

## **CHAPTER II**

### **LITERATURE REVIEW**

This chapter provides a review of studies and literature related to green airlines. The topics covered include the following: history of aviation, national airline and low-cost airline, global warming, motivations and drivers for corporate environmental commitment, environmental impacts of air travel, and green environmental programs in Green Airlines, perception, and participation.

#### **History of Aviation**

The participation of the U.S.A. in World War I stimulated the development of the airline industry and the success of Charles Lindbergh's flight across the Atlantic Ocean in 1927, created massive interest in flying. The biggest factors of air transportation industry at the beginning were focused on carrying bags of mail and cargo, but after a safety of air travel was assured, the volume of passengers increased tremendously. The profits in transporting passengers made the airlines industries expand rapidly.

The history of airline started with the German Airship Transport Corporation in 1909. Netherland's KLM first flew in 1920 and Australia's Qantas was founded the same year, and the U.S. scheduled commercial airline flight began in 1914. An all-metal aircraft for passenger service was constructed, and it became the first successful American airliner that made passenger service potentially profitable. At the same time, Juan Trippe created an air network. His airline, Pan American World Airways, linked Los Angeles to Shanghai and Boston to London. Boeing 247 and Douglas DC-3 were introduced in 1930 (Heil and Terrence, 1998).

The end of the World War II brought a new life to the airline industry, with the U.S.A. taking a position of maximum operating freedom. Many airlines in the allied countries were free from military activities and foresaw a future expansion of demand for civil air transport, for both passengers and cargoes. The wide-body jumbo jet aircraft began in the U.S.A. and in 1972, Airbus began to be a successfully

commercial airline in Europe. By 1980s, almost half of the total flying in the world took place in the U.S.A. and today domestic airline industry operates over 10,000 daily departures nationwide.

### **History of Thai National Airline**

Thai Airways International Public Company Limited is the national carrier of the Kingdom of Thailand. It operates domestic, regional and intercontinental flights radiating from its home base in Bangkok to key destinations around the world and within Thailand. The company's fully paid up share capital amounts to 16,988,765,500 Baht (9 May 2005) and is 53.77% owned by the Ministry of Finance, the Thai Government. At the end of September 2004, consolidated total assets of the company amounted to 193,211 million Baht. In its operations, THAI has achieved profitability every year for the last 40 consecutive years (thaiairways, 2010).

Thai Airways International was founded in 1960 as a joint venture between Thailand's domestic carrier, Thai Airways Company (TAC) and Scandinavian Airlines System (SAS) with the Scandinavian carrier initially providing a 30% share capital of two million Baht. SAS also provided operations, managerial and marketing expertise, with training assistance aiming at building a fully independent national airline within the shortest possible time. Thai nationals, through training and experience, were gradually able to assume full managerial responsibility and the numbers of expatriate staff were duly reduced to less than one percent in 1987. On April 1, 1977, after a 17-year capital participation partnership with SAS, the Thai Government bought out SAS remaining 15 % holding and THAI became fully owned by the Thai people (thaiairways, 2010).

In 1960, flights were inaugurated from Bangkok to 9 overseas destinations, all within the Asian region. Intercontinental services were launched in 1971, to Australia, followed by flights to Europe in 1972, and to North America in 1980. Thai Airways International growth was greatly accelerated on April 1, 1988 as a result of its merger with Thai Airways Company (TAC), the domestic airline, which raised the Company's share capital from 1,400 million to 2,230 million Baht. Under the Cabinet policy, as authorized by General Prem Tinsulanonda, Prime Minister at the time, Thai Airways International would be responsible for commercial aviation, both

international and domestic. Thai Airways International can now rightfully be called Thailand's only national carrier. On June 25, 1991, Thailand Cabinet gave approval to THAI to list its shares on the Stock Exchange of Thailand (SET). The resolution authorized THAI to convert Baht 10.77 billion of retained earnings into capital, and increase its capital by an additional Baht 3 billion with the first issue of 100 million shares. Of those 100 million shares, five million shares were reserved for THAI employees at par Baht 10 and 95 million shares were to be offered to the public (thaiairways, 2010).

The listing of THAI shares was commenced on July 19, 1991. By converting retained earnings into capital and increased its share capital upon the Cabinet approval, THAI registered share capital has risen from Baht 2,230 million to a total of Baht 14,000 million. This has made the total amount of THAI share listing to be the largest in the history of SET. Moreover, THAI public offering of shares is the single largest one ever undertaken in Thailand (thaiairways, 2010).

The main purposes in listing on the SET and offering shares to the public are to obtain the additional funds needed in giving the airline a competitive edge in the international market and to allow member of the general public and THAI employees to become shareholders in this national flag carrier of Thailand. On November 20-21, 2003, THAI offered for sale the company's 442.75 million ordinary shares, comprising 285 million capital increase ordinary shares and 157.75 million existing ordinary shares held by the Ministry of Finance upon the Cabinet approval. Proceeds generated by the sales would be used as investment in the Suvarnabhumi Airport project, and for upgrading inflight services ranging from passenger seats to other amenities. Since September 2004, the company has sold THAI shares to its employees through the Employee Securities Option Plan (ESOP) in a total of 13,896,150 shares at 15 Baht per share. The company continued selling its shares to those employees who held the warrants until the end of the plan in April 2007 (thaiairways, 2010).

**Business Units & Affiliates** (thaiairways, 2010)

1. THAI Cargo
2. THAI Maintenance
3. THAI Catering
4. THAI Ground Services

5. THAI Ground Support Equipment and Services
6. THAI Aviation Training
7. External Customer Services Training
8. Affiliates

### **Background of Low-cost Airlines**

A low-cost carrier or low cost airline (also known as a no-frills or discount carrier / airline) is an airline that offers generally low fares in exchange for eliminating many traditional passenger services. The concept originated in the United States before spreading to Europe in the early 1990s and subsequently to much of the rest of the world (Gross and Schroeder, 2007).

With no-frills, passengers will have to make their own booking using the Internet or by using a call centre. Food will also not be served aboard such flights but tickets will cost 30 per cent less (Jirasakunthai, 2003).

According to Gross and Schroeder (2007), an original low-cost carrier business model practice includes:

1. A single passenger class
2. A single type of airplane in order to reduce training and servicing costs
3. A minimum set of optional equipment on the airplane
4. A simple fare scheme such as charging one-way tickets half that of round-trips
5. Unreserved seating in order to encourage passengers to board early and quickly
6. Flying to cheaper and less congested secondary airports together with flying early in the morning or late in the evening to avoid air traffic delays and take advantage of lower landing fees
7. Fast turnaround times (allowing maximum use of aircraft)
8. Simplified routes; emphasizing point-to-point transit instead of transfers at hubs
9. Encourage the use of direct flights; due to luggage is not automatically transferred from one flight to another even if both flights are with the same company

10. Generation of ancillary revenue from a variety of activities such as a la carte features and commission-based products

11. Emphasis on direct sales of tickets especially over the Internet in order to avoid fees and commissions paid to travel agents and computer reservations systems

12. Employees working in multiple roles; for instance flight attendants also cleaning the aircraft or working as gate agents in order to limit personnel costs

13. A disinclination to handle Special Service passengers, for instance by placing a higher age limit on unaccompanied minors than full service carriers

14. Aggressive fuel hedging programs

But currently, not every low-cost carrier implements all of the above actions. For example, some try to differentiate themselves with allocated seating, others operate more than one aircraft type, while others still have relatively high operating costs but lower fares (Gross and Schroeder, 2007). According to Gross and Schroeder (2007), the price policy of the low cost carriers is usually very dynamic, with discounts and tickets in promotion. Even if the advertised price may be very low, sometimes it does not include charges and taxes.

#### **Development of Low-Cost airlines**

In reality, the history of low-cost airlines itself could be traced back for more than 50 years ago. The first successful low-cost carrier was the Pacific Southwest Airlines in the United States which pioneered the concept in 1949. However, this credit has been incorrectly given to Southwest Airlines which began service in 1971 and has been profitable every year since 1973 (Gross and Schroeder, 2007).

With the advent of aviation deregulation, the model spread to Europe. The most notable successes are Ryanair from Ireland which began low-fares operations in 1990, followed by easyJet of UK formed in 1995 (Gross and Schroeder, 2007).

In Asia and Oceania, low cost carriers began in 2000 by such operators as AirAsia, Air Deccan, One-Two-Go, Tiger airways, and Virgin Blue (Gross and Schroeder, 2007). Later in year 2006, new low-cost airlines were announced in Saudi Arabia and also in America including Mexico. Low-cost airline businesses are now operating worldwide and keep expanding rapidly.

