration of factors having direct impact on fuel demand like rationalizing

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[26] Interview with Ms. Prasertsuk Jamornman**,** Deputy Director of Thailand Greenhouse Gas Management Organization.

[27] Ibid.

aircraft weight by reducing unnecessary weight burden and managing on-ground taxi time and in-air holding time. These initiatives should not be overlooked when assessing THAI's readiness for the scheme.

6.9 Competition from other airlines operating in the EU

According to the Executive Vice President, Strategy and Business Development Department of THAI, there are 2 types of competition. The first being airlines that fly to the same destinations like Eva Air, Lufthansa, and British Airways. THAI, however, has the largest market share in the European market on Bangkok-Europe routes (36%-60% depending on destination). THAI has long established itself in the mind of Europeans wanting to come to Thailand. Confidence in THAI is there in the EU market. While THAI has established its presence in the EU other new airlines have emerged in the past 10 years. Examples are Emirates, Qatar and Etihad. These newcomers want to build their respected countries into airline hubs. One example is Emirates, which made a stop in Dubai before going to Australia. Singapore airline is another competitor worth discussing. The airline is considered one of the best in Asia. Singapore is already an established hub and has the strong support from the Singaporean government through Temasek Holdings Pte. The Airline adheres to the three basic competencies when conducting services: providing quality service; managing capital expenditure; and optimizing collaboration with international partners.

Here we will compare THAI's profitability to Singapore Airline and Cathay Pacific to see how efficient THAI is against other successful airlines from Asia. Cathay Pacific Airways (Cathay Pacific) is an international airline based in Hong Kong. It provides passengers and cargo to 117 destinations in 36 countries, slightly more destinations but in

less number of countries compared to THAI. In the financial year ended December 31, 2009 its reported revenue was $8,640.2 million (€6,012,870,703.6), a 22.6% drop from 2008.[28] But looking closer will reveal that the operating profit of the company was $577.8 million (€402,101,420.4) in 2009, compared to an operating loss of $975.4 million (€678,798,417.2) in 2008, which obviously came out as an overall loss in profit. The net profit was $605.5 million (€421,378,349) in 2009, compared to a net loss of $1,121.8 million (€780,680,812.4) in 2008 so we can conclude that Cathay is actually did better in 2009 than it did in 2008, somewhat of a similar story with THAI.

Looking at Table 6.4 one will see that Cathay emitted lesser amount of CO_2 compared to other airlines on the list (2,008,373 tons valued at €2,811,722.2), just one place behind Singapore. Singapore Airlines, on the other hand, emitted 2,001,378 tons of CO_2 valued at €2,801,929.2 (See: Table 6.4). Next we will compare each airline's profitability against another. Each airline's costs in operation will be measured against its overall profit in order to see how efficient money had been spent to make profit, while adding pressure from the ETS into account.

Example 6

From what we have gathered so far the percentages of emission allowance from THAI's, Singapore Airlines' and Cathay Pacific against their revenue is quite negligible. Here we will measure each airline's emission responsibility against its profit-making capacity, again using information from Appendix E and the most recent price at €14.00 and 10% auction as we are in Phase II:

Emission Auction $THAI_{2009}$ = (2,296,063 tons * €14.00) 0.10 = €3,214,488.2

[28] Report Linker, Cathay Pacific Airways Limited – SWOT Analysis [Online], 2010. Available from : http://www.reportlinker.com/p092125/Cathay-Pacific-Airways-Limited-SWOT-Analysis.html#.

Emission Auction $Singapore_{2009}$ = (2,001,378 tons * €14.00) 0.10 = €2,801,929.2

Emission Auction $Cathay_{2009}$ = (2,008,373 tons * €14.00) 0.10 = €2,811,722.2

Net Profit $THAI_{2009}$ = €170,755,776.229[29]

Net Profit $Cathay_{2009}$ = €37,124,000[30]

Net (Loss) $Singapore_{2009}$ = (€301,504,000)[31]

Singapore Airlines has sustained losses in 2009 due to fuel price rise so it is not a good indicator of what the airline is able to do under normal circumstances. That having been said, the allowance-to-losses ratio of Singapore was -9.3%. Although THAI's allowance-to-profit ratio was almost 2% while Cathay's is 7.6%, signaling an upward direction of THAI's profitability and, while it was able to pay for the allowances, Cathay's cost management problem.

What can be concluded here is that there is definitely room for improvement in emission reduction efficiency for Asian airlines to achieve and THAI seems to be doing well in managing its fuel use and other resources and was able to outdone its Asian competitors. Whether THAI can sustain this level of CO_2 emission remains to be seen.

Another type of competition against THAI's profitability in the EU market is low-cost airlines. Low-cost airlines do not directly have an impact on THAI since they target different groups of consumers and they only cover domestic routes and short city-to-city flights in Europe, but they do have an effect on total demand as growth in the airline industry is being

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[29] Bangkok Pundit, Thai Airways Returns to Profit [Online], 2010. Available from : http://asiancorrespondent.com/29342/thai-airways-returns-to-profit/.

[30] Andrea Deuchrass, Cathay Pacific Returns to Profit in 2009 [Online], 2011. Available from: http://www.nbr.co.nz/article/cathay-pacific-returns-profit-2009-119916.

[31] Ben Sandilands, Singapore Airlines Report Losses and Recovery [Online], 2009. Available from: http://blogs.crikey.com.au/planetalking/2009/11/11/singapore-airlines-reports-smaller-losses-and-signs-of-recovery/>.

accelerated and price-conscious consumers have found new alternatives in lower-priced air transport especially in the European market where LCCs come with full service and amenities. Customers who wish to fly short distances now have new options beside flag carriers. The plan is to position THAI in the premium market where it can focus on providing premium services and long-haul international flights.

There is no discrimination of carbon emission scheme against Asian airlines. On the contrary, long-haul flights from foreign airlines have an advantage of not having to fly the whole distance over EU's jurisdiction and therefore have more allowances left. All airlines with flights to and from Europe will be forced to pay regardless of their nationalities. Small airlines operating only in Europe will suffer most because they cannot deviate their routes outside of Europe to reduce costs. Each airline has its own set of strategies (solution) to deal with emission trading. CDM in Thailand is too small and inadequate at the moment. Governments of non-annex 1 countries who are not forced to pay (including the Thai Government) will help with voluntary reduction, resulting in less cost to THAI. At the moment emission inventory in Thailand still lacks behind other nations (National Communication 2 (NC2)) according to the UNFCCC standard.

6.10 THAI's Responses to EU ETS

Despite the low impact from the EU ETS, main regulations by THAI to be put in place in 2010 was to curb both the volume and efficiency of fuel burning have been added with 2 certified environmental projects and more pending requests to further the cause. The objectives of the projects were to claim more carbon credits through reforestation and to raise Thai people's awareness of the issue. Forests absorb carbon dioxide during their lifetime but give them out when they are cut down. Thai locals need to be aware of this fact especially

those whose means of getting by is to cut down more woods for fuel and sell them. The result will be domestic but reductions of carbon emission are worth the same anywhere on the planet. That is why these mechanisms exist: to reduce the global carbon emission at the least cost. Costs of these projects were 400-500 million THB (9.25 to 11.56 million Euros) but THAI as a company believes that they will pay in the long run. Proceeds from the projects will go into the fight against climate change and global warming. The building of new carbon credit reserve will help prepare THAI and they are to be used in 2012. Main strategies for THAI in 2010 would be to:

1. Ensure full cabin factor
2. Obtaining new aircrafts that burn less fuel
3. Participate in emission trading
4. Corporate Social Responsibility (CSR)

6.10.1 Renewing THAI's fleet

THAI's fleets will have to be replaced by more efficient aircrafts measuring by distance times the payload to reduce future costs to be able to stay ahead of the competition in Europe if not to comply with EU ETS. New aircrafts need to be used efficiently according to their capacity and demand, example include Boeing 777. The aircraft is the most fuel efficient in THAI fleet but it has to be put to proper use (passengers should fill up about 70% of seats) through strategic fleet plan (size, demand, rate of fuel usage). Airlines must keep in mind holidays seasons and summer vacations during which load factor can be

significantly higher, therefore, it is important to compare the figures against the same period from the previous year.[32]

As of December 2008 THAI's fleet consists of 89 aircrafts with a new A340-600 joining in October 2008. The new aircraft was intended to serve European destinations during winter schedule of 2008/2009. 2 A300-600 aircrafts were retired and another 3 Boeing 737-400s were leased by Nok Air, leaving a total of 86 aircrafts for THAI's operations.[33]

6 Boeing 777-300 were undergoing refurbishment to increase comfort and modernize the aircrafts' interior. The refurbishment of one of the 6 was completed in May 2008 and work on the second aircraft commenced in December 2008. The completion of the second aircraft is scheduled for early 2009.[34]

6 new A330-300HGW aircrafts will join the fleet in April to replace the outgoing capacity in 2009. THAI's plan is to sell the 4 A340-500 aircrafts previously used in the Bangkok-New York and Bangkok-Los Angeles routes. Bangkok-New York flights had been put on hold while the Bangkok-Los Angeles direct flights have been reduced from daily service to 5 weekly flights effective July 1, 2008. A two-stop flight is planned to make a stop in Osaka before flying to Los Angeles using Boeing 777-200ER aircraft.[35]

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[32] Investopedia, The Industry Handbook: The Airline Industry [Online], 2010. Available from: http://www.investopedia.com/ features/industryhandbook/airline.asp.

[33] Thai Airways International Company Limited Annual report 2008, 18.

[34] Ibid. , 18.

[35] Ibid. , 18.

These purchases are not collusions among THAI executives to make more money out of corruption. They are rather a necessary strategic move long overdue to catch up with other airlines. The planes will be coming in intervals during the next few years to replenish the fleet, make room for the increasing number of customers and achieve its goal to become a premium airline.

6.10.2 Route and Destination Development

Route and destination development of THAI and its flight frequency are determined by the number and type of the aircraft in its fleet, demand expectations in various markets, profitability outlook on each sector, and the expected contribution to be made to THAI's existing route network.[36] Frequent reviews are needed as well as quick responses to changes in these factors. At the moment the impact of the ETS scheme is still at a minimum so major rerouting in the EU is not expected to happen yet but rerouting or de-routing is done on a normal basis to reduce costs.

The alliance with European airlines gives THAI an advantage in resource management through code-sharing, increase THAI's reach into the EU market and shared marketing campaigns also introduces THAI to potential customers in the EU.

