'It Does Not Harm the Environment!' An Analysis of Industry Discourses on Tourism, Air Travel and the Environment

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While a substantial part of the population in Europe seems well informed about the phenomenon of climate change, uncertainty seems to prevail in terms of its seriousness, its consequences for society and action that needs to be taken in order to prevent 'dangerous interference with the climate system'. Many people seem to believe that there is no scientific consensus about climate change and that individual behavioural change is irrelevant in the face of uncertainty. Such a 'psychology of denial' seems particularly strong in the context of air travel, the fastest growing transport sector. This paper seeks to understand this phenomenon by analysing the discourses surrounding air travel. Four major industry discourses are identified: air travel is energy efficient and accounts only for marginal emissions of CO_2; air travel is economically and socially too important to be restricted; fuel use is constantly minimized and new technology will solve the problem, and air travel is treated unfairly in comparison to other means of transport. The validity of these claims is evaluated based on data and material presented in the scientific literature. Results show that there are substantial gaps between the discourses and the reality of aviation's environmental performance, which might partially explain the controversial understanding of air travel and its environmental consequences among the public.

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Introduction

Tourism in the industrialised countries has changed substantially in the past decade, with a general trend towards more frequent, but shorter trips, and trips to more distant locations. Within Europe, this development is characterised by the emergence of low-fare airlines offering, for example, a wide variety of city breaks. Globally, an increasing number of people travel to distant or peripheral destinations, often for short periods of time. These developments are facilitated by air travel, which, over the past 45 years, has turned from a luxury form of mobility for the wealthy few into a contemporary form of hypermobility

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(Adams, 2005). Hypermobility – movements that are frequent in time and often long-distance in space – is a characteristic of industrialised societies that has emerged with the growing network of airports facilitating global travel between any two places, perceived cheap fares for air travel (particularly in contrast to other means of transport), better education, higher incomes and more leisure time including opportunities to leave work for longer periods of time (Hall, 2005). Changing global mobility patterns can be seen as resulting in the transformation of social identities towards cosmopolitan ones (Gössling, 2002a; Hall, 2005; Urry, 1995).

More generally, air travel now serves a wide range of functions: business travellers may increasingly rely on air connections even to cover short distances and a growing number of people may commute by air between their places of residence and work on a daily basis. Trends also bear witness to the inclusion of new societal groups in air travel, such as children regularly flying on their own to visit friends and relatives, elderly people commuting to warmer and drier climates for health care and probably, most importantly in terms of volume, the movement of long distance leisure travellers. Clearly, movement is now a norm (Hall, 2005) and for many people leisure mobility is now routine (Gössling & Hall, 2005: 5). Global air travel growth rates have been in the order of 5–6% per year in the period 1970–2000; air transport volume is now five times as large as it was in 1970. Globally, some 42% of all international tourist arrivals are now by air (WTO, 2005). Airbus (2004) suggests that air travel will continue to grow rapidly, with average annual growth rates of 5.3% up to 2023. Boeing (2005) predicts a growth rate of 4.8% until 2024, taking into account strong competition, more airline entrants, lower fares and improved networks. Simultaneously, it is anticipated that governments will continue to deregulate air travel markets. Consequently, air travel will continue to be one of the key factors in international long haul tourism development, outpacing growth rates for surface transport. Within the European Union (EU), the growth of air travel will mean that average distances covered by each tourist will increase from about 1,150 km in 2000 to about 1,600–1,700 km by 2020 (Peeters *et al.*, 2004).

Mobility growth has always been viewed as an indicator of progress and economic growth. However, during the past 15 years, concerns have been raised that air travel has increasingly significant environmental consequences (Penner *et al.*, 1999; Sausen *et al.* 2005; Schumann, 1990, 2003). For example, in an average trip involving air transport, 60–95% of its contribution to global warming will be caused by the flight (Gössling *et al.*, 2005a; Peeters & Schouten, 2006). Air travel also deserves special attention because most emissions are released at 10–12 km height in the upper troposphere and lower stratosphere, where they have a larger impact on ozone, cloudiness and radiative forcing than they do at the earth's surface (Penner *et al.*, 1999). Aircraft emissions thus need to be weighted with a factor of 1.9–5.1 to compare their radiative forcing (RF) potential with that of carbon dioxide emissions alone (Sausen *et al.*, 2005; note that due to differences in relative concentrations and lifetimes of emissions, their radiative forcing contribution needs to be calculated for a given year, in this case 2000). For rail, road and sea-based transport modes the RF factor is near to one (Peeters *et al.*, 2005b). Hence, tourism based on air travel is the most environmentally harmful form of tourism with respect to climate change (Gössling *et al.*, 2005b).

These insights have only recently been incorporated in tourism research, indicating that a broadening of perspective is necessary in order to move from the consideration of the local environmental consequences of tourism to the consideration of its global environmental consequences (Gössling, 2002b; Høyer, 2000).