### **Low-cost airlines in Asia**

In Asia, low-cost airlines were first operated in early 2004 with AirAsia. As of July 2008, twenty-seven (27) low-cost airlines were registered in Asian countries. Examples include Adam Air of Indonesia, Aero Asia of Pakistan, Air Arabia of the Middle East, AirAsia of Malaysia, Air Blue of Pakistan etc. Of these low cost airlines, only ten airlines serve the destination to Thailand -- they are Air Asia, Air India Express, Cebu Pacific Air, FireFly, Jetstar Asia, Mihin Lanka, Nok Air, One Two Go, Thai AirAsia, and Tiger Airways (Attitude travel, 2008).

## **Global Warming**

### **Cause of global warming**

Global warming refers to an average increase in the Earth's temperature, which in turn, causes climate change. Scientists talk about the issue of climate change, and their concern is about global warming caused by the increase of some of these heat-trapping gases and adding new ones, we intensify the natural greenhouse effect such as CO<sub>2</sub>, Methane, N<sub>2</sub>O and the other main causes are CFCs that make ozone hole (Saini, 2007).

### **The ozone hole**

Erickson (1990, pp.88-90) stressed that Chlorofluorocarbons (CFCs) and related industrial gases have thinned the ozone layer in many places. The ozone hole is the area over Antarctica where damage has been the greatest. The icy clouds there speed up chemical changes initiated by CFCs that result in destroying the ozone. Ultraviolet light passing through damaged areas can harm many forms of life on Earth. In humans, ultraviolet light can cause skin cancer. The ozone layer, a blanket of gas in the upper atmosphere, shields the Earth from the sun's harmful ultraviolet rays. The ozone hole, a gap in this layer does not intensify the greenhouse effect and should not be confused with it. The "good" protective ozone layer in upper atmosphere should be distinguished from the "bad" ozone in the lower atmosphere which is a major component of smog.

### **Greenhouse effect: how the earth stays warm**

Houghton (1997, pp.10-19) stated that the glass panes of a greenhouse and the Earth's atmosphere are both transparent to sunlight, they let the sun's energy in.

Both also trap heat. Greenhouse traps heat as sunlight passes through greenhouse glass and warms the ground inside. Heat rising from the ground warms the air; the glass prevents the air from escaping, so the greenhouse retains the heat. The atmosphere traps heat as sunlight passes through the atmosphere and warms the planet's surface. Heat rising from the surface warms the atmosphere; gases in the atmosphere absorb some of the heat and reflect it back to the ground. This warming process is called the greenhouse effect.

### **Life depends on the greenhouse effect**

The greenhouse effect keeps the Earth's average surface temperature at about 60°F (15°C). If there were no greenhouse gases in the atmosphere, the planet's temperature would be 0°F (- 18°C), too cold for most life. Most of the heat radiated from the Earth's surface would be lost directly to outer space. Mars has a very thin atmosphere with a weak greenhouse effect. Its surface is much colder than Earth's. In fact, it is frozen. Venus has an intense greenhouse effect. Its atmosphere is thick with carbon dioxide and other gases that trap heat. The surface of Venus is much hotter than Earth's hot enough to melt lead (National Geographic, 2010).

### **Greenhouse gases warm the earth**

About half of the sun's incoming energy reaches the earth's surface. The rest is reflected back into space or is absorbed by the atmosphere. The Earth absorbs most of the energy that reaches its surface and re-emits it as heat (Uherek, 2008). The atmosphere contains gases such as water vapor and carbon dioxide which absorb, or trap, some of the rising heat and return it back to earth. This warming of the planet's surface is called the greenhouse effect. Without it, the rising heat would escape directly into space and Earth would be much colder. But if the greenhouse effect becomes stronger, it could make the Earth warmer than usual. Even a little extra warming may cause problems for humans, plants, and animals (Uherek, 2008).

### **How we are altering the earth's atmosphere**

Human activities are intensifying the natural greenhouse effect. Every year we release billions of tons heat-trapping gases to the atmosphere. In doing so, we are setting the stage for a warmer Earth. Green house gases are carbon dioxide, nitrous oxide, fluorocarbon, methane (Solomon, et al., 2007).

**Climate clues: pieces of the climate puzzle**

For a reliable picture of earth's past climate, scientists must combine bits of evidence from many sources. Seeking climate clues, scientists probe deep in glaciers, ocean and lake floors, century's old trees and ancient caves. Using the information they find, they reconstruct a continuous record of past temperature, rainfall, vegetation and levels of atmosphere. Tree rings: reflect climate conditions year by year. Stalagmites that grow on cave floors preserve a pattern of past temperatures. Sediments that fall on the sea floor serve as archives of past ocean temperatures and currents. Lake-bottom sediments reveal lake temperatures of the past (Taikam, 2005).

**Ice cores: drilling for climate records**

One way scientists reconstruct past climate changes is by studying ice cores extracted from ancient glaciers in Antarctica and Greenland. By analyzing the ice and the air trapped within the ice cores, they can build a record of levels of two gases that trap heat in the atmosphere: carbon dioxide and methane. They can also estimate past temperature changes that go back thousands of years (Taikam, 2005).

**Tree-ring growth reflects temperature changes**

A growing tree adds a new ring of wood to its trunk every year. Counting the growth rings tells the tree's age. The width of the rings provides evidence of past climate. In years when growing conditions are favorable, trees grow wider rings than in less favorable years. Using computers, scientists measure changes in ring width not obvious to the naked eye (Taikam, 2005).

**Stalagmites: clues from cave floors**

Stalagmites are limestone deposits that grow upward from a cave floor over many thousands of years as water drips from the roof of a limestone cave. By analyzing stalagmites, scientists can find out about past temperature and rainfall patterns (Taikam, 2005).

**Sediments from the deep: climate history buried underwater**

The remains of plants and animals, and particles such as dust and clay, accumulate through the years at the bottom of oceans and lakes and gradually build up. Scientists extract cylinders, or cores, of these sediments and analyze the contents for clues about the climate at the time they were deposited (Taikam, 2005).

### **Impact of Global Warming**

The impacts of warmer climate condition have driven our planet to face with devastating events such as severe melting of icecaps and glaciers, rising of ocean level, coastal erosion, expanding large amount of salt water intrusion in the fresh water, heavy flood disasters, extreme heat wave, drought and wildfire, increase of lethal epidemics widespread and cause of weak health. These disastrous events can signify that global warming can generate catastrophe to the planet. Many evidence showed that global warming is the cause of unbalancing ecosystem, environmental degradation, and disruption of the well-being of flora, fauna and human life (Spence, 2005). Besides generating negative effects on environment, global warming has the potential to destroy many sectors, especially the tourism industry.

Impact on Thailand seaside resort: Resort towns such as Pattaya, Prachuap Kiri Khan, Hua Hin and Cha-am have development on low lying land immediately behind beaches as have many other smaller resorts and hotel complexes, like on the west coast of Phuket Island. The demand has been for resorts close to the present beach but some have been built on coastal slopes like those near Leam Mae Phim. Impact has been noted by rising sea level which will initiate or intensify erosion of beaches along the front of seaside resort esplanades. For instance, those at Pak Nam Chumphon will be reduced and eventually disappear (Thailand Environment Institute Annual Conference, 1996, pp.2-6).

### **How to avoid global warming**

The discussion about problems of global warming is never ending. Ways to solve this problem should be utilized. There are many different ways to solve the problem so that the World can be protected from high temperature, but the whole effort depends on our control of as follows:

1. Keep level of greenhouse gases
2. Preserve energy
3. Ban CFCs
4. Reduce methane and Nitrous oxide
5. Fuel from biomass and charcoal burner
6. Use technology of circle energy
7. Increase the area of forest

## **Motivations and drivers for corporate environmental commitment**

### **Motivations and Drivers**

Identifying cultural influences and recognizing their role in policy-making is a critical component of policymaking (Hall and Jenkins, 1995; Parsons, 1995; Hall, 1994). In dynamic and reflexive policy-making processes, issues are constantly being identified, framed and evaluated by different actors and agencies. This dynamic process means that issues move in and out of focus and are continuously impacting upon stakeholder interest, the identification of possible solution and decision-making. In this way, issues can be conceptualized as being mediated through ever-changing power structures and the dynamic knowledge that characterizes a community of stakeholders. Knowing both how companies perceive and construct decisions relating to their environmental performance and what the motivations are that drive corporate environmental commitment becomes important knowledge when developing policy aimed at achieving improved environmental outcomes.

Baylis, Connell and Flynn (1998b, p.285) state that Business perceptions are built upon a combination of factors at times, these factors such as size and regulation may reinforce one another and so lead to a clear direction of activity and a relatively uncomplicated line of analysis, whilst, at other times, they neutralize each other and thereby result in a lack of clear direction and difficulty in analyzing what is happening.