6.10.3 Fleet Composition

Fleet plan strategy will be applied in terms of sizes, demands, and rate of fuel consumption. Engine size generally determines the rate of fuel consumption. The amount of emission from an aircraft can be roughly calculated by multiplying the amount of fuel by 3.

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[36] Thai Airways International Company Limited Annual report 2008, 18-19.

Fleet composition, therefore, is going to have a direct impact on emissions released.[37] The aviation industry emits an estimated 650 million tons of carbon dioxide every year. Being charged at USD$25 per ton, for example, this would cost the industry USD$16 billion, but even if the allowances are at USD$15 per ton, the figure would still total to USD$10 billion, but do not forget that hundreds of airlines will each be partially responsible for this not just any individual airline.[38]

6.10.4 Improvement of In-Flight services

The improvement in the services offered by THAI is another effort to attract more customers in the EU and elsewhere. One of the complaints by customers and was included in the SWOT analysis was that THAI's services are inconsistent. THAI cannot afford to have this weakness with the oncoming of the ETS scheme where costs are cut and airlines everywhere are trying to attract more customers. THAI had made changes to its aircrafts' interior to reflect their new vision to become "First Choice Carrier With Touches of Thai," integrating the uniqueness of Thai culture into its services (hospitability, service with a smile, etc.) to compete with other Asian airliners in the EU. While these are being done, again, service quality should not be compromised.

6.10.5 Fuel efficiency

THAI will have to reduce their fuel intake to a minimum not only because of the carbon exchange scheme but for other practical reasons as well. Fuel price peaked in 2008,

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[37] John Whitelegg, Transport For A Sustainable Future: The Case For Europe, (London: John Wiley & Sons, 1993), 25.

[38] Reuters, Emissions Trading: Asian Airlines' Friend or Foe? [Online], 2009. Available from: http://news.airwise.com /story /view/1234945186.html.

forcing THAI to reduce flights to destinations where profits have taken a toll. Additional long-haul flights were postponed mostly to deter the impact of fuel price. Flights are rerouted to destinations that received very little impact from the crises and where fuel accounts for a small percentage of operating costs and thus yields the most profit for the company.[39] Hedging was also used with jet fuel price to lower the impact of high fuel price. According to the company's policy hedging was allowed up to 50% of a full year demand. Average hedging exposure is around 3%-5% a month and lasts between 3-6 months.[40] Reducing fuel use and curbing emission will not work in the long term considering the limited nature of oil reserves. THAI, along with all commercial airlines, private jets, and military air force should be looking into alternative forms of energy that releases less or none of CO2 and other greenhouse gases into the atmosphere that are being developed and was mentioned in Chapter 4.

6.10.6 Global Alliances

THAI happens to be of the founding members of the Star Alliance. Joining an alliance gives the benefit to THAI in terms of network expansion. By linking 2 or more airlines ideally operating in distinct geographic locations gives its members scope and more coverage. An alliance usually means code sharing on a number of routes and an increase in volume of passengers. It can also mean marketing benefits, schedule coordination, joint sales office, joint ground handling, combined frequent flyers program, joint maintenance or even

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[39] Ibid. , 17.

[40] Ibid. , 59.

joint equity transfer.[41] Joining an alliance gives better scope to penetrate the market, especially if the airline is new to the market or the barrier of entry is high.

6.10.7 Spin-Off

The new trend among traditional airlines since the arrival and success of low-cost airlines is to launch a low-cost version of themselves to capture the new segment and stay in the competition. THAI has done this also with the launching of Nok Air, although the new THAI-owned LCC only operates domestic flights within Thailand, its existence should contribute to THAI's financial strength.

6.10.8 Aircraft Modifications

So far we have discussed about acquiring new planes and new engines to be more fuel-efficient, there are other technical ways in which to make aircrafts consume less fuel as well like changing surface material to reduce drag (air resistance) and installations of winglets (devices positioned at the end of the wings also to reduce drag).

THAI has a lot of old aircrafts that burns fuel faster than they should. These aircrafts will go through engine modifications to improve their fuel consumption rate. THAI also had decided to purchase 15 new aircrafts, which will be gradually unveiled in 2011, 2012 and 2013. In terms of Corporate Social Responsibility (CSR), THAI will include carbon footprint on its menu identifying not only where the food came from but also how much emission had been released during the process of obtaining the ingredients. Carbon donations will be made

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[41] Debarshi Datta and Subham L. Chakravarty, European Airline Industry – Strategies for the New Millennium [Online], 2001. Available from : http://www.skytechsolutions.com/pdf/researchPapers/European%20Airline%20Industry%20-%20Strategies%20for%20the%20New%20Millennium.pdf.

available to passengers who wish to support the cause. THAI's slogan of being "Lean and Green" promises to make the best use of resources possible and every project have to be considered in terms of their impact on the environment.

Other Measures Used by other airlines

Cross Holding

Cross holding is done by acquiring shares of smaller airlines to boost profit. Many airlines have done the same and it proved to be successful. Ryanair is a prime example.

To conclude the chapter and confirm the findings, we have first discussed the impacts of the emission-trading scheme on Asian airlines and on the level of emission itself. The result revealed that there is no discrimination against Asian airlines. On the contrary, when compared to EU airlines non-EU airlines have the advantage of not having to disclose and pay for allowances when they fly outside of the EU routes and EU airports. The allowances would represent only a fraction of non-EU airlines' income where as they constitute a heavier burden on EU airlines. We then moved on to discuss the impacts of the scheme on the emissions themselves with the result that the emissions released was kept at the 2004-2006 average. An estimated 183 million tons of CO2 emissions, a 46% saving of total EU's emission, is projected to happen in 2020. The background on Thai Airways International has been given and we have learned about the situation of the company in the past few years. A SWOT analysis was done on THAI and it confirms that THAI is lacking behind in the technical department where as its reputation is still being kept. Compliance mechanisms have been shown and we get a better picture of what the airline industry in the EU will look like in 2012 as well as what THAI will have to face as an airline. Like other non-EU airlines, THAI will not suffer as much because it still has businesses outside of the EU where rapid

and overreaching growth is expected and can make up for losses occurred as has been said. It must be remembered, however, that the EU is a major market for THAI, and that THAI will do almost anything to maintain its continuation of operations in this area. Solutions were suggested after the discussion on impacts as revealed by the value-chain analysis. The actual solutions chosen by THAI were presented and we came to the conclusion that THAI has decided to absorb all the costs occurring because of the ETS in the initial period so there will not be impacts on THAI's ticket prices, yet. How effective their choices are in dealing with the scheme remains to be seen.

CHAPTER VII

CONCLUSION

7.1 Conclusion and Recommendations

Once again, this paper aims to find what are the effects of EU Emission Trading scheme on THAI in terms of profit and changes in operations. The main tools used to find the answer to this question include, but not limited to, Porter's Five-Force Model applied to the EU airline industry, SWOT Analysis applied to THAI as a company and Value Chain Analysis applied to THAI's operations in the EU. In answering the research question we found that the impact of EU ETS on THAI's operations in the EU is minimal and that THAI will be able to cover the costs of its CO_2 emissions in 2012. Nevertheless, it is crucial that THAI comply to the ETS because not only financially, EU flights by THAI generate the second biggest revenue for the airline compared to other regions. The alliances of international partners mean that THAI has the opportunity to expand its network in the EU.

This paper has first assessed the degree of competition in EU airline market, which turns out to be quite aggressive. Chapter 4 dealt with regulations on greenhouse gases at the regional and international level that may have an affect on airline operations with specific focus on the EU ETS scheme. Energy issues were tied with sustainability as the EU hopes to lead the global green movement. The EU ETS was tested against guidelines developed in 1992 by John Roberts and other commentators on sustainable contemporary transport policy and met all the relevant criteria. In Chapter 5 the EU airline industry was put against Porter's Five Forces Model with the conclusion that competition is fierce, barriers of entry were almost impossible to get across and bargaining power of suppliers remains high for jet fuel. Airbus in Europe and Boeing in the United States continue to take control of the aircraft building and technology, of which THAI has to keep up with. Bargaining power of buyers is

at its highest while threat of substitute product is high due to the quality of alternative modes of transport in Europe. Chapter 6 is dedicated into analyzing Thai Airways International Co., Ltd. as a case study. THAI's many operations were looked at through Value-Chain and SWOT Analyses to be able to understand the impact of EU ETS on THAI's operations.

A SWOT analysis has been done on THAI as a company with the result that THAI has more weaknesses than strengths and the strengths they have seem to come only from reputation and image. Where as its weaknesses whether in the financial or IT, market positioning, old aircrafts, inconsistency in service, and problems in management itself are a lot more fundamental to the overall operation and need immediate attention. As for opportunities, the Asia pacific region is growing rapidly and THAI can count on more prospects of customers in this region in the future, albeit THAI becomes more consistent with the image it tries to project and target the right group of customers. EU ETS is another opportunity for THAI to prove itself to be strong and versatile enough to overcome the costs it will have to bear. Threats for THAI in the EU market include competition and the need of conformation at different levels of authority but not discrimination, as all airlines will be treated equally under the emissions trading scheme. Other threats include fluctuating price of fuel, the risk of another financial crisis and unstable political situation back home.

Looking at the big picture, we have also come to the conclusion that non-EU airlines, more specifically, Asian airlines, have the advantage of having their revenues coming from flights in other areas of the globe that are not subject to the scheme and therefore have better financial leverage over EU airlines whose flights are restricted within the EU zone and have to meet their allowance obligations for all of their flights. There is, once again, no

discriminations against any airlines from outside the economic zone as all airlines are treated the same regardless of where they are from.

Looking at the relationship between THAI and the EU ETS one will find that there is a mutual benefits to both sides: THAI does have to pay for the amount of pollution it causes while operating in the EU but it is allowed to continue its operation in its second biggest market and the EU ETS will be able to collect allowances for its cause in averting climate change as well as being able to be an example for other regions in the hope of a global movement towards becoming green societies.

THAI has survived from the fuel and the recent global financial crises. It should apply lessons learned to the new threat of emission trading like hedging to avoid the risk of price increases in jet fuel and buying future options to cover the risk in currency exchange. Its IT equipment needs serious upgrading and so are its aircrafts; beautiful interior should accompany standard safety equipments as well as in-flight entertainment. THAI having been supported by the Thai government may have given it complacency in operations and decision-makings over the years even though it is now privatized. Benchmarking should be done on a regular basis. Privatization that happened in the recent years had given THAI somewhat of an opportunity to make a turnaround in their efficiency, as competition gets fiercer. It is fortunate that THAI has a good reputation among European travelers. It is essential that THAI maintain that trust by continue to provide excellent services in addition to everything else that has been done to ensure the company's viability in the European Market and these should be done before the policy takes effect in 2012. THAI should continue with its domestic environmental projects, make these a reserve of carbon credits, a safety net if you will, but it must also be aware that only certain percentages of the carbon reserve from CDM projects will be allowed to be traded and they will be valid within the time limit.