European outbound tourism illustrates the role of aviation in terms of tourist movements and corresponding emissions. The share of tourism trips by citizens of the EU based on air transport was less than 20% in Europe in 2000 (Figure 1, including all 25 European member states as between 2004 and 2007). However, these trips accounted for more than half the distances travelled and almost 80% of the greenhouse gas emissions released through tourism-related transport. By 2020, the share of outbound tourism trips based on air travel is predicted to increase to 30%, accounting for almost 90% of all emissions resulting from tourist travel. (Peeters *et al.*, 2004).

The strong growth in air travel raises the question of environmental awareness among air travellers. Knowledge of environmental problems associated with air travel seems low in industrialised societies, even though there are, as yet, few studies to confirm this hypothesis. For example, Gössling *et al.* (2005a) conducted a study among international leisure tourists in Zanzibar, Tanzania in order to understand the tourist's perception of tourism-related environmental problems. Results indicated that tourists were largely unaware of the consequences of air travel, while their perception was dominated by local, visible, 'immediate' and comprehendible environmental problems, such as plastic bags deposited along roads. Only 17% of the tourists interviewed mentioned problems associated with air travel and even fewer had a more profound understanding of the issue, i.e. were able to describe the interaction of greenhouse gas emissions and climate change. These results need to be seen in the light of the fact that 68% of the respondents reported having university degrees.

Similar results were obtained by a study of international tourists visiting New Zealand and delegates visiting the Council for Australian University

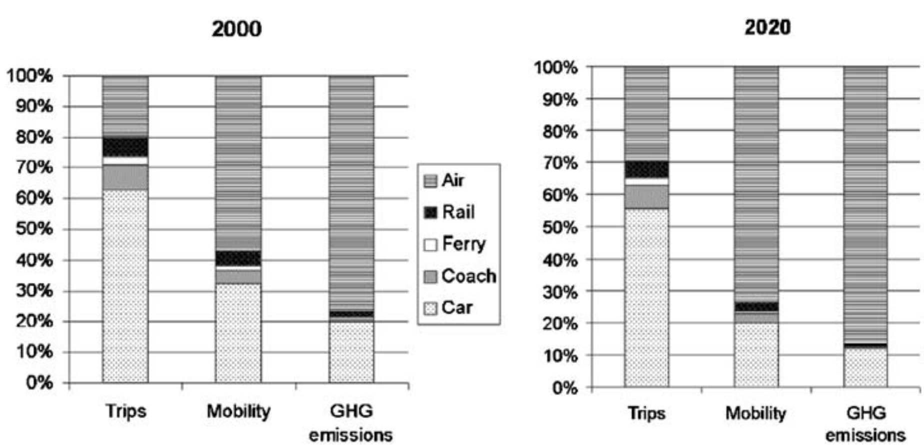

Figure 1 Modal split of number of trips, distances (pkm) and greenhouse gas emissions (GHG) of EU25 outbound tourism transport in 2000 (left) and 2020 (right).
Source: calculation based on Peeters *et al.* (2004)

Tourism and Hospitality Education Conference in February 2003 (Becken, 2004). About 50% of the *tourists* believed that a relationship exists between climate change and tourism, in the sense that climate change impacts on tourism, but only 12% believed that tourism contributes to climate change. Likewise, almost all of the *conference delegates* (97%) believed that climate change was an issue for tourism, but only 9% believed that tourism contributes to climate change. Another study shows that the environmental awareness of Dutch tourists has declined between 1998 and 2004 (Maas, 2005). In 1998, 68% ($n = 2{,}176$; representative of the Dutch population) said that they took the environment into consideration at least 'to some extent' when going on vacation. This figure had fallen to 61% ($n = 2{,}603$) in 2004. Respondents were also asked which pro-environmental measures they took. The broad majority of answers fell into the category 'remove rubbish' (49%), followed by 'leave everything tidy' (17%) and 'drive less/slower with my car or use public transport' (15%). However, only four of 2,603 respondents mentioned 'less/no flying'. All case studies thus indicate that the public awareness of environmental problems connected to flying is low.