There are different motivations for the various components of corporate greening. Benchmarking and eco-labeling practices for instance are coercive voluntary instruments that have the potential to improve product marketability to an increasingly educated and environmentally aware consumer (Middleton and Hawkins, 1999). Khanna and Anton (2002) find that total quality environmental management and environmental reporting are principally motivated by perceived competitive advantages in the marketplace and internal environmental policy, corporate environmental standards and environmental auditing are predominantly influenced by the regulatory environment. The reasons why businesses choose to participate in environmental commitment are motivations from various factors depending on the type of industry to which they belong. For example, industries thought to pose significant environmental risk seek to regain public trust through highly publicized environmental improvement activities (Lynes and Gibson, 1998, p.18).

These factors provide an overview of the drivers for environmental activity within a company. However, recent research suggests that there are different drivers for different sectors and drivers can also be dependent on the nature of the decision (Céspedes-Lorente, et al., 2003; Khanna and Anton, 2002; Gilley, et al., 2000). As a result, generic lists of drivers are open to criticisms of reductionism, consolidating the argument that further research is required on specific sectors (Céspedes-Lorente, et al., 2003; Gilley, et al., 2000; Howes, et al., 1997).

Motivations have been considered in relation to voluntary initiatives and regulatory systems as well as with respect to reasons for adopting environmental management systems such as ISO 14000 (Chapman and Anderson, 2000). Over the last ten years a vast body of literature has emerged that examines influences on corporate greening (Khanna and Anton, 2002; Bansal and Roth, 2000; Gilley, Worrell and El-Jelly, 2000; Gibson, 1999a). This literature is invaluable in identifying broad range of drivers and in building up understandings of what sorts of policy instruments (from compulsory regulatory instruments through to coercive voluntary initiatives) can be effectively used in different industries to further sustainable management practices.

Gibson (1999c, p.253) suggested that corporate environmental commitment should be considered in a much broader “web of motivations and methods” since the actions of corporations are not ‘voluntary’ in the traditional sense of the word. Finding answers to why some firms take for granted that sustainability and profitability can, and must, reinforce one another’s calls for a different kind of analysis, one that transcends our narrow faith in markets and goes beyond the legalisms and dead ends of so many (voluntary initiative) examples (Fowler, 2000, p.73).

It can be seen that a number of themes emerge to motivations for corporate environmental commitment.

1. Financial benefits (e.g. to reduce costs and increase efficiency, especially by cutting resource use and waste generation)
2. Competitive advantage
3. Image enhancement (e.g. to enhance or reinforce a positive image in the marketplace as a ‘good corporate citizen’)

4. Stakeholder pressures (e.g. customers, community groups, industry member, banks and insurance companies)

5. Desire to avoid or delay regulatory action

Furthermore, a complex array of motivations influencing corporate environmental commitment, including internal industry-specific and external drivers.

Two types of motivations can be identified in these studies:

1. Catalysts

2. Drivers

Catalysts are not motivations in themselves, but can act as a medium to encouraging corporate greening, such as internal environmental leadership within a firm. Drivers, on the other hand, are what actually induce companies to pursue environmental commitment.

Previous empirical studies have focused predominantly on the manufacturing sectors and typically relied on the use of quantitative collection of data in the form of surveys. In a study on the hotel industry, Céspedes-Lorente, et al. (2003) concluded that the greater the economic legitimacy of environmental practices that was perceived by firms, the greater the likelihood they would be adopted.

The power of stakeholders was also an influential factor in the extent of environmental practices that were introduced. Roome (1999) arrived at a similar conclusion but discusses it by using a fictional company which is a composite based on his experience with various American and European businesses over a fifteen-year period. For Composite Co. the route to change in the early 1990s appears to have been a result of timeliness, momentum and the powerful articulation of environmental storylines by internal champions (Roome, 1999, p.283). This was supported by evidence of changing environmental positions in other corporations and institutional mimicry. The champions sold the ideas to the company through evidence of cost savings, market opportunities and the overall leadership position of the company, with senior management deciding that it was 'good for business', as it would enable environmental protection and competitiveness (win-win position).

Corporate environmental commitment can also be driven internally by strategic considerations. For example Williams, Medhurst and Drew (1993) identified that in Germany, although environmental and profit objectives are no longer viewed as

a conflict by senior management, very few top managers had realized the potential of the long-term financial gains from market and competitive advantage opportunities related to environment initiative. These strategic drivers can be motivations in themselves, or they can be used as tools by environmental champions to encourage environmental commitment. In a study on determinants of regulatory compliance amongst Australian mining companies it was found that the internal organizational culture of the firm exerted the greatest influence on the way management dealt with regulatory requirements (Annandale and Taplin, 2003). While the search for economic efficiency, shareholder pressure and environmental champions represent internal drivers for environmental commitment corporations can also be encouraged to improve environmental commitment through external drivers such as industry pressure and government intervention.

This discussion identifies that while economic considerations and the search for eco-efficiency appear to be required to justify environmental commitment in corporate decision-making there are other influences (such as the role of internal champions, external government regulation and perceived strategic advantage) that motivate corporations to consider and adopt environmental commitment. In order to identify what motivations influence environmental commitment in particular contexts it is necessary to develop a more in-depth understanding of the nature of these motivations and the influence they may have in corporate decision-making.

### **Financial benefits**

The financial benefits of environmental commitment range from short and medium term savings through improved resource management to long-term competitive advantages. While eco-efficiencies (such as energy savings) may produce immediate and clearly measurable improvements, there is also a range of indirect benefits on which it is more difficult to put a precise monetary value (such as the outcomes of a firm's improved image or increased productivity as a result of employee 'pride'). Financial incentives can be further defined to incorporate money saved and money earned as the result of a firm's level of corporate greening. However, early stages of programs such as the American-based Pollution Prevention Pays may incur large savings at the beginning that then gradually decrease (e.g. diminishing returns) (Buchholz, 1998; Hart, 1995). Table 1 provides a summary

of the various indirect and direct financial benefits that can be realised through investment and commitment of a firm towards environmental management.

**Table 1 Financial Benefits of Corporate Greening**

Increase Revenue	Decreased Costs
1. Increased market share	1. Improved efficiency in managing resources
2. Increased brand value	2. Decreased risk and liability concerns
3. Increased market share	3. Avoiding environmental law suits and clean-up costs
4. Improved productivity and customer service through increase in employee pride or improvement in corporate culture	4. Avoiding taxes and charges (or paying reduced taxes and/or charges)
5. Increase revenue through emissions trading	5. Avoiding cost of compliance with more stringent regulations

**Source:** Kiernan, 2001; Lynes and Gibson, 1998; Buchholz, 1998

Shareholder value is another aspect of financial benefits. The American-based company Baxter International claimed in the cover letter for their 1993 Environmental Report that the savings the company generated from their environmental program added eight cents per share to Baxter's profitability (Frankel, 1998, p.40). Higher returns are one aspect of shareholder value, but there is also the pressure from shareholders for companies to be environmentally and socially responsible for ethical principles. Green and ethical funds began to emerge almost a decade ago and sustainability indexes have also been established such as the Dow Jones Sustainability Index and (DJSI), however, Kiernan (2001, p.1) argued that the importance of a company's sustainable performance has also moved "from being the sole preserve of the statistically marginal 'socially responsible' investment into

the mainstream”. Kiernan’s study begins to answer some of the questions surrounding shareholder pressure through empirical data of what he refers to as the effects of ‘eco-value’ on the financial performance of four industry sectors – mining, integrated oil and gas, steel and electric utilities. Of these four sectors, with respect to investment on stock return, the environmental leaders outperformed ‘industry laggards’ by between 11 and 37% over a three-year period (Kiernan, 2001, p.6).

### **Competitive advantage**

The benefits a firm would gain from competitive advantage for corporate greening are part of an advanced long-term business strategy. Prahalad and Hamal (1990) stated the importance of competing for the future as a strategic move, but much-neglected aspect of competitive advantage. Porter (1991) also argued that a stringent regulatory framework within a country can actually encourage competitiveness on an international scale over the long term. Indeed, companies with superior implements for environmental commitment would become more attractive for investors and corporate customers. It also adds value to a company by differentiating or outperforming competitors (Porter, 1985). Porter divides competitive advantage into three categories:

1. Direct (e.g. adding value to a product or service)
2. Indirect (e.g. activities that make it possible to perform direct activities)
3. Quality assurance (e.g. monitoring, inspecting, testing, reviewing, reporting)

While the distinction between these three groups is not often made, it is important in determining the extent and effect of the competitive advantage. Stead and Stead (1992) also emphasized the importance of developing competitive advantages with respect to environmental initiative by capitalizing on environmental opportunities and minimizing environmental threats. That being said, strategic choice to use environmental management as a competitive advantage is “rarely a dominant belief; it usually has to be haggled for by a committed, but ever vulnerable, champion” (Fineman, 1997, p.37).