Alliances with European airlines were a move in the right direction to gain resources and shared information and help increase THAI's presence in Europe.

As for the EU ETS, linking climate change issue to worldwide sustainability is the best way to engage countries and businesses in the longer term and forces them to think ahead for future generations. The awareness that emissions of greenhouse gases have environmental and resource implications and the need to take actions are long overdue. Burning fossil fuels releases other pollutants other than CO2: preventing climate change by using less fossil fuels can also lead to reduced acidification and improvement of urban air quality. Securing resources for the future can mean decreasing dependence toward oil rich countries with volatile political situations, namely Russia and the Middle East.[1] Policy makers at the national and regional level should be aware that the business community needs a coherent, stable and efficient policy framework to guide its long-term investment decisions and that taking the initiative to avert climate change is compatible with long-term, sustainable growth.[2]

As for Thai Airways International (THAI), the changes need to be made are crucial to its survival in the EU market even if evidences point to the fact that it is doing better than other airlines from the same Asian region. Due to the global nature of the issue, airlines need to be more aware of what consequences that will take place should they ignore the effects of their pollution on the environment. THAI can no longer depend on its image and reputation to carry its business forward into the future. The problems THAI has whether it is out-of-date IT system or inconsistencies in services should be alleviated immediately: THAI will

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[1] Michael Grubb and Joyeeta Gupta, Climate Change and the European Leadership: A Sustainable Role For Europe? (The Netherlands: Kluwar Academic Publishers, 2000), 23.

[2] COM (2009) Pamphlet 29, pp. 8.

have to exit its own prison of complacency nevertheless before competition and regulations become stricter, or, even worse, more needed and becomes too late for a turnaround in profitability. The effects of global warming is likely to continue and not likely to dissipate easily and let the world bounce back the way economic recessions and oil price crises do so adaptation is a must.

7.2 Summary and Suggestions

It is hoped that by bringing the EU ETS into focus readers will be able to get in touch with changes happening in not only the EU airline industry but the world aviation industry as well. More importantly, passengers should look to the fact that the consequences of climate change will not be contained to air transport. The Case study on THAI brings the issues a little closer to home so Thai readers will be able to relate. Further research effort is encouraged as there are still on going debates and new developments on the issues as Phase II is coming to a close in 2012 and Phase III begins in 2013. Applications of this thesis to related fields are most welcome as the thesis is intended that it covers the fields of economic, political science, history and law as required by the Department. Lastly, it is hoped to see a mobilization of efforts at the global level, which is what is badly needed, to take shape in the near future.

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Appendices

Appendix A: List of Annex I Countries
Source: see[1]

Australia

Austria

Belarus**

Belgium

Bulgaria

Canada

Croatia**

Czech Republic**

Denmark

Estonia

European Community

Finland

France

Germany

Greece

Hungary

Iceland

Ireland

Italy**

Japan

Latvia

Liechtenstein**

Lithuania

Luxembourg

[1] UNFCCC, *Annex I Countries,* http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php (accessed November 29, 2009).

Monaco**

Netherlands

New Zealand

Norway

Poland

Portugal

Romania

Russian Federation**

Slovakia**

Slovenia**

Spain

Sweden

Switzerland

Turkey**

Ukraine**

United Kingdom of Great Britain and Northern Ireland

United States of America

*Observer State ** Party for which there is a specific COP and/or CMP decision*

Appendix B: Interview Questions

Ms. Vichuda Sthalanand*, Department Manager for Aviation Pollution/Emission Trading*

1. When will the carbon regulation be effective? Do you think it is fair to tax Asian operators with the same rate as EU airlines and is the scheduled implementation in 2012 too soon, too difficult to achieve?
2. Volume of CO2 emissions by THAI aircrafts. Comparing it with other Asian Airlines. What about the need to replace fleets by more fuel- efficient aircrafts that release less emission?
3. THAI's cost structure.
4. Impacts of EU ETS on costs and profitability.

Mr.Chokechai Panyayong, *Executive Vice President, Strategy and Business Development Department*

1. THAI's current status in terms of profits and losses in the EU market.
2. How they will determine the decision-making process within each Asian operator?
3. Impacts of EU emission trading scheme on costs and profitability.
4. THAI's stance on the green movement, is it in conflict with what is required by the EU?
5. Action plans in dealing with EU ETS by THAI (pushing partial/full costs to consumers, reducing operating costs through efficiency, etc.).
6. What about competition between Asian airliners? Who stands to lose/gain from the EU ETS regulation?

Mrs. Delphine Brissonneau*, Programme Officer, Representative at European Delegation*

1. From the delegation's point of view, what had been the effects of the liberalization of airlines on the EU airline industry? Do you think the policies put in place by the Commission (EU ETS) had worked/are working the way they were intended?
2. What do you think will happen to the competition in the EU airline industry after the implementation of the EU ETS scheme in 2012 (competition-wise, customers' satisfaction on services provided and not provided due to the regulation)?
3. As a citizen of the EU, do you think the measures to mitigate/adapt to climate change are being called for? Are you for or against such actions?
4. What, if any, do you think will be the impact on the Asian airlines operating within the EU countries? In other words, do you think the EU ETS scheme is equitable and accountable to its actions when it comes to Asian airlines?

5. Do you think the EU ETS has the appropriate timeframe? Is there a possibility that it is too slow and will not cause a big enough impact on the global scale or is the schedule is being created too soon for airlines to adjust that it might become a problem later on?

6. Are there any measures from the Commission to ease the transition into the scheme? Do you expect ticket prices will rise as a result of the scheme being enforced? What about responses from the consumers? Will the general feeling be benign or hostile? Give it your best estimates, about how many percent of European citizens will be for and how many against the regulation?

7. I had read about 'clean' jet fuel being developed in a foreign country. What do you think of this? What changes do you think may happen to the EU airline industry once this fuel becomes available in the market?

8. As a representative of the EU in Thailand, what else is being done to help promote and educate the local community about EU ETS and the need to reduce greenhouse gases?

9. On a scale of 1 to 10 with 1 being the least successful and 10 the most successful, please rate the success of the EU ETS scheme in your opinion.

Ms. Prasertsuk Jamornman, *Deputy Director of Thailand Greenhouse Gas Management Organization:*

1. To what purpose does your agency serve with regard to EU ETS?

2. What are your Agency's main objectives?

3. Kindly comment on the viability of the ETS scheme and its impacts on non-EU airlines.

4. My thesis is focusing on the impacts of EU ETS on Thai Airways International. What do you think would be the impacts of ETS on the airline?

5. Thai Airways have taken several steps to safeguard against the negative impacts of the EU ETS, especially to their profit margin like sponsoring CDM projects and achieving fuel efficiency. Do you think these measures will work (in the short-run, long-run)? Do you have other suggestions for THAI?

6. How effective do you think the scheme is? Any suggestions if the scheme can be applied to Thailand's aviation industry?

Appendix C: Freedoms of the air

The Convention on International Civil Aviation in 1944 signed at Chicago (Also called the Chicago Convention) was intended to prepare a framework within which civil air transport could develop (excluding military or other state activities whether in a piloted or drone craft). The nine *freedoms of the air* was introduced for those states that have adopted the Convention and enter into bilateral treaties that may grant any of the following rights or privileges for scheduled international air services:

- To fly across the territory of either state without landing.
- To land in either state for non-traffic purposes, e.g. refueling without boarding or disembarking passengers.
- To land in the territory of the first state and disembark passengers coming from the home state of the airline.
- To land in the territory of the first state and board passengers travelling to the home state of the airline.
- To land in the territory of the first state and board passengers travelling on to a third state where the passengers disembark, e.g. a scheduled flight from the U.S. to France could pick up traffic in the UK and take all to France (sometimes termed *beyond rights*).
- To transport passengers moving between two other states via the home state of the airline, e.g. a scheduled flight on an American airline from the United Kingdom lands in the U.S. and then goes on to Canada on the same aircraft.
- To transport passengers between the territory of the granting State and any third State state without going through the home state of the airline, e.g. a scheduled flight on an American airline from the UK to Canada that does not connect to or extend any service to/from the U.S..

- To transport cabotage traffic between two points in the territory of the granting State on a service which originates or terminates in the home state of the foreign carrier or (in connection with the so-called Seventh Freedom) outside the territory of the granting State (also known as *consecutive cabotage*), e.g. an American airline flies from the U.S., lands passengers in London and then boards passengers to fly to Manchester.
- To transport cabotage traffic of the granting State on a service performed entirely within the territory of the granting State (also known as *stand alone* cabotage), e.g. an British airline operates a service between Perth and Sydney in Australia).

Because only the first five "freedoms" have been officially recognized by international treaties, the ICAO considers the remaining "freedoms" "so-called". *Source:* see[2]

[2] Wikipedia contributors, *Open Skies,* <http://en.wikipedia.org/wiki/Open_skies> (last modified January 13, 2010 and accessed April 21, 2010).

Appendix D : Airlines of Europe

- AB Airlines
- Adria Airways
- AerArann
- Aer Lingus
- Aeroflot - Russian International Airlines
- AeroSvit
- Air Comet
- Air France
- Air Gozo
- Air Malta
- Air One
- Air Polonia
- Air Scotland
- Air UK
- Alitalia
- AOM French Airlines
- Atlasjet
- Aurigny
- Austrian
- Belavia
- Braathens SAFE
- British Airways
- bmi British Midland
- bmiBaby
- Brussels Airlines
- Cargolux
- Centralwings
- Corsair
- Croatia Airlines
- Crossair
- easyJet
- Eurofly
- Finnair
- Japanese
- Local versions in Singapore and North America
- Finncomm Airlines
- Flybe
- FlyGlobespan
- FreshAer
- Futura
- German Wings
- Hapag-Lloyd Express
- Iberia
- Icelandair
- Iceland Express
- Jet2

- KLM
- Lauda Air
- LOT Polish Airlines
- LTU
- Lufthansa
- Luxair
- Macedonian Airlines
- Malév
- MK Airlines
- MyTravel Lite
- Olympic
- OpenSkies
- Portugália
- Ryanair
- Scandinavian Airlines System (SAS)
- Sky Europe
- SN Brussels Airlines
- ScotAirways
- Spanair
- Sucklin g Airways - now ScotAirways
- Swiss
- Swiss Skies
- TAROM
- Tatarstan Airlines
- Thomsonfly
- Titan Airways
- Transwede
- Virgin Atlantic
- Virgin Express
- Vueling
- Wizz Air
- Zoom Airlines

Appendix E: CO_2 Output by Airlines

CO2 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: RDC Aviation[3]

[3] Green Air Online, CO2 Emissions from scheduled airline flights within the scope of the aviation EU ETS fell by around 7 percent in 2009, (GreenAir.com2010), file:///Users/Nannie/Downloads/CO2%20emissions%20from%20scheduled %20airline%20flights%20with in%20the%20scope%20of%20the%20Aviation%20EU%20ETS%20fell %20by%20around %207%20percent%20in%20202009%20on%20GreenAir%20Online.webarchive(Last Modified October 12, 2010 and accessed October 24, 2010).