Methodology

Various groups in society, including governments, companies or organizations of various kinds are active in providing information on sustainability. This information is often discursive in the sense that it presents only part of the aspects of relevance for a balanced understanding of an issue. Clearly, there is no single 'truth' or 'reality', and we thus seek to understand of how 'realities' and 'truths' are created in the context of aviation and its environmental performance. We focus on the language and interpretations of the aviation industry, aircraft manufacturers and its organisations. This includes both written and spoken forms of language, as well as language form and function (Burman & Parker, 1993; Pritchard & Jaworski, 2005). The study is delimitated by the choice of airlines, aircraft manufacturers and associated organisations, including British Airways, Lufthansa, Scandinavian Airlines, Airbus, Boeing, International Air Transport Association (IATA), International Civil Aviation Organisation (ICAO), Association of European Airlines (AEA), Air Transport Action Group (ATAG), Airports Council International Europe (ACI Europe), Collaborative Forum of Air Transport Stakeholders, Advisory Council for Aeronautics Research in Europe (ACARE) and the World Tourism Organisation (WTO). In order to identify discourses, information available in various in-flight magazines, journals, brochures and magazines printed and distributed by airlines and aviation organisations, as well as the homepages of airlines and aviation organisations was analysed with a focus on information on the environmental performance of aircraft as well as other environmental issues. Information was collected until no further statements could be found. In total, some 40 statements were identified, which seem to comprise and represent the totality of arguments forwarded in the context of air traffic's environmental performance and sustainability. Based on comparative analysis of these statements, four major lines of argumentation were identified:

(1) Air travel is energy-efficient. Globally, it accounts only for marginal emissions of CO_2.

(2) Air travel is economically and socially too important to be restricted.
(3) Environmental impacts exist, but technology will solve the problem.
(4) Air travel is treated 'unfairly' in comparison to other means of transport.

The four lines of argument are then compared to material and data available in scientific publications and similar sources of information, in order to understand whether the statements provided by the industry match with scientific insights. Unspecific statements were not considered, including for instance 'protecting our planet is a serious responsibility and Airbus is aware that reducing environmental impact at the source is a key factor' (Airbus, 2004: 32) or 'environmental responsibility is a pillar of our industry along with safety and security' (Bisignani, 2005). Obviously, these statements represent discourses as well, as they claim environmental responsibility and promise action, but they are difficult to compare to more specific scientific data.

Analysis

Argument 1: Air travel is energy-efficient. Globally, it accounts only for marginal emissions of CO_2

The two most frequently encountered arguments in the context of the aviation industry's environmental performance are 1) air travel is 'energy efficient' and 2) the contribution of aviation to global emissions of greenhouse gases is negligible in comparison to other sources.

> It [the Airbus A380] will be the first aircraft to crack the 3 l per 100 seat-km barrier. Astonishingly, at a typical occupancy rate of 70% this translates into 4 l per 100 km per passenger; about the same as a small car with an average load of 1.25 passengers. It also means that the A380 will be some 12% more fuel-efficient per seat than the 747–400, enabling it to save 53 tonnes of fuel, and a corresponding volume of emissions, for every 1,000 passengers flown on a 13-hour flight. The A380 is truly a 'Green Giant'!
> Airbus representative, Airbus Research and Technology (2005)

> At US$ 40 per barrel (Brent) fuel is 18% of our total cost. The fuel bill last year was US$ 63 billion. Even a 10% improvement in fuel efficiency would deliver 2% to our bottom line. The case for investment in more fuel-efficient aircraft is compelling. (Bisignani, 2005)

The statements are intended to show that relative energy use by aircraft is low, while economic pressures force airlines to further reduce fuel use. Furthermore, technological progress has already led to substantial reductions in fuel use. However, a critical analysis shows that the statement does represent a discourse, as facts are simplified or appear to be incorrect for at least four reasons.

First, comparison is made with small cars in order to show that energy use is low. However, cars can generally not be seen as environmentally friendly, and particularly not at a low occupancy rate of 1.25 passengers/car. Furthermore, in order to compare aircraft to cars, comparison should rather be made with long-distance car occupancy rates, which are higher at about 2 persons per car. Low occupancy rates are particularly found among commuters on short distances

(Peeters *et al.*, 2004: Annex VII). Using this more adequate occupancy rate of 2 for comparison, the A380 uses an estimated 60% more fuel per passenger km than the small car used for comparison by Airbus.

Second, comparison with surface bound means of transport fails to consider that the contribution to global warming by aircraft is significantly higher per unit of fossil fuel burnt, as emissions released at cruise altitude cause additional radiative forcing (Penner *et al.*, 1999; Schumann, 2003). In order to compare surface-bound transport with air transport, the latter has to be weighted with a factor of between 1.9 and 5.1 (Sausen *et al.*, 2005; see earlier).

Third, the presentation of data on relative fuel use should be accompanied by data on fuel use per trip, as people travelling by aircraft usually cover larger distances. To illustrate this: the average fuel use per passenger for a 11,000 km one-way flight corresponds to a Dutch citizen's annual average consumption of fuel used for travel by car. Airlines seem to frequently use relative measures for comparison, such as emissions per seat kilometre, which obscures the fact that total fuel use is high when distance is taken into account.