### **Enhancing image and being a good corporate citizen**

Fineman (1997, p.36) maintained that public embarrassment is a potent emotion for organizational change. Other advantages of improving and/or maintaining

good relationships with community stakeholders and upholding the good neighbor badge are that less management and employee time is spent on complaints and enquiries from the press (Howes, et al., 1997); as well as easier approval for new planning (Kiernan, 2001). Social legitimacy is an essential aspect of management and it has long since been recognized in the literature that competitive advantage should be developed in the broader context of social legitimacy (Hartn, 1995, p.998).

### **Stakeholder pressures**

Stakeholder pressures can include concerns from banks and insurance companies (who do not wish to inherit environmental liabilities), industry-specific pressures as well as pressures to conform to pressures from community and environmental groups. Hart (1995) proposed that over time a pollution prevention strategy will become increasingly based on external legitimacy (and grow from an internal competitive process) since transparency will enhance image and legitimacy as opposed to acting as a deterrent (e.g. through environmental reports). Some companies also claim that participation in programs such as formal industry agreements (e.g. Responsible Care) provides monetary incentives from financial institutions such as reduced lending rates and reduced liability risks (Moffet and Bregha, 1999).

### **Desire to avoid or delay regulatory action**

Environmental regulation has been identified as an important stimulus in the level of a firm's environmental commitment (Baylis, et al., 1998). In addition to complying with regulations, firms may take 'pro-active' action to avoid or delay more stringent regulatory requirements. Case studies suggest that the threat of regulation is the key driving force in accelerated levels of corporate greening, especially with respect to initiatives developed by industry groups (Lynes and Gibson, 1998; Labatt and Maclaren, 1998). Another motive for firms to become more active in corporate greening is so that they can exercise their power to influence the shape of national and international environmental directives (Fineman, 1997, p.35). An ulterior motive of this pro-activeness is to reduce the cost of compliance and to maximise potential long-term competitive advantage gains (Howes, et al., 1997; Fineman, 1997). Howes, et al. (1997) argued that firms are moving beyond rebelling against regulations, or just meeting regulatory requirements, to strategically managing the anticipation of regulations to gain a competitive advantage. Cairncross (1995) postulated that a great

deal of 'corporate environmentalism has been as a result of regulations.

#### **'Non-drivers' and 'negative influences'**

While motivations or influences for environmental commitment are extensively discussed in the literature, deterrents, or 'non-drivers' are not as widely acknowledged. Steger (1996, p.51) identified barriers to development of a sustainable organization such as lack of regulatory or market pressure, uncertainty, and a monetary bias of a firm's information system which favors narrow, economist, and short-term views. In the larger context of policy-making and designing mechanisms to encourage corporate environmental commitment, it is important to identify the elements which are negative influences on corporate decision-making (Henriques and Sadosky, 1996).

However, results of a study by Baylis, et al. (1998a) on motivations of manufacturing firms showed that the closer the sector was to the end-user, the more important customer concerns became. Fineman (1997) found that in the automotive industry in the UK, there is limited pressure from consumers for a 'greener' car. Selling the environment internally was seen by managers as difficult, especially since there was little customer demand for improvements and "greenness was rarely awarded any intrinsic value, worthy of investment for its own sake" (Fineman, 1997, p.35). Limited demand from customers in many sectors, as well as an overemphasis on how important the customer believes the environment is (because of the dissonance between attitude and actual consumer behavior) has perhaps misled to emphasis being placed on customer demands in regards to environmental commitment of a corporation.

Another deterrent that has been identified is that short-term profits are preferred over long-term environmental investments because of the requirements of shareholder dividends, pressure from banks, markets and investors (Moffet and Bregha, 1999). Furthermore, if a firm were to internalize their environmental costs, it would provide them with a competitive disadvantage to other companies who chose not to use this method (in the absence of internationally or industry agreed rules). This can also occur if the regulations or other instruments give disadvantages (competitive or otherwise) to certain companies or jurisdictions. The resulting effect is a 'lose-lose' situation (Howes, et al., 1997; Greer and Bruno, 1996). Ineffective regulation, or

regulation made by inappropriate authorities who are too distanced from the needs of the industry can also discourage businesses from participating (Howes, et al., 1997). Finally, Andersson and Bateman (2000) note in their study on environmental championing that managers do not tackle environmental issues because they think they are too 'complex', too 'scientific' with 'undetectable' and 'incalculable outcomes' (Shrivastava, 1995a; Stead and Stead, 1992). These are all important to evaluating the effectiveness of various environmental tools and mechanisms aimed at encouraging deeper environmental commitment from corporations.

Up to this point in the discussion about influences on a company's level of environmental commitment, the focus has been on external drivers such as market conditions, demands of shareholders and fear of more stringent regulations. The review of the literature concerning motivations for corporate environment commitment however identified internal motivations as playing an important role. In particular, the influence of strong internal leadership was identified as a motivating factor to further activate environmental commitment.

#### **Environmental champions as engines of change**

Roberts and Gehrke (1996) argued that pressure to pay attention to environmental issues has typically come from outside the firm. However, while lobby groups and government regulation can act as 'push' factors in environmental commitment, individuals within an organization can act as 'pull' factors (Schaper, 2002). Green entrepreneurship is an emerging area of research that examines the role (and power) of an individual (such as an employee, manager or owner) in the environmental ethos of a company, large or small (Andersson and Bateman, 2000; Walley and Stubbs, 1999; Starik and Rands, 1995). Green entrepreneurs can help management see the external drivers and act as an internal driver to stimulate change and sell green ideas by demonstrating opportunities for marketing and/or efficiency improvements (Schaper, 2002). Such individuals are often referred to as 'environmental champions' (Andersson and Bateman, 2000; Walley and Stubbs, 1997). Other terms such as 'green maverick' (Taylor and Walley, 2003), environmental 'entrepreneur' (Pinchot, 1985) and an 'eco-preneur' (Schaper, 2002) are also used to denote internal environmental leaders. An environmental champion is an individual who, through formal organizational roles and/or personal activism,

attempts to introduce or create change in a product, process, or method within an organization to improve environmental performance (Andersson and Bateman, 2000). Champions are able to recognize the business significance of an issue and promote it within their organization to help ideas proceed beyond the initial stages.

Post and Altman (1994) cited that some of the most successful organizations (with regards to environmental management) have actually tried to create environmental champions and position themselves at various levels within the company. This method is reinforced by Drucker (1985, p.40), in which he remarks that entrepreneurship is indeed a behavior (and sometimes learned behavior) and not a personality trait. In a field study of successful and unsuccessful 'championing episodes' amongst American-based firms, Andersson and Bateman (2000, p.548) found that the degree to which organizations adopted the ideas of an environmental champion depended on how the individual 'identified, packaged and sold the idea'. It also depended on the degree to which the company already had adopted an environmental paradigm, as well as the strength of that paradigm. This finding reinforces the importance of an environmental champion as an internal driver to encourage environmental commitment. Given the dominant corporate decision-making context in which environmental champions operate, the innovation and alternative thinking that they bring to decision-making processes means that environmental champions reflect the qualities epitomized by the traditional business definition of an entrepreneur. Indeed, reflecting this argument is the attention environmental champions are being provided within the literature under the term green entrepreneur. Though broader in discussion than green entrepreneurship, Drucker (1985, pp.35-36) defined entrepreneurship as the ability to create a new market and/or a new customer while 'transmuting' values. In this context innovation is a social or economic term rather than a technological one: "The entrepreneur always searches for change, responds to it and exploits it as an opportunity" (Drucker, 1985, p.42). Schumpeter (1934) labeled entrepreneurship as 'creative destruction' and an entrepreneur as an engine of change. Given the similarities between traditional definitions of an entrepreneur and the role of environmental champions it can be seen that many of the concepts of intra- and entrepreneurship, when posed in an environmental context, can be applied to corporate greening. One example is

Drucker's (1985, p.61) advice for companies (or individuals) to pose the questions:

1. What would it mean to us if we pursued this course of action?
2. What would we have to do to turn it into an opportunity? and
3. Where could it lead us?

When these questions are posed in response to a potential commitment to improve environmental performance it becomes possible to identify how environmental considerations can play a strategic and long-term role in corporate decision-making. Little empirical research, however has examined how champions process issues or innovations (Schaper, 2002; Andersson and Bateman, 2000). The role and importance of the environmental champion, or in some cases, champions, is understated in the literature as an influence over a company's level of environmental commitment. The action of an environmental champion can, at times, be the difference between a company which is environmentally compliant and an environmental leader in its sector. Annandale and Taplin's (2003, p.903) research demonstrated the perceived importance (within a company) of an individual's role in a firm as an influential determinant of the company's response to environmental regulation. This difference, they argue, provides additional evidence to counter the profit-maximisation assumptions embedded within neo-classical economic theory. However, perhaps the influence individuals exert within a company demonstrates their understanding of the positive direct and indirect financial benefits of corporate greening which they have been able to 'package and sell' to upper management. Individuals within a firm, therefore, can respond to external pressures while still fulfilling their obligation to act in the best (financial) interests of the company and its shareholders.