Appendix F: Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community (Text with EEA relevance)

Directive 2008/101/EC of the European Parliament and of the Council

of 19 November 2008

amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Economic and Social Committee [1],

Having regard to the opinion of the Committee of the Regions [2],

Acting in accordance with the procedure laid down in Article 251 of the Treaty [3],

Whereas:

(1) Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community [4] established a scheme for greenhouse gas emission allowance trading within the Community in order to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner.

(2) The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC), which was approved on behalf of the European Community by Council Decision 94/69/EC [5], is to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

(3) The European Council meeting in Brussels on 8 and 9 March 2007 underlined the vital importance of achieving the strategic objective of limiting the global average temperature increase to not more than 2 °C above pre-industrial levels. The latest scientific findings reported by the Intergovernmental Panel on Climate Change (IPCC) in its Fourth

Assessment Report demonstrate even more clearly that the negative impacts of climate change are increasingly posing a serious risk to ecosystems, food production and the attainment of sustainable development and of the Millennium Development Goals, as well as to human health and security. Keeping the 2 °C objective within reach requires stabilisation of the concentration of greenhouse gases in the atmosphere in line with about 450 ppmv CO2 equivalent, which requires global greenhouse gas emissions to peak within the next 10 to 15 years and substantial global emission reductions to at least 50 % below 1990 levels by 2050.

(4) The European Council emphasised that the European Union is committed to transforming Europe into a highly energy-efficient and low greenhouse gas-emitting economy and, until a global and comprehensive post-2012 agreement is concluded, made a firm independent commitment for the EU to reduce its greenhouse gas emissions to at least 20 % below 1990 levels by 2020. The limitation of greenhouse gas emissions from aviation is an essential contribution in line with this commitment.

(5) The European Council emphasised that the EU is committed to a global and comprehensive agreement for reductions in greenhouse gas emissions beyond 2012, providing an effective, efficient and equitable response on the scale required to face climate change challenges. It endorsed a 30 % reduction in the EU's greenhouse gas emissions below 1990 levels by 2020 as its contribution to a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries to contributing adequately according to their responsibilities and respective capabilities. The EU is continuing to take the lead in the negotiation of an ambitious international agreement that will achieve the objective of limiting the global temperature increase to 2 °C and is encouraged by the progress made towards this objective at the 13th Conference of the Parties to the UNFCCC in Bali in December 2007. The EU will seek to ensure that such a global agreement includes measures to reduce greenhouse gas emissions from aviation and, in this event, the Commission should consider which amendments to this Directive as it applies to aircraft operators are necessary.

(6) On 14 February 2007 the European Parliament adopted a resolution on climate change [6] in which it referred to the objective to limit the average global temperature increase to 2 °C above pre-industrialisation levels, and in which it urged the EU to maintain its leading role in the negotiations with a view to establishing a post-2012 international framework on climate change and to maintain a high level of ambition in future discussions with its international partners, and it emphasised the need to undertake overall emission reductions for all industrialised countries of 30 % compared to 1990 emission levels by 2020 with a view to achieving a reduction in the order of 60 to 80 % by 2050.

(7) The UNFCCC requires all parties to formulate and implement national

and, where appropriate, regional programmes containing measures to mitigate climate change.

(8) The Kyoto Protocol to the UNFCCC, which was approved on behalf of the European Community by Council Decision 2002/358/EC [7], requires developed countries to pursue the limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation, working through the International Civil Aviation Organisation (ICAO).

(9) While the Community is not a Contracting Party to the 1944 Chicago Convention on International Civil Aviation (the Chicago Convention), all Member States are Contracting Parties to that Convention and members of the ICAO. Member States continue to support work with other States in the ICAO on the development of measures, including market-based instruments, to address the climate change impacts of aviation. At the sixth meeting of the ICAO Committee on Aviation Environmental Protection in 2004, it was agreed that an aviation-specific emissions trading system based on a new legal instrument under ICAO auspices seemed sufficiently unattractive that it should not then be pursued further. Consequently, Resolution A35-5 of the ICAO's 35th Assembly held in September 2004 did not propose a new legal instrument but instead endorsed open emissions trading and the possibility for States to incorporate emissions from international aviation into their emissions trading schemes. Appendix L to Resolution A36-22 of the ICAO's 36th Assembly held in September 2007 urges Contracting States not to implement an emissions trading system on other Contracting States' aircraft operators except on the basis of mutual agreement between those States. Recalling that the Chicago Convention recognises expressly the right of each Contracting Party to apply on a non-discriminatory basis its own air laws and regulations to the aircraft of all States, the Member States of the European Community and fifteen other European States placed a reservation on this resolution and reserved the right under the Chicago Convention to enact and apply market-based measures on a non-discriminatory basis to all aircraft operators of all States providing services to, from or within their territory.

(10) The Sixth Community Environment Action Programme established by Decision No 1600/2002/EC of the European Parliament and of the Council [8] provided for the Community to identify and undertake specific actions to reduce greenhouse gas emissions from aviation if no such action were agreed within the ICAO by 2002. In its conclusions of October 2002, December 2003 and October 2004, the Council has repeatedly called on the Commission to propose action to reduce the climate change impact of international air transport.

(11) Policies and measures should be implemented at Member State and Community level across all sectors of the Community economy in order to generate the substantial reductions needed. If the climate change impact of the aviation sector continues to grow at the current rate, it would significantly undermine reductions made by other sectors to combat climate

change.

(12) In its Communication of 27 September 2005 to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions entitled "Reducing the Climate Change Impact of Aviation", the Commission outlined a strategy for reducing the climate impact of aviation. As part of a comprehensive package of measures, the strategy proposed the inclusion of aviation in the Community scheme for greenhouse gas emission allowance trading and provided for the creation of a multi-stakeholder working group on aviation as part of the second phase of the European Climate Change Programme to consider ways of including aviation in the Community scheme. In its Conclusions of 2 December 2005, the Council recognised that, from an economic and environmental point of view, the inclusion of the aviation sector in the Community scheme seemed to be the best way forward and called on the Commission to bring forward a legislative proposal by the end of 2006. In its resolution of 4 July 2006 on reducing the climate change impact of aviation [9], the European Parliament recognised that emissions trading has the potential to play a role as part of a comprehensive package of measures to address the climate impact of aviation, provided that it is appropriately designed.

(13) A comprehensive package of measures should also include operational and technological measures. Improvements in air traffic management under the Single European Sky and SESAR programmes could help increase overall fuel efficiency by up to 12 %. Research into new technologies, including into methods for improving the fuel efficiency of aircraft, can further cut emissions from aviation.

(14) The objective of the amendments made to Directive 2003/87/EC by this Directive is to reduce the climate change impact attributable to aviation by including emissions from aviation activities in the Community scheme.

(15) Aircraft operators have the most direct control over the type of aircraft in operation and the way in which they are flown and should therefore be responsible for complying with the obligations imposed by this Directive, including the obligation to prepare a monitoring plan and to monitor and report emissions in accordance with that plan. An aircraft operator may be identified by the use of an ICAO designator or any other recognised designator used in the identification of the flight. If the identity of the aircraft operator is not known, the owner of the aircraft should be regarded as the aircraft operator unless it proves which other person was the aircraft operator.

(16) In order to avoid distortions of competition and improve environmental effectiveness, emissions from all flights arriving at and departing from Community aerodromes should be included from 2012.

(17) The Community and its Member States should continue to seek an agreement on global measures to reduce greenhouse gas emissions from aviation. The Community scheme may serve as a model for the use of

emissions trading worldwide. The Community and its Member States should continue to be in contact with third parties during the implementation of this Directive and to encourage third countries to take equivalent measures. If a third country adopts measures, which have an environmental effect at least equivalent to that of this Directive, to reduce the climate impact of flights to the Community, the Commission should consider the options available in order to provide for optimal interaction between the Community scheme and that country's measures, after consulting with that country. Emissions trading schemes being developed in third countries are beginning to provide for optimal interaction with the Community scheme in relation to their coverage of aviation. Bilateral arrangements on linking the Community scheme with other trading schemes to form a common scheme or taking account of equivalent measures to avoid double regulation could constitute a step towards global agreement. Where such bilateral arrangements are made, the Commission may amend the types of aviation activities included in the Community scheme, including consequential adjustments to the total quantity of allowances to be issued to aircraft operators.

(18) In line with the principle of better regulation, certain flights should be exempt from the Community scheme. To further avoid disproportionate administrative burdens, commercial air transport operators operating, for three consecutive four-month periods, fewer than 243 flights per period should be exempt from the Community scheme. This would benefit airlines operating limited services within the scope of the Community scheme, including airlines from developing countries.

(19) Aviation has an impact on the global climate through releases of carbon dioxide, nitrogen oxides, water vapour and sulphate and soot particles. The IPCC has estimated that the total climate impact of aviation is currently two to four times higher than the effect of its past carbon dioxide emissions alone. Recent Community research indicates that the total climate impact of aviation could be around two times higher than the impact of carbon dioxide alone. However, none of these estimates takes into account the highly uncertain cirrus cloud effects. In accordance with Article 174(2) of the Treaty, Community environment policy is to be based on the precautionary principle. Pending scientific progress, all impacts of aviation should be addressed to the extent possible. Emissions of nitrogen oxides will be addressed in other legislation to be proposed by the Commission in 2008. Research on the formation of contrails and cirrus clouds and effective mitigation measures, including operational and technical measures, should be promoted.