#### **The role of management in a firm's level of environmental commitment**

There is a consensus about the relationship between support from top management for environmental commitment and a firm's actual level of environmental commitment (Azzone and Noci, 1998; Fineman, 1997; Stead and Stead, 1992; Hambrick and Mason, 1984).

Although employees can also permeate a company with attitudes and values that reflect broader social change, this is particularly effective when the 'messengers of change' are senior managers since they have the authority and



resources to institutionalize value changes (Howes, et al., 1997, p.162). That being said, even though 'the environment' is appearing more and more in large corporations (e.g. through reporting mechanisms, mission statements, environmental departments, and so on) top policy meetings have been described as 'pragmatic', 'usually defensive' and focused on 'how to keep our nose clean' (Fineman, 1997, p.35). This demonstrates that rather than demonstrating an environmental commitment for the purpose of improving environmental performance for social, philosophical or environmental reasons the environment is being considered in corporate decision-making only because it coincides with more traditional economic considerations.

The reason corporate decision-making has not fundamentally changed to include genuine environmental commitment may be related to the relationship between the objectives and values of individuals and those of the corporation they represent. Fineman's (1997) study reveals that a manager's morals define what he/she does in the workplace. The findings of Fineman's (1997) study on the personal and professional views of managers in the car manufacturing industry suggest that many managers do not take the environment into serious consideration in their personal lives and this then extends to their work principles. Others, however, suggest that there is dissonance between what a senior manager of a corporation does in his/her personal life and what they must do in the best interest of the company (Bakan, 2004).

Fineman (1997, p.33) studied on how managers value the environment in their private lives found that most described their involvement as non-existent to mildly interested. He found that managers who had a specific responsibility to the environment at work would step back from any personal feeling they had about environmental damage. The exception to this finding, however, was the case study of a Scandinavian car manufacturer. Fineman (1997, p.36) found that managers in general are not good ambassadors for the environment and they are skilled at 'techno-rationalization', or removing emotional attachment that one may have to an environmental issue. The managers in this study rarely moved beyond Stage 3 (living up to the expectations of key role-senders at work) or Stage 4 (being legally justified in their actions) of Kohlberg's six stages of cognitive moral development

(Fineman ,1997, p.36; Kohlberg, 1969). Fineman feels that changes in these managers are unlikely to occur through training and changes in corporate statements because the change in attitude needs to be more fundamental.

It is this relationship between the values of business managers and the actions of the corporations they represent that has led Jackson (Bakan, 2004, p.25) to state that corporate leaders have displaced politicians as the new 'high priests' in influencing the environmental performance of industry. From this position of power top managers is the potential to make a difference through environmental leadership but they can also do the reverse: what determines the structure of society is not the majority but the leaders (Drucker, 1946, p.5). If the level of environmental commitment of a corporation is dependent, at least in part, on the values of its top management what are the motivations that exist to encourage managers to integrate an environmental agenda into decision- making?

John Browne, CEO of British Petroleum who has been labeled as a green maverick by his colleagues in the petroleum industry says, of his green strategies, that "this is not a sudden discovery of moral virtue or a sense of guilt about past errors, it is about long-term interest – enlightened, I hope, but self- interest nonetheless" (Bakan, 2004, p.44). Comments such as those of Browne hint at a movement from businesses realizing the short-term benefit of eco- efficiencies to the focusing on the larger picture of long-term economic survival. Perhaps these leaders have the ability to see opportunities where others see threats (Sharma, 2000). In this sense, green entrepreneurs can be seen as the catalyst between the external and internal influences that a corporation is presented with and the ability to action these influences with a positive effect on the environment.

While the term environmental champion is typically used to describe a green entrepreneur within a corporation, a firm – as a whole - which displays similar characteristics can also be considered an environmental champion (Walley and Stubbs, 1999). For instance, defines a "leader" as a company that has environmental standards that internalize costs on a continuous improvement basis and will also use their environmental performance as a promotional tool, using competitive edge environmental management with a marketing focus.

### Science and technology: the environmental impacts of air travel

The spectacular increases in air travel witnessed over the last thirty years and the projected increases make the environmental impacts of air travel a particularly pressing issue (IATA, 2000a). In 1996 ICAO requested that the Intergovernmental Panel on Climate Change (IPCC) conduct a study on the environmental impacts of aviation on climate change. It is the first report conducted by the IPCC on a specific industrial sub-sector (Penner, et al., 1999). The aim of the report was to provide an overview of the scientific issues related to emissions and climate change, directed at the policymaking community of the aviation industry. The IPCC report is currently the most comprehensive study that has been completed on the environmental impacts of commercial aviation. Amongst the conclusions of this report was that, while some aspects of the environmental impact of air travel are well understood, there remain many scientific uncertainties. The report noted that further work is required to better inform decision-makers.

**Table 2 Summary of environmental impacts generated by airlines**

<b>Environmental Issue</b>	<b>Summary of Impact</b>	<b>Factors affecting Management</b>
<b>Air Emissions:</b>	- Carbon Dioxide CO <sub>2</sub> - Carbon Monoxide	- Airline's choice of aircraft
Air Transport accounts for 3% of global CO <sub>2</sub> emissions and 12% of transportation CO <sub>2</sub> emissions	- Hydrocarbons (HC) - Oxides of Nitrogen (NO <sub>x</sub> ) - Oxides of Sulphur (SO <sub>x</sub> ) - Condensation trails (contrails)	- International standards developed by ICAO - Individual countries can impose emissions-related charges and taxes - Emissions of international flights do not fall under the present Kyoto Protocol

**Table 2 (Cont.)**

<b>Environmental Issue</b>	<b>Summary of Impact</b>	<b>Factors affecting Management</b>
<p><b>Noise Emissions:</b></p> <p>Exacerbated by increasing residential development near airports and under flight paths</p>	<ul style="list-style-type: none"> <li>- Most prominent during landing/take off cycle (LTO)</li> <li>- Affects local residents and wildlife</li> </ul>	<ul style="list-style-type: none"> <li>- Airline's choice of aircraft</li> <li>- Standards developed by ICAO (starting in the 1960s)</li> <li>- Landing charges for noise emissions at some airports</li> </ul>
<p><b>Congestion:</b></p> <p>Up to 10% of aircraft fuel use could be reduced through more efficient air traffic management</p>	<ul style="list-style-type: none"> <li>- Increased fuel use (and thus emissions) caused by circling busy airports and longer taxiing on the ground</li> </ul>	<ul style="list-style-type: none"> <li>- Regional / National governments and their NGOs develop more effective air traffic management systems</li> <li>- Partly caused by national air space rules that sometimes prevent aircraft from flying the most direct route</li> </ul>

**Table 2 (Cont.)**

<b>Environmental Issue</b>	<b>Summary of Impact</b>	<b>Factors affecting Management</b>
<b>Waste:</b>  Solid and hazardous wastes	<ul style="list-style-type: none"> <li>- Solid waste from inflight service and aircraft grooming</li> <li>- Waste generated from airline administration offices</li> <li>- Hazardous waste from aircraft maintenance (e.g. petroleum products) and de-icing of aircraft (glycol)</li> </ul>	<ul style="list-style-type: none"> <li>- Local rules developed by each municipality or airport authority for waste disposal/treatment of tarmac run-off</li> </ul>

**Source:** ATAG, 2002; European Commission, 1999; British Airways, 2000; IAT, 2000a; SAS, 2000; Penner, et al., 1999; Somerville, 1999.

### **Noise and air emissions**

The principal environmental concerns of aviation are aircraft noise and emissions from the engines (including CO<sub>2</sub>, oxides of nitrogen (NO<sub>x</sub>), carbon monoxide (CO) and hydrocarbons (HC)). The fuel efficiency and noise emissions of aircraft have improved by over 70% since the 1960s (IATA, 2000c; Penner, et al., 1999, p.10). Noise is of concern to residents surrounding airports. It has been attributed to causing psychological and physiological effects of nearby residents (Morrell, Taylor and Lyle, 1997) and, in some cases, can lead to house damage from vortices (Upham, 2001). Noise emissions also have an important effect on surrounding wildlife and can affect their migration habits. The number of people affected by aircraft noise has decreased over the last thirty years despite the increase in air traffic

(ATAG, 2002).