(20) In order to avoid distortions of competition, a harmonised allocation methodology should be specified for determining the total quantity of allowances to be issued and for distributing allowances to aircraft operators. A proportion of allowances will be allocated by auction in accordance with rules to be developed by the Commission. A special reserve of allowances should be set aside to ensure access to the market for new aircraft operators and to assist aircraft operators which increase sharply the number of tonne-

kilometres that they perform. Aircraft operators that cease operations should continue to be issued with allowances until the end of the period for which free allowances have already been allocated.

(21) Full harmonisation of the proportion of allowances issued free of charge to all aircraft operators participating in the Community scheme is appropriate in order to ensure a level playing field for aircraft operators, given that each aircraft operator will be regulated by a single Member State in respect of all their operations to, from and within the EU and by the non-discrimination provisions of bilateral air service agreements with third countries.

(22) Aviation contributes to the overall climate change impact of human activities and the environmental impact of greenhouse gas emissions from aircraft can be mitigated through measures to tackle climate change in the EU and third countries, especially in developing countries, and to fund research and development for mitigation and adaptation including in particular in the fields of aeronautics and air transport. Decisions on national public expenditure are a matter for Member States, in line with the principle of subsidiarity. Without prejudice to that position, revenues generated from the auctioning of allowances, or an equivalent amount where required by overriding budgetary principles of the Member States, such as unity and universality, should be used to reduce greenhouse gas emissions, to adapt to the impacts of climate change in the EU and third countries, to fund research and development for mitigation and adaptation and to cover the cost of administering the Community scheme. Revenues generated from auctioning should also be used on low-emission transport. The proceeds of auctioning should in particular be used to fund contributions to the Global Energy Efficiency and Renewable Energy Fund, and measures to avoid deforestation and facilitate adaptation in developing countries. The provisions of this Directive relating to the use of revenues should not prejudge any decision on the use to be made of revenues generated from the auctioning of allowances in the broader context of the general review of Directive 2003/87/EC.

(23) Provisions for the use of funds from the auctioning should be notified to the Commission. Such notification does not release Member States from the obligation laid down in Article 88(3) of the Treaty to notify certain national measures. This Directive should be without prejudice to the outcome of any future State aid procedures that may be undertaken in accordance with Articles 87 and 88 of the Treaty.

(24) To increase the cost-effectiveness of the Community scheme, aircraft operators should be able to use certified emission reductions (CERs) and emission reduction units (ERUs) from project activities to meet obligations to surrender allowances up to a harmonised limit. The use of CERs and ERUs should be consistent with the criteria for acceptance for use in the trading scheme set out in this Directive. The average of the percentages specified by Member States for the use of CERs and ERUs during the Kyoto Protocol's first commitment period is approximately 15 %.

(25) In its Conclusions, the European Council meeting in Brussels on 13 and 14 March 2008 recognised that in a global context of competitive markets the risk of carbon leakage is a concern that needs to be analysed and addressed urgently in the new Emissions Trading System Directive, so that if international negotiations fail appropriate measures can be taken. An international agreement remains the best way of addressing this issue.

(26) In order to reduce the administrative burden on aircraft operators, one Member State should be responsible for each aircraft operator. Member States should be required to ensure that aircraft operators which were issued with an operating licence in that Member State, or aircraft operators without an operating licence or from third countries whose emissions in a base year are mostly attributable to that Member State, comply with the requirements of this Directive. In the event that an aircraft operator fails to comply with the requirements of this Directive and other enforcement measures by the administering Member State have failed to ensure compliance, Member States should act in solidarity. The administering Member State should therefore be able to request the Commission to decide on the imposition of an operating ban at Community level on the aircraft operator concerned, as a last resort.

(27) To maintain the integrity of the accounting system for the Community scheme in view of the fact that emissions from international aviation are not integrated into Member States' commitments under the Kyoto Protocol, allowances allocated to the aviation sector should only be used to meet the obligations placed on aircraft operators to surrender allowances under this Directive.

(28) In order to ensure equal treatment of aircraft operators, Member States should follow harmonised rules for the administration of aircraft operators for which they have responsibility, in accordance with specific guidelines to be developed by the Commission.

(29) To safeguard the environmental integrity of the Community scheme, units surrendered by aircraft operators should only count towards greenhouse gas reduction targets that take these emissions into account.

(30) The European Organisation for the Safety of Air Navigation (Eurocontrol) may possess information which could assist Member States or the Commission in discharging their obligations imposed by this Directive.

(31) The provisions of the Community scheme relating to monitoring, reporting and verifying emissions and to penalties applicable to operators should also apply to aircraft operators.

(32) The Commission should review the functioning of Directive 2003/87/EC in relation to aviation activities in the light of experience of its application and should then report to the European Parliament and the Council.

(33) The review of the functioning of Directive 2003/87/EC in relation to

aviation activities should consider the structural dependence on aviation of countries which do not have adequate and comparable alternative modes of transport and which are therefore highly dependent on air transport and in which the tourism sector provides a high contribution to those countries' gross domestic product. Special consideration should be given to mitigating or even eliminating any accessibility and competitiveness problems arising for the outermost regions of the Community, as specified in Article 299(2) of the Treaty, and problems for public service obligations in connection with the implementation of this Directive.

(34) The Ministerial Statement on Gibraltar Airport, agreed in Córdoba on 18 September 2006, during the first Ministerial meeting of the Forum of Dialogue on Gibraltar, will replace the Joint Declaration on the Airport made in London on 2 December 1987, and full compliance with it will be deemed to constitute compliance with the 1987 Declaration.

(35) The measures necessary for the implementation of this Directive should be adopted in accordance with Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission [10].

(36) In particular, the Commission should be empowered to adopt measures for the auctioning of allowances not required to be issued for free; to adopt detailed rules on the operation of the special reserve for certain aircraft operators and on the procedures relating to requests for the Commission to decide on the imposition of an operating ban on an aircraft operator; and to amend the aviation activities listed in Annex I where a third country introduces measures to reduce the climate change impact of aviation. Since those measures are of general scope and are designed to amend non-essential elements of this Directive, inter alia, by supplementing this Directive with new non-essential elements, they must be adopted in accordance with the regulatory procedure with scrutiny provided for in Article 5a of Decision 1999/468/EC.

(37) Since the objective of this Directive cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale and effects of the proposed action, be better achieved at Community level, the Community may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve that objective.

(38) In accordance with point 34 of the Interinstitutional Agreement on better law-making [11], Member States are encouraged to draw up, for themselves and in the interest of the Community, their own tables illustrating, as far as possible, the correlation between the Directive and the transposition measures, and to make them public.

(39) Directive 2003/87/EC should therefore be amended accordingly,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Amendments to Directive 2003/87/EC

Directive 2003/87/EC is hereby amended as follows:

1. the following title shall be inserted before Article 1:

"CHAPTER I

GENERAL PROVISIONS";

2. the following paragraph shall be added to Article 2:

"3. The application of this Directive to the airport of Gibraltar is understood to be without prejudice to the respective legal positions of the Kingdom of Spain and the United Kingdom with regard to the dispute over sovereignty over the territory in which the airport is situated.";

3. Article 3 shall be amended as follows:

(a) point (b) shall be replaced by the following:

"(b) "emissions" means the release of greenhouse gases into the atmosphere from sources in an installation or the release from an aircraft performing an aviation activity listed in Annex I of the gases specified in respect of that activity;"

(b) the following points shall be added:

"(o) "aircraft operator" means the person who operates an aircraft at the time it performs an aviation activity listed in Annex I or, where that person is not known or is not identified by the owner of the aircraft, the owner of the aircraft;

(p) "commercial air transport operator" means an operator that, for remuneration, provides scheduled or non-scheduled air transport services to the public for the carriage of passengers, freight or mail;

(q) "administering Member State" means the Member State responsible for administering the Community scheme in respect of an aircraft operator in accordance with Article 18a;

(r) "attributed aviation emissions" means emissions from all flights falling within the aviation activities listed in Annex I which depart from an aerodrome situated in the territory of a Member State and those which arrive in such an aerodrome from a third country;

(s) "historical aviation emissions" means the mean average of the annual emissions in the calendar years 2004, 2005 and 2006 from aircraft performing an aviation activity listed in Annex I.";

4. the following Chapter shall be inserted after Article 3:

"CHAPTER II

AVIATION

Article 3a

Scope

The provisions of this Chapter shall apply to the allocation and issue of allowances in respect of aviation activities listed in Annex I.

Article 3b

Aviation activities

By 2 August 2009, the Commission shall, in accordance with the regulatory procedure referred to in Article 23(2), develop guidelines on the detailed interpretation of the aviation activities listed in Annex I.

Article 3c

Total quantity of allowances for aviation

1. For the period from 1 January 2012 to 31 December 2012, the total quantity of allowances to be allocated to aircraft operators shall be equivalent to 97 % of the historical aviation emissions.

2. For the period referred to in Article 11(2) beginning on 1 January 2013, and, in the absence of any amendments following the review referred to in Article 30(4), for each subsequent period, the total quantity of allowances to be allocated to aircraft operators shall be equivalent to 95 % of the historical aviation emissions multiplied by the number of years in the period.

This percentage may be reviewed as part of the general review of this Directive.

3. The Commission shall review the total quantity of allowances to be allocated to aircraft operators in accordance with Article 30(4).

4. By 2 August 2009, the Commission shall decide on the historical aviation emissions, based on best available data, including estimates based on actual traffic information. That decision shall be considered within the Committee referred to in Article 23(1).

Article 3d

Method of allocation of allowances for aviation through auctioning

1. In the period referred to in Article 3c(1), 15 % of allowances shall be auctioned.

2. From 1 January 2013, 15 % of allowances shall be auctioned. This

percentage may be increased as part of the general review of this Directive.

3. A Regulation shall be adopted containing detailed provisions for the auctioning by Member States of allowances not required to be issued free of charge in accordance with paragraphs 1 and 2 of this Article or Article 3f(8). The number of allowances to be auctioned in each period by each Member State shall be proportionate to its share of the total attributed aviation emissions for all Member States for the reference year reported pursuant to Article 14(3) and verified pursuant to Article 15. For the period referred to in Article 3c(1), the reference year shall be 2010 and for each subsequent period referred to in Article 3c the reference year shall be the calendar year ending 24 months before the start of the period to which the auction relates.

That Regulation, designed to amend non-essential elements of this Directive by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 23(3).