The airline industry currently produces 12% of the transportation industry's CO<sub>2</sub> emissions. While the airline industry contends that the total amount CO<sub>2</sub> is 'only' 3% of global emissions (Penner, et al., 1999), Upham (2001, p.723) argued that it is roughly equivalent to the total CO<sub>2</sub> emissions of some developed countries such as Canada and the UK. Although the rate of CO<sub>2</sub> and NO<sub>x</sub> emissions are now comparable to other forms of transport such as road and rail, recent studies have shown that the impact of the emissions from aircraft at high altitudes are thought to have a global warming effect three times greater than on the ground (Penner, et al., 1999). NO<sub>x</sub> emissions from aircraft are on the rise because of the trend towards aircraft with larger engines and a higher pressure ratio which are quieter and more fuel efficient (ATAG, 2002). Consequently, the challenge of aircraft manufacturers is to design an engine that is low in CO<sub>2</sub> emissions but does not compromise NO<sub>x</sub> emissions. The efficiency of aircraft depends largely on the length of the flight and the number of take-off and landing cycles. Fuel consumption during take-off is about 2.5 to 3 times higher than when an aircraft is at a cruising altitude (Ansett, 2001). A report carried out for the Air Transport Action Group (ATAG) studied the different cost elements (e.g. external accident, environmental infrastructure, net balance and time costs) for road, rail and air and concluded that there was a 'favorable position for the aviation sector' for journeys over one hour flying time (or 400–500 km). The longer the journey, the better the environmental performance of air travel compared with road and rail (due to the fact that ground-level externalities (e.g. noise and air pollution) decrease over time spent in the air (Maibach and Schneide, 2002, p.3; Bogelund, 2001). Therefore, the longer the flight and the fewer the number of landings, the more efficient air travels becomes. Emissions and consumption of kerosene fuel for aircraft contribute to approximately 90% of an airline's overall environmental impact.

A further impact of aviation on air quality is radioactive forcing, where the composition of the atmosphere is altered by the remittance by aircraft of gases and particles such as CO<sub>2</sub>, O<sub>3</sub> (ozone) and CH<sub>4</sub> (methane). Radioactive forcing causes the formation of condensation trails or 'contrails' and may increase cirrus cloudiness and, potentially, climate change (Department for Transport (UK) 2003; Penner, et al.,

1999). The expert community feels that there is still significant scientific uncertainty surrounding the quantification of damage costs of climate change (Department for Transport (UK), 2003).

### **Congestion of airspace and airports**

Another area of concern related to fuel consumption is the increasing congestion at airports. Congestion affects fuel consumption by causing aircraft to queue on the ground before takeoff, circle before landing and fly indirect routes because of traffic jams in the sky (Upham, 2001; European Commission, 1999; Mortimer, 1998). In Europe, for example, 25% of flights are currently delayed an average of 21 minutes (ATAG, 2002). Part of the congestion problem is related to the consistent growth the airline industry has had over the last three decades. This growth has not been matched by equal expansion of airport infrastructure because these projects often face heavy opposition and result in delays (European Commission, 1999; McMillan, 1999; ATAG, 2002). Many airports, particularly in Europe, are already running at, or near, capacity and the ability to increase the capacity even further through new infrastructure is often hampered by delays in environmental impact assessments and negotiations with the local community and government agencies (ATAG, 2002; Lufthansa, 2000; Somerville, 1999). Improvements in air traffic management (ATM) and increased capacity at airports could reduce fuel consumption of an aircraft by between 8 and 18% (British Airways, 2000; Penner, et al., 1999, p.11). Both the Airports Council International and Eurocontrol (Europe's air traffic management body) warn that recent post-September 11 resurgences in air traffic could lead to increased airport-related delays as the scarcity of new airport capacity grows (Baker, 2004b, p.22).

### **Solid and hazardous waste**

Other environmental impacts of commercial aviation include hazardous and non-hazardous waste management and resource consumption from ground and administrative operations. The design of the inflight meal has noteworthy environmental and economic implications. With up to 70% of an airline's solid waste being attributed to inflight service (British Airways, 2001), the resources consumed not only become a disposal issue, but can also increase the amount of fuel consumed by the aircraft. Logistical and legislative complexities surrounding the disposal of

waste from international flights mean that, in many instances, waste from these destinations cannot be recycled and must be incinerated (Lynes, 1999). Hazardous waste is produced from the maintenance of aircraft. De-icing of the aircraft in winter is an important environmental concern for airports, since the glycol used in the process can enter the stormwater run-off causing land and groundwater contamination (Upham, 2001).

The issues of noise, air emissions, waste and congestion are inextricably linked to the impact the aviation industry has on the environment. It is, therefore, important for flight, cabin and ground operations to work together to develop solutions for best environmental practice. Factors that affect the environmental efficiency of an aircraft, such as adequate infrastructure, market forces and availability of technology (ATAG, 2002, p.19), need to be taken into consideration when developing environmental policy for the airline industry.

### **Green Environmental Program in Green Airlines**

In terms of green program, many green airlines have created various programs for minimizing environmental impacts such as energy, water, indoor environment, waste, building and construction, and environmental contribution programs (Reynolds, et al., 2006). Among these programs, the researcher will focus on 4 major programs including energy, water, solid waste and sustainable operating programs. Therefore, these programs are directly related to routine activities of employees that have strong potential to catalyze the severity of global warming problems to occur.

#### **Energy program**

The airline is one of many businesses that have consumed the large amount of energy supplies for supporting business facilities and comfort customers (Kim, 2008). Kim (2008) suggested that each year the sector has paid more than US\$ 1 billion for energy cost. Thus, conserving energy without disturbing the convenience of the customer has become more interesting activities to help the airlines reduce energy bills and save the earth from greenhouses gas emission (Reynolds, 2006). In order to contribute to energy saving, the airlines need to apply energy management programs, activities and management strategies of the airlines including:

### **Carbon offset**

A carbon offset is a reduction in emissions of carbon or greenhouse gases made in order to compensate for or to offset an emission made elsewhere (Goodward and Kelly, 2010).

Carbon offsets are measured in metric tons of carbon dioxide-equivalent (CO<sub>2</sub>e) and may represent six primary categories of greenhouse gases. One carbon offset represents the reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gases.

There are two markets for carbon offsets. In the larger, compliance market, companies, governments, or other entities buy carbon offsets in order to comply with caps on the total amount of carbon dioxide they are allowed to emit. In 2006, about \$5.5 billion of carbon offsets were purchased in the compliance market, representing about 1.6 billion metric tons of CO<sub>2</sub>e reductions.

In the much smaller, voluntary market, individuals, companies, or governments purchase carbon offsets to mitigate their own greenhouse gas emissions from transportation, electricity use, and other sources. For example, an individual might purchase carbon offsets to compensate for the greenhouse gas emissions caused by personal air travel. Many companies offer carbon offsets as an up-sell during the sales process so that customers can mitigate the emissions related with their product or service purchase (such as offsetting emissions related to a vacation flight, car rental, hotel stay, consumer good, etc.) (Carbon Offsets Daily, 2008). In 2008, about \$705 million of carbon offsets were purchased in the voluntary market, representing about 123.4 million metric tons of CO<sub>2</sub>e reductions.

In 2009, 8.2 billion metric tons of carbon dioxide equivalent changed hands worldwide, up 68% from 2008, according to the study by carbon-market research firm Point Carbon, of Washington and Oslo. But at EUR94 billion, or about \$135 billion, the market's value was nearly unchanged compared with 2008, with world carbon prices averaging EUR11.40 a ton, down about 40% from the previous year, according to the study. (Cassandra, 2010) The World Bank's "State and Trends of the Carbon Market 2010" (World Bank Group, 2010) put the overall value of the market at \$144 billion, but found that a significant part of this figure resulted from manipulation of a VAT loophole. (Reyes, 2010) and purchase of carbon allowances from emissions

trading schemes ,Voluntary purchasers can offset their carbon emissions by purchasing carbon allowances from legally mandated cap-and-trade programs such as the Regional Greenhouse Gas Initiative or the European Emissions Trading Scheme. By purchasing the allowances that power plants, oil refineries, and industrial facilities need to hold to comply with a cap, voluntary purchases tighten the cap and force additional emissions reductions. Voluntary purchases can also be made through small-scale and sometimes uncertified schemes such as those offered at South African based Promoting Access to Carbon Equity Centre (PACE), (PACE 2010) which nevertheless offers clear services such as poverty alleviation in the form of renewable energy development. Also, as "easy carbon credits are coming to an end", (New Carcon Finance, 2010)

#### **Thai airways set offset your carbon for a greener world**

When you book your flight on THAI through [www.thaiairways.com](http://www.thaiairways.com), please do not forget to think about offsetting your carbon generated from flying. Through the program in the website, information about the CO<sub>2</sub> emitted for the flight you will take will be shown, as well as information about the cost to offset that amount CO<sub>2</sub>

Below are the different renewable energy projects around the world where the money from your carbon offset is to be invested in:

1. Thailand: biogas, waste heat based in Nakorn Ratchasima, Thailand
2. Jordan: fuel switching at AQABA Thermal power station
3. Chile: biomass project nueva aldea
4. Peru: landfill gas-ancon
5. Brazil: braco norte iv small hydro in the guaranta do norte county, mato grosso state, mid-west Brazil

#### **Carbon footprint**

A carbon footprint is "the total set of greenhouse gases (GHG) emissions caused by an organization, event, product or person"(UK Carbon Trust. Retrieved: 2010). For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide, or its equivalent of other GHGs, emitted.