4. It shall be for Member States to determine the use to be made of revenues generated from the auctioning of allowances. Those revenues should be used to tackle climate change in the EU and third countries, inter alia, to reduce greenhouse gas emissions, to adapt to the impacts of climate change in the EU and third countries, especially developing countries, to fund research and development for mitigation and adaptation, including in particular in the fields of aeronautics and air transport, to reduce emissions through low-emission transport and to cover the cost of administering the Community scheme. The proceeds of auctioning should also be used to fund contributions to the Global Energy Efficiency and Renewable Energy Fund, and measures to avoid deforestation.

Member States shall inform the Commission of actions taken pursuant to this paragraph.

5. Information provided to the Commission pursuant to this Directive does not free Member States from the notification obligation laid down in Article 88(3) of the Treaty.

Article 3e

Allocation and issue of allowances to aircraft operators

1. For each period referred to in Article 3c, each aircraft operator may apply for an allocation of allowances that are to be allocated free of charge. An application may be made by submitting to the competent authority in the administering Member State verified tonne-kilometre data for the aviation activities listed in Annex I performed by that aircraft operator for the monitoring year. For the purposes of this Article, the monitoring year shall be the calendar year ending 24 months before the start of the period to which it relates in accordance with Annexes IV and V or, in relation to the period referred to in Article 3c(1), 2010. Any application shall be made at least 21 months before the start of the period to which it relates or, in relation to the period referred to in Article 3c(1), by 31 March 2011.

2. At least 18 months before the start of the period to which the application relates or, in relation to the period referred to in Article 3c(1), by 30 June 2011, Member States shall submit applications received under paragraph 1 to the Commission.

3. At least 15 months before the start of each period referred to in Article 3c(2) or, in relation to the period referred to in Article 3c(1), by 30 September 2011, the Commission shall calculate and adopt a decision setting out:

(a) the total quantity of allowances to be allocated for that period in accordance with Article 3c;

(b) the number of allowances to be auctioned in that period in accordance with Article 3d;

(c) the number of allowances in the special reserve for aircraft operators in that period in accordance with Article 3f(1);

(d) the number of allowances to be allocated free of charge in that period by subtracting the number of allowances referred to in points (b) and (c) from the total quantity of allowances decided upon under point (a); and

(e) the benchmark to be used to allocate allowances free of charge to aircraft operators whose applications were submitted to the Commission in accordance with paragraph 2.

The benchmark referred to in point (e), expressed as allowances per tonne-kilometre, shall be calculated by dividing the number of allowances referred to in point (d) by the sum of the tonne-kilometre data included in applications submitted to the Commission in accordance with paragraph 2.

4. Within three months from the date on which the Commission adopts a decision under paragraph 3, each administering Member State shall calculate and publish:

(a) the total allocation of allowances for the period to each aircraft operator whose application it submitted to the Commission in accordance with paragraph 2, calculated by multiplying the tonne-kilometre data included in the application by the benchmark referred to in paragraph 3(e); and

(b) the allocation of allowances to each aircraft operator for each year, which shall be determined by dividing its total allocation of allowances for the period calculated under point (a) by the number of years in the period for which that aircraft operator is performing an aviation activity listed in Annex I.

5. By 28 February 2012 and by 28 February of each subsequent year, the competent authority of the administering Member State shall issue to each aircraft operator the number of allowances allocated to that aircraft operator for that year under this Article or Article 3f.

Article 3f

Special reserve for certain aircraft operators

1. In each period referred to in Article 3c(2), 3 % of the total quantity of allowances to be allocated shall be set aside in a special reserve for aircraft operators:

(a) who start performing an aviation activity falling within Annex I after the monitoring year for which tonne-kilometre data was submitted under Article 3e(1) in respect of a period referred to in Article 3c(2); or

(b) whose tonne-kilometre data increases by an average of more than 18 % annually between the monitoring year for which tonne-kilometre data was submitted under Article 3e(1) in respect of a period referred to in Article 3c(2) and the second calendar year of that period;

and whose activity under point (a), or additional activity under point (b), is not in whole or in part a continuation of an aviation activity previously performed by another aircraft operator.

2. An aircraft operator who is eligible under paragraph 1 may apply for a free allocation of allowances from the special reserve by making an application to the competent authority of its administering Member State. Any application shall be made by 30 June in the third year of the period referred to in Article 3c(2) to which it relates.

An allocation to an aircraft operator under paragraph 1(b) shall not exceed 1000000 allowances.

3. An application under paragraph 2 shall:

(a) include verified tonne-kilometre data in accordance with Annexes IV and V for the aviation activities listed in Annex I performed by the aircraft operator in the second calendar year of the period referred to in Article 3c(2) to which the application relates;

(b) provide evidence that the criteria for eligibility under paragraph 1 are fulfilled; and

(c) in the case of aircraft operators falling within paragraph 1(b), state:

(i) the percentage increase in tonne-kilometres performed by that aircraft operator between the monitoring year for which tonne-kilometre data was submitted under Article 3e(1) in respect of a period referred to in Article 3c(2) and the second calendar year of that period;

(ii) the absolute growth in tonne-kilometres performed by that aircraft operator between the monitoring year for which tonne-kilometre data was submitted under Article 3e(1) in respect of a period referred to in Article 3c(2) and the second calendar year of that period; and

(iii) the absolute growth in tonne-kilometres performed by that aircraft operator between the monitoring year for which tonne-kilometre data was submitted under Article 3e(1) in respect of a period referred to in Article 3c(2) and the second calendar year of that period which exceeds the percentage specified in paragraph 1(b).

4. No later than six months from the deadline for making an application under paragraph 2, Member States shall submit applications received under that paragraph to the Commission.

5. No later than 12 months from the deadline for making an application under paragraph 2, the Commission shall decide on the benchmark to be used to allocate allowances free of charge to aircraft operators whose applications were submitted to the Commission in accordance with paragraph 4.

Subject to paragraph 6, the benchmark shall be calculated by dividing the number of the allowances in the special reserve by the sum of:

(a) the tonne-kilometre data for aircraft operators falling within paragraph 1(a) included in applications submitted to the Commission in accordance with paragraphs 3(a) and 4; and

(b) the absolute growth in tonne-kilometres exceeding the percentage specified in paragraph 1(b) for aircraft operators falling within paragraph 1(b) included in applications submitted to the Commission in accordance with paragraphs 3(c)(iii) and 4.

6. The benchmark referred to in paragraph 5 shall not result in an annual allocation per tonne-kilometre greater than the annual allocation per tonne-kilometre to aircraft operators under Article 3e(4).

7. Within three months from the date on which the Commission adopts a decision under paragraph 5, each administering Member State shall calculate and publish:

(a) the allocation of allowances from the special reserve to each aircraft operator whose application it submitted to the Commission in accordance with paragraph 4. This allocation shall be calculated by multiplying the benchmark referred to in paragraph 5 by:

(i) in the case of an aircraft operator falling within paragraph 1(a), the tonne-kilometre data included in the application submitted to the Commission under paragraphs 3(a) and 4;

(ii) in the case of an aircraft operator falling within paragraph 1(b), the absolute growth in tonne-kilometres exceeding the percentage specified in paragraph 1(b) included in the application submitted to the Commission under paragraphs 3(c)(iii) and 4; and

(b) the allocation of allowances to each aircraft operator for each year, which

shall be determined by dividing its allocation of allowances under point (a) by the number of full calendar years remaining in the period referred to in Article 3c(2) to which the allocation relates.

8. Any unallocated allowances in the special reserve shall be auctioned by Member States.

9. The Commission may establish detailed rules on the operation of the special reserve under this Article, including the assessment of compliance with eligibility criteria under paragraph 1. Those measures, designed to amend non-essential elements of this Directive by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 23(3).

Article 3g

Monitoring and reporting plans

The administering Member State shall ensure that each aircraft operator submits to the competent authority in that Member State a monitoring plan setting out measures to monitor and report emissions and tonne-kilometre data for the purpose of an application under Article 3e and that such plans are approved by the competent authority in accordance with the guidelines adopted pursuant to Article 14.";

5. the following title and Article shall be inserted:

"CHAPTER III

STATIONARY INSTALLATIONS

Article 3h

Scope

The provisions of this Chapter shall apply to greenhouse gas emissions permits and the allocation and issue of allowances in respect of activities listed in Annex I other than aviation activities.";

6. Article 6(2)(e) shall be replaced by the following:

"(e) an obligation to surrender allowances, other than allowances issued under Chapter II, equal to the total emissions of the installation in each calendar year, as verified in accordance with Article 15, within four months following the end of that year.";

7. the following title shall be inserted after Article 11:

"CHAPTER IV

PROVISIONS APPLYING TO AVIATION AND STATIONARY INSTALLATIONS";

8. in Article 11a the following paragraph shall be inserted:

"1a. During the period referred to in Article 3c(1), aircraft operators may use CERs and ERUs, up to 15 % of the number of allowances they are required to surrender pursuant to Article 12(2a).

For subsequent periods, the percentage of CERs and ERUs that may be used in relation to aviation activities shall be reviewed as part of the general review of this Directive and taking into consideration the development of the international climate change regime.

The Commission shall publish this percentage at least six months before the start of each period referred to in Article 3c.";

9. in Article 11b(2), the word "installations" shall be replaced by the word "activities";

10. Article 12 shall be amended as follows:

(a) in paragraph 2, after the word "purpose" the words "of meeting an aircraft operator's obligations under paragraph 2a or" shall be inserted;

(b) the following paragraph shall be inserted:

"2a. Administering Member States shall ensure that, by 30 April each year, each aircraft operator surrenders a number of allowances equal to the total emissions during the preceding calendar year from aviation activities listed in Annex I for which it is the aircraft operator, as verified in accordance with Article 15. Member States shall ensure that allowances surrendered in accordance with this paragraph are subsequently cancelled.";

(c) paragraph 3 shall be replaced by the following:

"3. Member States shall ensure that, by 30 April each year, the operator of each installation surrenders a number of allowances, other than allowances issued under Chapter II, equal to the total emissions from that installation during the preceding calendar year as verified in accordance with Article 15, and that these are subsequently cancelled.";

11. in Article 13(3), the words "Article 12(3)" shall be replaced by the words "Article 12(2a) or (3)";

12. Article 14 shall be amended as follows:

(a) in the first sentence of paragraph 1:

(i) after the words "those activities" the words "and of tonne-kilometre data for the purpose of an application under Articles 3e or 3f" shall be inserted;

(ii) the words ", by 30 September 2003" shall be deleted;

(b) paragraph 3 shall be replaced by the following:

"3. Member States shall ensure that each operator or aircraft operator reports the emissions during each calendar year from the installation, or, from 1 January 2010, the aircraft, which it operates to the competent authority after the end of that year in accordance with the guidelines.";

13. Article 15 shall be replaced by the following:

"Article 15

Verification

Member States shall ensure that the reports submitted by operators and aircraft operators pursuant to Article 14(3) are verified in accordance with the criteria set out in Annex V and any detailed provisions adopted by the Commission in accordance with this Article, and that the competent authority is informed thereof.

Member States shall ensure that an operator or aircraft operator whose report has not been verified as satisfactory in accordance with the criteria set out in Annex V and any detailed provisions adopted by the Commission in accordance with this Article by 31 March each year for emissions during the preceding year cannot make further transfers of allowances until a report from that operator or aircraft operator has been verified as satisfactory.

The Commission may adopt detailed provisions for the verification of reports submitted by aircraft operators pursuant to Article 14(3) and applications under Articles 3e and 3f, including the verification procedures to be used by verifiers, in accordance with the regulatory procedure referred to in Article 23(2).";

14. Article 16 shall be amended as follows:

(a) in paragraph 1, the words "by 31 December 2003 at the latest," shall be deleted;

(b) paragraphs 2 and 3 shall be replaced by the following:

"2. Member States shall ensure publication of the names of operators and aircraft operators who are in breach of requirements to surrender sufficient allowances under this Directive.

3. Member States shall ensure that any operator or aircraft operator who does not surrender sufficient allowances by 30 April of each year to cover its emissions during the preceding year shall be held liable for the payment of an excess emissions penalty. The excess emissions penalty shall be EUR 100 for each tonne of carbon dioxide equivalent emitted for which the operator or aircraft operator has not surrendered allowances. Payment of the excess emissions penalty shall not release the operator or aircraft operator from the obligation to surrender an amount of allowances equal to those excess emissions when surrendering allowances in relation to the following calendar year.";

(c) the following paragraphs shall be added:

"5. In the event that an aircraft operator fails to comply with the requirements of this Directive and where other enforcement measures have failed to ensure compliance, its administering Member State may request the Commission to decide on the imposition of an operating ban on the aircraft operator concerned.

6. Any request by an administering Member State under paragraph 5 shall include:

(a) evidence that the aircraft operator has not complied with its obligations under this Directive;

(b) details of the enforcement action which has been taken by that Member State;

(c) a justification for the imposition of an operating ban at Community level; and

(d) a recommendation for the scope of an operating ban at Community level and any conditions that should be applied.

7. When requests such as those referred to in paragraph 5 are addressed to the Commission, the Commission shall inform the other Member States through their representatives on the Committee referred to in Article 23(1) in accordance with the Committee's Rules of Procedure.

8. The adoption of a decision following a request pursuant to paragraph 5 shall be preceded, when appropriate and practicable, by consultations with the authorities responsible for regulatory oversight of the aircraft operator concerned. Whenever possible, consultations shall be held jointly by the Commission and the Member States.

9. When the Commission is considering whether to adopt a decision following a request pursuant to paragraph 5, it shall disclose to the aircraft operator concerned the essential facts and considerations which form the basis for such decision. The aircraft operator concerned shall be given an opportunity to submit written comments to the Commission within 10 working days from the date of disclosure.

10. At the request of a Member State, the Commission may, in accordance with the regulatory procedure referred to in Article 23(2), adopt a decision to impose an operating ban on the aircraft operator concerned.

11. Each Member State shall enforce, within its territory, any decisions adopted under paragraph 10. It shall inform the Commission of any measures taken to implement such decisions.

12. Where appropriate, detailed rules shall be established in respect of the procedures referred to in this Article. Those measures, designed to amend non-essential elements of this Directive by supplementing it, shall be

adopted in accordance with the regulatory procedure with scrutiny referred to in Article 23(3).";

15. the following Articles shall be inserted:

"Article 18a

Administering Member State

1. The administering Member State in respect of an aircraft operator shall be:

(a) in the case of an aircraft operator with a valid operating licence granted by a Member State in accordance with the provisions of Council Regulation (EEC) No 2407/92 of 23 July 1992 on licensing of air carriers [], the Member State which granted the operating licence in respect of that aircraft operator; and

(b) in all other cases, the Member State with the greatest estimated attributed aviation emissions from flights performed by that aircraft operator in the base year.

2. Where in the first two years of any period referred to in Article 3c, none of the attributed aviation emissions from flights performed by an aircraft operator falling within paragraph 1(b) of this Article are attributed to its administering Member State, the aircraft operator shall be transferred to another administering Member State in respect of the next period. The new administering Member State shall be the Member State with the greatest estimated attributed aviation emissions from flights performed by that aircraft operator during the first two years of the previous period.

3. Based on the best available information, the Commission shall:

(a) before 1 February 2009, publish a list of aircraft operators which performed an aviation activity listed in Annex I on or after 1 January 2006 specifying the administering Member State for each aircraft operator in accordance with paragraph 1; and

(b) before 1 February of each subsequent year, update the list to include aircraft operators which have subsequently performed an aviation activity listed in Annex I.

4. The Commission may, in accordance with the regulatory procedure referred to in Article 23(2), develop guidelines relating to the administration of aircraft operators under this Directive by administering Member States.

5. For the purposes of paragraph 1, "base year" means, in relation to an aircraft operator which started operating in the Community after 1 January 2006, the first calendar year of operation, and in all other cases, the calendar year starting on 1 January 2006.

Article 18b

Assistance from Eurocontrol

For the purposes of carrying out its obligations under Articles 3c(4) and 18a, the Commission may request the assistance of Eurocontrol or another relevant organisation and may conclude to that effect any appropriate agreements with those organisations.

16. in Article 19, paragraph 3 shall be amended as follows:

(a) the last sentence shall be replaced by the following:

"That Regulation shall also include provisions concerning the use and identification of CERs and ERUs in the Community scheme and the monitoring of the level of such use and provisions to take account of the inclusion of aviation activities in the Community scheme.";

(b) the following subparagraph shall be added:

"The Regulation on a standardised and secured system of registries shall ensure that allowances, CERs and ERUs surrendered by aircraft operators are transferred to Member States' retirement accounts for the Kyoto Protocol's first commitment period only to the extent that those allowances, CERs and ERUs correspond to emissions included in the national totals of Member States' national inventories for that period.";

17. in Article 23, paragraph 3 shall be replaced by the following:

"3. Where reference is made to this paragraph, Article 5a(1) to (4) and Article 7 of Decision 1999/468/EC shall apply, having regard to the provisions of Article 8 thereof.";

18. the following Article shall be inserted:

"Article 25a

Third country measures to reduce the climate change impact of aviation

1. Where a third country adopts measures for reducing the climate change impact of flights departing from that country which land in the Community, the Commission, after consulting with that third country, and with Member States within the Committee referred to in Article 23(1), shall consider options available in order to provide for optimal interaction between the Community scheme and that country's measures.

Where necessary, the Commission may adopt amendments to provide for flights arriving from the third country concerned to be excluded from the aviation activities listed in Annex I or to provide for any other amendments to the aviation activities listed in Annex I which are required by an agreement pursuant to the fourth subparagraph. Those measures, designed to amend non-essential elements of this Directive, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 23(3).

The Commission may propose to the European Parliament and the Council any other amendments to this Directive.

The Commission may also, where appropriate, make recommendations to the Council in accordance with Article 300(1) of the Treaty to open negotiations with a view to concluding an agreement with the third country concerned.

2. The Community and its Member States shall continue to seek an agreement on global measures to reduce greenhouse gas emissions from aviation. In the light of any such agreement, the Commission shall consider whether amendments to this Directive as it applies to aircraft operators are necessary.";

19. Article 28 shall be amended as follows:

(a) paragraph 3(b) shall be replaced by the following:

"(b) to be responsible for surrendering allowances, other than allowances issued under Chapter II, equal to the total emissions from installations in the pool, by way of derogation from Articles 6(2)(e) and 12(3); and";

(b) paragraph 4 shall be replaced by the following:

"4. The trustee shall be subject to the penalties applicable for breaches of requirements to surrender sufficient allowances, other than allowances issued under Chapter II, to cover the total emissions from installations in the pool, by way of derogation from Article 16(2), (3) and (4).";

20. the following paragraph shall be added to Article 30:

"4. By 1 December 2014 the Commission shall, on the basis of monitoring and experience of the application of this Directive, review the functioning of this Directive in relation to aviation activities in Annex I and may make proposals to the European Parliament and the Council pursuant to Article 251 of the Treaty as appropriate. The Commission shall give consideration in particular to:

(a) the implications and impacts of this Directive as regards the overall functioning of the Community scheme;

(b) the functioning of the aviation allowance market, covering in particular any possible market disturbances;

(c) the environmental effectiveness of the Community scheme and the extent by which the total quantity of allowances to be allocated to aircraft operators under Article 3c should be reduced in line with overall EU emissions reduction targets;

(d) the impact of the Community scheme on the aviation sector, including issues of competitiveness, taking into account in particular the effect of climate change policies implemented for aviation outside the EU;

(e) continuing with the special reserve for aircraft operators, taking into account the likely convergence of growth rates across the industry;

(f) the impact of the Community scheme on the structural dependency on aviation transport of islands, landlocked regions, peripheral regions and the outermost regions of the Community;

(g) whether a gateway system should be included to facilitate the trading of allowances between aircraft operators and operators of installations whilst ensuring that no transactions would result in a net transfer of allowances from aircraft operators to operators of installations;

(h) the implications of the exclusion thresholds as specified in Annex I in terms of certified maximum take-off mass and number of flights per year performed by an aircraft operator;

(i) the impact of the exemption from the Community scheme of certain flights performed in the framework of public service obligations imposed in accordance with Council Regulation (EEC) No 2408/92 of 23 July 1992 on access for Community air carriers to intra-Community air routes [];

(j) developments, including the potential for future developments, in the efficiency of aviation and in particular the progress towards meeting the Advisory Council for Aeronautics Research in Europe (ACARE) goal to develop and demonstrate technologies able to reduce fuel consumption by 50 % by 2020 and whether further measures to increase efficiency are necessary;

(k) developments in scientific understanding on the climate change impacts of contrails and cirrus clouds caused by aviation with a view to proposing effective mitigation measures.

The Commission shall then report to the European Parliament and the Council.

21. the following title shall be inserted after Article 30:

"CHAPTER V

FINAL PROVISIONS";

22. Annexes I, IV and V shall be amended in accordance with the Annex to this Directive.

Article 2

Transposition

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 2 February 2010. They shall forthwith inform the Commission thereof.