The concept name of the carbon footprint originates from ecological footprint discussion (The New York Times, 2010). The carbon footprint is a subset of the ecological footprint and of the more comprehensive Life Cycle Assessment (LCA).

An individual, nation, or organization's carbon footprint can be measured by undertaking a GHG emissions assessment. Once the size of a carbon footprint is known, a strategy can be devised to reduce it, e.g. by technological developments, better process and product management, changed Green Public or Private Procurement (GPP), Carbon capture, consumption strategies, and others.

The mitigation of carbon footprints through the development of alternative projects, such as solar or wind energy or reforestation, represents one way of reducing a carbon footprint and is often known as Carbon offsetting.

### **Thai airline offers carbon footprint rating on in-flight food**

Thai Airways International claims to be the first airline in the world to provide carbon footprint information on its signature dishes served in-flight

THAI president Piyasvasti Amranand (2010) said that from the beginning of 2010, THAI's in-flight menu features carbon footprint information for passengers, starting with two Thai signature dishes - Chicken Mussaman Curry with steamed Thai Hom Mali Rice (13.6 kg CO<sub>2</sub> e per 250g serving) and Green Curry Kiew-Wan with steamed Thai Hom Mali Rice (13.9 kg CO<sub>2</sub>e per 250g serving). "Passengers can become more environmentally conscious when they are aware of the amount of greenhouse gases produced in the choice of meals offered in the menu," he says.

Carbon Footprint labeling is the result of THAI's participation in the Carbon Footprint Technical Cooperation Project for Thai Products, in cooperation with the Thai Greenhouse Gas Management Organization (TGO) and the National Metal and Materials Technology Center (MTEC).

### **Eco-efficiencies**

The Executive Director for ATAG cites state that there is a clear financial benefit for airlines to have modern fleets because it will result in savings on fuel costs (pers. comm., 28 June, 2002). Airlines are also finding that the effects on the bottom line of costs savings and revenue gains from recycling and reducing energy consumption are worth the effort (Trombly, 1991). Several airlines have initiated waste management practices over the past decade without the help of a regulatory structure at the industry level. The factors that have driven these airlines to develop more efficient ways to manage resources include pressure from employees (e.g. in regards to waste management of inflight service) and the realisation of financial

savings, or eco-efficiencies (Lynes, 1999). One example of this is the story of American Airlines flight attendant Heather Bell. In 1989 she started a recycling program out of her home base in San Jose, California to try to combat all of the waste she was seeing on board the flights. The money from the collection of the aluminum cans was given to several charities that were chosen by the employees. The program was soon expanded to include the collection of newspapers used during the flight. In the first eight months of the program the flight attendants recovered more than 524,000 pounds of aluminum and paper, and gave US\$37,612 (A\$52,656) in donations to charity groups, making the company one of the pioneers in on-board recycling (Trombly, 1991). The flight attendants went on to earn four separate awards for their endeavours even before they had the official support of the company for their project (Dunn, 2000; Swissair, 1998; O'Neill, 1993; Meill, 1992).

While initial eco-efficiencies in the airline industry were often achieved through waste management techniques such as recycling, the focus is now on optimizing fuel efficiency through both modern aircraft and improved operational management systems. The cost of fuel represents up to 25% of an airline's total operating costs (IATA, 2003); therefore there is a strong monetary incentive to operate aircraft with high fuel efficiency. Airlines are increasingly taking the on-board weight of aircraft into consideration (e.g. food trolleys and duty-free carts) as important fuel savings can be made through minimization of weight (British Airways, 2002).

#### **Reduce consumption of transportations' fuel**

Airlines can decrease fossil fuel consumption that causes global warming through various plans. For example, the airlines may increase awareness among airlines' staff to cut greenhouse gases emission and traffic congestion through walking; riding bicycle or public buses from their homes to workplaces rather than use private (individual) vehicles.

### **Green Purchasing**

Green purchasing means that products purchased by, and used in, an airline such as food, detergents, fuel etc. are eco-labeled or otherwise certified as environmentally preferable products (Coddington, 1993). Green purchasing is attracting attention from the industry and the business community as a tool to promote and practice sustainable development. Green purchasing can greatly boost the efforts of any hotel to “go green”. While this could be directly helpful in reducing the environment impact of the airline operations, it can also create awareness amongst the employees as well as consumer about the airline’s effort to improvement their environmental performance (UNEP;IE, 1997).

Products can be identified as green by being environmentally sound or environmentally packaged or both. These products cause the least damage to the environment (Ottman, 1997). Value for money, quality, and convenience were traditionally considered when making product purchases. However, purchasing decisions can make a great contribution to the environmental protection. Waste can be reduced through a concept called “pre-cycling”. This concept involves making purchasing decisions which support responsible products and packaging, made recycling easier, and reduces the amount of waste thrown away. Today it is also an economic consideration, as costs for waste disposal continue to rise (Balfe and Engrldum, 1998).

Moreover, purchasing local products and organic foods from local farmers for the airline’s restaurant, catering and shops is the essential strategy to reduce greenhouse gases emission through transportation for importing exotic food from abroad. Furthermore, some experts mention that organic food is free from pesticide that generates hazardous chemical to atmosphere and rich with nutrients, vitamin, and mineral that are good for health (Spence, 2005).

### **Invite employees to participate in saving energy program**

The airlines can encourage employees to participate in saving energy program by using a placard to introduce them for switching off the lights that not in use while in the aircraft or in the office (Silva, 2001). In order to reduce transportation emission, airlines can encourage them to travel or come to work with public buses or bicycles, through provision of public buses or bike maps and

information for helping them to travel or come to work attractions easily. Preparing organic food and local products to serve them is one way to facilitate them to go green. Furthermore, leaflets that suggest about energy saving practices also play as another channel that raises their awareness of energy saving.

### **Water programs**

Water is one of the basic sources of all life on earth. It is necessary for food production, health, and survival. However, it is one of the most fragile resources in the world (CUC UEM, 2000).

Presently, water conservation is an effective way to save money and improve the environment, and it can be done without sacrificing the quality of service. Thus, quality and commitment are keys to the success of such a program in airlines.

Water conservation is becoming increasingly important because it can reduce not only the total cost of water consumption, but also the cost of wastewater treatment. Furthermore, water saving can also lead to energy saving because water storage and transportation consumes energy, and a reduction in hot water consumption means a direct boiler fuel saving (Griffin, 1996).

However, the quality of service provided to employees should not be reduced in order to save water. The employees will not accept devices with weak water pressure. Therefore, it is extremely important to choose high-quality technologies when investing in water efficiently. A wide variety of technological products are available in Thailand (CUC UEM, 2000). Many activities have been established to reduce water consumption that as follows:

#### **Install water-efficient devices**

Furnishing efficiency devices such as low-flush toilets and low-flow showerhead can help airlines decrease the large amount of water consumption. Therefore, general toilets which consume water around 3.5 – 5 gallons each flush that are replaced by low-flow toilets that use only 1.6 gallons of water can encourage the airlines to reduce supply usage. According to Reichardt (2008), low-flow toilets support the airlines to save fresh water around 20 percent.

### **Maintenance of any leakage of water devices**

Leaky water equipments such as pipes, faucets, showerheads and toilets can cause a drop and lead to lose a large amount of water. Reichardt (2007) mentioned that fixing and repairing leaky devices can help hotels to decrease the loss of fresh water for unnecessary reasons around 15 – 20 gallons each day.

### **Reuse treated water**

Many organizations have generated a large amount of water from day to day operation such as from tubs, basins, latrines, laundry, dishwashers and others. Wastewater and contaminated water defiled with pieces of food, people excrement, oils and many poisonous chemical substances must pass the treatment procedures before being released to the environment. If not, this contaminated water will generate negative impact to marine creature, habitat of animals, health of human being, and contribute to global warming. For example, the wastewater that was drained to ocean or river can cause coral bleaching, decrease the fresh water resources or disturb the other natural resources (Green Hotelier, 2006).

### **Solid waste Programs**

Airlines can produce solid waste from the construction and daily work such as wood materials, metal, aluminum, food leaf after meals, glass, clipboard, paper, plastic, foam, tissues, and cigarettes and others. These solid wastes such as pesticide containers can generate hazardous materials to landfill that cause environmental deterioration and disrupt human health. Hence, the procedures to minimize wastes through 3 main principles including reduce, reuse and recycle plus dispose the solid waste have become useful tools for protecting the environment, reducing material purchasing cost, and increasing marketing value by changing these wastes into commodities that can be sold.