When Member States adopt those measures, they shall contain a reference to this Directive or shall be accompanied by such reference on the occasion of their official publication. The methods of making such reference shall be laid down by Member States.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive. The Commission shall inform the Member States thereof.

Article 3

Entry into force

This Directive shall enter into force on the 20th day following its publication in the Official Journal of the European Union.

Article 4

Addressees

This Directive is addressed to the Member States.

Done at Strasbourg, 19 November 2008

For the European Parliament

The President

H.-G. Pöttering

For the Council

The President

J.-P. Jouyet

[1] OJ C 175, 27.7.2007, p. 47.

[2] OJ C 305, 15.12.2007, p. 15.

[3] Opinion of the European Parliament of 13 November 2007 (not yet published in the Official Journal), Council Common Position of 18 April 2008 (OJ C 122 E, 20.5.2008, p. 19) and Position of the European Parliament of 8 July 2008 (not yet published in the Official Journal). Council Decision of 24 October 2008.

[4] OJ L 275, 25.10.2003, p. 32.

[5] OJ L 33, 7.2.1994, p. 11.

[6] OJ C 287 E, 29.11.2007, p. 344.

[7] OJ L 130, 15.5.2002, p. 1.

[8] OJ L 242, 10.9.2002, p. 1.

[9] OJ C 303 E, 13.12.2006, p. 119.

[10] OJ L 184, 17.7.1999, p. 23.

[11] OJ C 321, 31.12.2003, p. 1.

[] OJ L 240, 24.8.1992, p. 1.";

[] OJ L 240, 24.8.1992, p. 8.";

ANNEX

Annexes I, IV and V to Directive 2003/87/EC are hereby amended as follows:

1. Annex I shall be amended as follows:

(a) the title shall be replaced by the following:

"CATEGORIES OF ACTIVITIES TO WHICH THIS DIRECTIVE APPLIES";

(b) the following subparagraph shall be inserted in paragraph 2 before the table:

"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.";

(c) the following category of activity shall be added:

"Aviation

Flights which depart from or arrive in an aerodrome situated in the territory of a Member State to which the Treaty applies. This activity shall not include: (a)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;(b)military flights performed by military aircraft and customs and police flights;(c)flights related to search and rescue, firefighting flights, humanitarian flights and emergency medical service flights authorised by the appropriate competent authority;(d)any flights performed exclusively under visual flight rules as defined in Annex 2 to the Chicago Convention;(e)flights terminating at the aerodrome from which the aircraft has taken off and during which no intermediate landing has been made;(f)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;(g)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;(h)flights performed by aircraft with a certified maximum take-off mass of less than 5700 kg;(i)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 30000 seats per year; and(j)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; orflights with total annual emissions lower than 10000 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." | Carbon dioxide |

2. Annex IV shall be amended as follows:

(a) the following title shall be inserted after the title of the Annex:

"PART A — Monitoring and reporting of emissions from stationary installations";

(b) the following part shall be added:

"PART B — Monitoring and reporting of emissions from aviation activities

Monitoring of carbon dioxide emissions

Emissions shall be monitored by calculation. Emissions shall be calculated using the formula:

Fuel consumption × emission factor

Fuel consumption shall include fuel consumed by the auxiliary power unit. Actual fuel consumption for each flight shall be used wherever possible and shall be calculated using the formula:

Amount of fuel contained in aircraft tanks once fuel uplift for the flight is complete – amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete + fuel uplift for that subsequent flight.

If actual fuel consumption data are not available, a standardised tiered method shall be used to estimate fuel consumption data based on best available information.

Default IPCC emission factors, taken from the 2006 IPCC Inventory Guidelines or subsequent updates of these Guidelines, shall be used unless

activity-specific emission factors identified by independent accredited laboratories using accepted analytical methods are more accurate. The emission factor for biomass shall be zero.

A separate calculation shall be made for each flight and for each fuel.

Reporting of emissions

Each aircraft operator shall include the following information in its report under Article 14(3):

A. Data identifying the aircraft operator, including:

- name of the aircraft operator,

- its administering Member State,

- its address, including postcode and country and, where different, its contact address in the administering Member State,

- the aircraft registration numbers and types of aircraft used in the period covered by the report to perform the aviation activities listed in Annex I for which it is the aircraft operator,

- the number and issuing authority of the air operator certificate and operating licence under which the aviation activities listed in Annex I for which it is the aircraft operator were performed,

- address, telephone, fax and e-mail details for a contact person, and

- name of the aircraft owner.

B. For each type of fuel for which emissions are calculated:

- fuel consumption,

- emission factor,

- total aggregated emissions from all flights performed during the period covered by the report which fall within the aviation activities listed in Annex I for which it is the aircraft operator,

- aggregated emissions from:

- all flights performed during the period covered by the report which fall within the aviation activities listed in Annex I for which it is the aircraft operator and which departed from an aerodrome situated in the territory of a Member State and arrived at an aerodrome situated in the territory of the same Member State,

- all other flights performed during the period covered by the report which fall within the aviation activities listed in Annex I for which it is the aircraft operator,

- aggregated emissions from all flights performed during the period covered by the report which fall within the aviation activities listed in Annex I for which it is the aircraft operator and which:

- departed from each Member State, and

- arrived in each Member State from a third country,

- uncertainty.

Monitoring of tonne-kilometre data for the purpose of Articles 3e and 3f

For the purpose of applying for an allocation of allowances in accordance with Article 3e(1) or Article 3f(2), the amount of aviation activity shall be calculated in tonne-kilometres using the following formula:

tonne-kilometres = distance × payload

where:

"distance" means the great circle distance between the aerodrome of departure and the aerodrome of arrival plus an additional fixed factor of 95 km; and

"payload" means the total mass of freight, mail and passengers carried.

For the purposes of calculating the payload:

- the number of passengers shall be the number of persons on-board excluding crew members,

- an aircraft operator may choose to apply either the actual or standard mass for passengers and checked baggage contained in its mass and balance documentation for the relevant flights or a default value of 100 kg for each passenger and his checked baggage.

Reporting of tonne-kilometre data for the purpose of Articles 3e and 3f

Each aircraft operator shall include the following information in its application under Article 3e(1) or Article 3f(2):

A. Data identifying the aircraft operator, including:

- name of the aircraft operator,

- its administering Member State,

- its address, including postcode and country and, where different, its contact address in the administering Member State,

- the aircraft registration numbers and types of aircraft used during the year covered by the application to perform the aviation activities listed in Annex I for which it is the aircraft operator,

- the number and issuing authority of the air operator certificate and operating licence under which the aviation activities listed in Annex I for which it is the aircraft operator were performed,

- address, telephone, fax and e-mail details for a contact person, and

- name of the aircraft owner.

B. Tonne-kilometre data:

- number of flights by aerodrome pair,

- number of passenger-kilometres by aerodrome pair,

- number of tonne-kilometres by aerodrome pair,

- chosen method for calculation of mass for passengers and checked baggage,

- total number of tonne-kilometres for all flights performed during the year to which the report relates falling within the aviation activities listed in Annex I for which it is the aircraft operator.";

3. Annex V shall be amended as follows:

(a) the following title shall be inserted after the title of the Annex:

"PART A — Verification of emissions from stationary installations";

(b) the following part shall be added:

"PART B — Verification of emissions from aviation activities

13. The general principles and methodology set out in this Annex shall apply to the verification of reports of emissions from flights falling within an aviation activity listed in Annex I.

For this purpose:

(a) in paragraph 3, the reference to operator shall be read as if it were a reference to an aircraft operator, and in point (c) of that paragraph the reference to installation shall be read as if it were a reference to the aircraft used to perform the aviation activities covered by the report;

(b) in paragraph 5, the reference to installation shall be read as if it were a reference to the aircraft operator;

(c) in paragraph 6 the reference to activities carried out in the installation shall be read as a reference to aviation activities covered by the report carried out by the aircraft operator;

(d) in paragraph 7 the reference to the site of the installation shall be read as if it were a reference to the sites used by the aircraft operator to perform the aviation activities covered by the report;

(e) in paragraphs 8 and 9 the references to sources of emissions in the installation shall be read as if they were a reference to the aircraft for which the aircraft operator is responsible; and

(f) in paragraphs 10 and 12 the references to operator shall be read as if they were a reference to an aircraft operator.

Additional provisions for the verification of aviation emission reports

14. The verifier shall in particular ascertain that:

(a) all flights falling within an aviation activity listed in Annex I have been taken into account. In this task the verifier shall be assisted by timetable data and other data on the aircraft operator's traffic including data from Eurocontrol requested by that operator;

(b) there is overall consistency between aggregated fuel consumption data and data on fuel purchased or otherwise supplied to the aircraft performing the aviation activity.

Additional provisions for the verification of tonne-kilometre data submitted for the purposes of Articles 3e and 3f

15. The general principles and methodology for verifying emissions reports under Article 14(3) as set out in this Annex shall, where applicable, also apply correspondingly to the verification of aviation tonne-kilometre data.

16. The verifier shall in particular ascertain that only flights actually performed and falling within an aviation activity listed in Annex I for which the aircraft operator is responsible have been taken into account in that operator's application under Articles 3e(1) and 3f(2). In this task the verifier shall be assisted by data on the aircraft operator's traffic including data from Eurocontrol requested by that operator. In addition, the verifier shall ascertain that the payload reported by the aircraft operator corresponds to records on payloads kept by that operator for safety purposes."[4]

[4] Eur-Lex, *Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community,* <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0101:EN:HTML> (last updated January 13, 2009 and accessed February 26, 2011).

Biography

Thanaporn Wichienkuer was born on May 2, 1983 in Bangkok, Thailand. Thanaporn has graduated from Claremont High School in Southern California, with honor. She attended Chulalongkorn University"s Bachelor of Business Administrtaion and was granted a bachelor degree in 2008. Her father, Former Director General of the Department of Juvenile Observation and Protection of the Ministry of Justice, passed away on August 30, 2008 while on an assignment in Hat Yai due to a stroke. Her mother, former Executive Director/Vice President of I.C.C. International Company Limited has retired to an advisor position until she passed away on July 6th, 2011 due to cancer and related complications. Thanaporn now lives with two sisters, Thanawan and Thanunya Wichienkuer. Thanawan has graduated from the same University and the same program of the Bachelor of Business Administration International Program (BBA) at Chulalongkorn University. Thanunya is in her fourth year at the faculty of Communication Arts. Thanaporn was enrolled in the MA of European Studies Program at Chulalongkorn University in 2009 and this thesis contributes partially to her completion of the program.