### **Reduce**

The maximizing of solid wastes can be translated into raw-material and operational cost saving. Therefore, this program drives airlines to avoid over consuming materials, for example, bulk purchasing of food and materials in order reduce the numbers of packaging and containers. In addition, airlines can cut the condiments' packages from sugar and cream (in catering or restaurant) by durable

dispensers. Airlines can help employees decrease the number of wastes through using condiment dispensers.

Reducing waste means not producing it in the first place. By reducing the amount of waste generated, the handling, disposal and recycling costs can be saved. Here are few easy, simple ways to reduce waste (Coddington, 1993):

1. Use both sides of the paper when making copies
2. Substitute reusable items for disposable one
3. Use two-way shipping containers (those that can be returned and refilled)
4. Reuse manila envelopes
5. Have a fax machine and laser printer cartridges recharged

### **Reuse**

The reuse is the activities for decreasing wastes and saving money by using materials many times before disposing them. For instance, airlines can use durable materials like glass rather than plastic cups because durable materials have long lasting life for re-consumption. Donating food waste for local farms as well as donating flatware, dishware or construction materials that have proper conditions for reuse to charities, play as another channel to help airlines reduce waste and generate benefit to the society at the same time (Reynolds, 2006; Ridge, 2006).

### **Recycle**

Recycling is carried out after the waste has been generated and cannot be considered source reduction (even if it is carried out at the waste generation source) (Ronald, 1996). It is, however, a waste minimization method and a preferred option to waste disposal.

Recycling begins with collection, where different kinds of waste go into containers, followed by sorting and sale for reprocessing (Griffin, 1998). Using the audit, the coordinator and Environment Committee should perform recycling programs in as many areas as possible. Each department should be evaluated for its recycling possibilities. The common recyclables are aluminum, fine paper, food and organic material, glass, plastic and steel cans or tins (Malcolm, 1997).

Therefore, this action can save energy consumption, energy cost, raw materials as well as avoid deforestations that contribute to global warming. Webster (2005) mentioned that the processes to recycle plastics required less energy than

producing new plastics by 85-90 percent. Likewise, Elkington and Heils (1988) found that every ton of recycled glasses can reduce 30 gallons of petroleum and 1.2 tons of raw materials. In the meantime, recycled paper can help preserve forests and maintain balancing of ecosystem by reducing considerable new wood materials needed for producing virgin papers. In order to achieve recycle activities, participation of airlines' employees to sorting wastes is an important instrument for reducing time and money in recycle management.

### **Sustainable operating program**

Airlines can achieve long-term green activities by concentrating on sustainable operations that have required involvement of all stakeholders such as owner, line-managers, employees, consumers and others to implement any green activities. In order to have clear understanding about this program, green policies, office operation, staff training and consumer's educating are explained in the review.

### **Green policies**

Green policies can be made from various environmental responsibilities of all stakeholders based on the need to decrease negative impacts on the environment. Many airlines begin to set the policies by scrutinizing environmental effects from diverse company activities. Moreover, these analyses of information can be applied for developing green activities that focus on preserving and protecting natural resources and reducing wastes. In order to ensure each green activity has accomplished the organizational requirement, airlines must establish environmental criteria to evaluate green activities. The evaluation can identify what areas that the airlines should improve for eliminating pressure to environment (Bass Annual Report, 1998 as cited in Webster, 2005).

### **Staff training**

Senses of environmental awareness and responsibility among airlines employees from top-line to bottom lines can emerge through training programs. Therefore, various programs can advice employees to practice themselves to fit in environmental activities (Green Globe, 1994). According to Webster (2005), training programs are core elements for supporting employees to perform in accord with environmental activities. For example, airlines have trained employees for the easy methods to save water and energy consumptions in their homes in order to let them be

aware of benefits of saving programs that translate into saving money. They apply their saving actions to workplaces. Moreover, training programs encourage the employees to be aware of reducing reusing and recycling activities in order to protect environments and cutting ineffective operational costs. For instance, airlines support their employees to use both sides of paper, use recycled paper to make airline's brochures and use electronic mail for transacting businesses. This reduces over consumption of papers (Reynolds, 2006). Moreover, training programs can encourage the employees to deliver environmental protection messages to consumer.

These green activities are some examples that many airlines have applied in their operation in order to cut operational cost, improve profit, preserve valuable resources and help the planet to combat global warming. For the most achievement of green operation, airlines must focus on green activities to maintain consumers' satisfaction and comfort.

### **Perception Toward Environmental Protection**

Perception can be defined as the procedure regarding an individual person's managing and interpreting any information to meaningful description by using his/her senses, sight, hearing, smell, touch and taste. Furthermore, perception has strong influence to inspire the individual to express different actions (Kotler, Bowen and Makens, 2006).

In terms of employees' perception, these can be defined as the green airlines that are concerned with environmental degradation. The green airlines have tried to find the solution for protecting their quality of life and their home (Bergin-Seers and Mair, 2008), such as supporting companies that care for the environment, and avoiding using materials that contain hazardous chemicals (Ottoman, 1999; Spence, 2005).

In terms of energy, there are many activities that drive employees to reduce energy consumption and greenhouse gases emission (Spence, 2005) such as switching off all electrical equipment when not in use, using energy efficient devices (compact fluorescent bulbs and energy efficient fridges), shade house from heat with trees and using local public transportation, bicycle and walk for reducing greenhouse gases emission (Spence, 2005; Webster, 2005).

For water, the extravagant water consumption among human leads to water shortage condition that disrupts the well being of flora, fauna as well as humans. The city of San Diego water department (2004) suggested that using water efficiency devices (low flow showerhead, low flush toilet and tap-aerators) can save water by 230 gallons per week, while fixing and changing leaky toilets, faucet and valves can save 150 gallons of water per each leakage equipment; while washing vegetables and fruits in sink rather than wash under water saves 30 gallons of water per week. Meanwhile, Webster (2005) stated that using grey water from bathroom, laundry and kitchen for gardening and equipping rainwater tank for toilets can help reduce 60% of water usage.

In terms of waste reduction, Webster claimed that recycled materials such as aluminum, can, paper and glass in order to minimize waste and save up energy in the processing and production of new products. Furthermore, buying durable products in bulk so that there is less packaging and using refillable containers for cleaners and food are one strategy to cut excessive packaging waste (Spence, 2005; Reynolds, 2006). Meanwhile, Ottoman (1999) suggested that purchasing and consuming second hand goods can also reduce waste.

For environmental caring, Spence (2005) mentioned that it involves patronizing green companies that regard the environment as important, i.e., paying extra charge for green products, using environmental cleaning products and detergents, avoiding using hazardous pesticides for gardens.

The benefits of these activities perceived by employees may illustrate their attitude and belief toward environmental protection. This different perception influences over the act of people in different ways. According to Turner (1997), the positive perception toward the benefits of environmental protection in the context of health, quality of life and economy can lead to the growing of environmental actions. In terms of green airlines, the positive perceptions toward environmental protection among employees can inspire them to participate in green programs. However, the knowledge and awareness of information from various airline sources can open opportunities to be exposed to valuable information and interpret it into the environmental friendly actions toward green programs.

## **Participation**

The sense of responsibility has potential to inspire the employees in participating in environmental friendly activities. Therefore, these activities open their opportunities to join with environmental resilience as well as gain various benefits for life, health, and economy (Turner, 1997). According to Cohen (1979), participation can be defined as the procedure of people to join and share decision making, operating activities and deriving the benefits from activities.

For example, responsible of employees may choose green airlines that aim to preserve environment. Furthermore, their practices during work in airlines are to contribute to green activities of the airlines such as recycling activities, reuses, reduce energy and water consumption, and support local organic food. These are all in order to contribute to local businesses and cut harmful gases from transport emission, pay extra charge for supporting environmental friendly operation and donating some money for local communities and environments (Wei and Rui, 1997; Watkin, 1994; Green, 1995; Manaktola and Jauhari, 2007). These responsible and participating activities among airlines can contribute to the protection of precious global resources as well as protection of life from the threat of environmental degradation.

In terms of green airlines, airline play as the most important potential that support the airline to be successful in green activities and increasing economic and environmental profits. However, Kirk (1995) claimed that many people expect to indulge themselves by lashing of hot water, high pressure showers, daily fresh towels and bed sheets, various kinds of food and limousine services during the use of every service. These are the major obstacles that force the people to be unwilling to participate in green programs. In order to avoid dissatisfaction, previous research has become a useful tool to develop efficient green policies, strategies and activities.

The information regarding people participation in green airlines activities can generate benefits to all stakeholders. However, the studies relating to people participation in green airlines are rare, so the knowledge from research is inadequate. Based on these literatures, the study on relationship between employees and green activities in green airlines will provide insights to green airlines' success in their process of protecting the environment.