Finally, the Airbus A380 is an example of an aircraft *not* reaching highest fuel efficiency. This is because the wingspan of the A380 is limited by the maximum wingspan that can be accommodated by airports (the so-called 80 metre box, see de Barros & Wirasinghe, 1997). Therefore, the wingspan is less than would be the optimum for such a large and heavy aircraft. It has been estimated that the loss of fuel efficiency is 11% compared to an optimised wingspan of 90.2 m (Dalhuijsen & Slingerland, 2004). This optimal wing design would also lead to 2.4% lower operating costs. However, the costs and implications of modifying many airports to accommodate larger than 80 m spans may be prohibitive. An option to overcome this problem is folding wingtips. Dalhuijsen and Slingerland (2004) show that a folding wing design would result in savings of 10.9% fuel corresponding to 2.1% of the costs. Despite this, the A380 has a non-optimal wingspan of roughly 80 m which shows that new aircraft are not constructed with a total focus on efficiency.

In conclusion, the figures presented by the industry do not adequately represent air travel's environmental performance, efficiency and sustainability. Similar inadequacies can be found in the statement that greenhouse gas emissions by aviation are negligible in comparison to emissions from other sources.

> Today's level of air traffic has a 3.5% share of the man-made greenhouse effect. Industry, power stations and road traffic all have double-digit shares. Even higher is the difference between man-made and natural emission sources, such as volcanic eruptions. Lufthansa (2005)

The figure of 3.5% is widely used, and can, for example, be found in reports of the Airports Council International Europe (ACI Europe, 2005) and Airbus (2004: 38). Obviously, the figure is presented to underline that air transport is no significant contributor to climate change. The origin of the figure is the International Panel of Climate Change's Special report on aviation and the global atmosphere (Penner *et al.*, 1999). The figure refers to the overall contribution of subsonic aircraft to radiative forcing as compared to all radiative forcing by anthropogenic activities. Even though the Special Report is the most recent one published by the IPCC (the Fourth Assessment Report is due in 2007), the figure refers to 1992 and is thus outdated given the over-proportionally strong growth in the aviation sector. Since 1992, total emissions of air transport have increased by 50%, while greenhouse gas emissions in the EU have slightly decreased (Gugele *et al.*, 2002). The 2005 contribution of aviation to all anthropogenic radiative forcing is rather in the order of 3.4–6.8% (own calculation; the range being a result of the consideration of radiative forcing; Sausen *et al.*, 2005). Within Europe, greenhouse gas emissions of tourism-related aviation account already for 7% of all emissions (in 2000) and are predicted to grow to 15% by 2020 (Peeters *et al.*, 2004).

The share of 5.1% (average of range) needs to be seen in the light of the fact that only a minor proportion of the world population participates in air travel. For international air travel, this is 4.6% (all international arrivals by air divided by the world population; based on WTO, 2005). The share of individuals participating in international flights is in reality lower, as many tourists make several trips per year (Gössling *et al.*, 2006). Given the high number of frequent flyers, we estimate that only about 2% of the world's population participate in international air travel. Given the current growth rate of aviation emissions, which is in the order of 3.5% per year, the goal to reduce global greenhouse gas emissions by 42% by 2050 (Åkerman, 2005: 114) will become difficult to achieve. Under a 'no limits to growth for aviation' scenario, aviation would, as the only sector with continued strong growth in emissions, account for 40% of global total emissions by 2050 (calculation based on Åkerman, 2005: 114). In order to stay within a 'safe rate of climate change' (Graßl *et al.*, 2003), no other economic sector would have room to grow in emissions. The contribution of air travel to climate change is thus relevant both in relative and in absolute terms.

Finally, the statement that 'even higher is the difference between man-made and natural emission sources, such as volcanic eruptions' indicates that action to mitigate the anthropogenic greenhouse effect is negligible in the face of the 'natural greenhouse effect'. Clearly, anthropogenic emissions might tip the balance of the climate system and 'the difference between man-made and natural emission sources' is thus, irrelevant. Consequently, comments such as this could be interpreted as attempts to render discussions on mitigation irrelevant. In conclusion, the statements presented by the industry on its efficiency and aviation's overall contribution to climate change seem to trivialise the environmental impact, and can thus, be seen as discourses.

Argument 2: Air travel is economically and socially too important to be restricted

Environmental considerations are likely to lead to restrictions in air travel. A second line of argumentation frequently encountered, thus highlights the indispensability of aviation for global and national economies and its importance for global cultural and social exchange:

> Air transport is the backbone of global tourism – the number one employer in the world. [. . .] remember the facts: air transport employs 4 million people and generates US$ 400 billion in output. Indirectly it

> creates a further 24 million jobs with nearly US$ 1.4 trillion in output. This is 4.5% of global GNP. Bisignani (2005)

Similar statements are made by other aviation organisations, for example, the Collaborative Forum of Air Transport Stakeholders (2003) or Air Transport Action Group (ATAG, 2005b). Clearly, all tourism depends on transport. However, the economic role of air transport seems often exaggerated. For instance, a survey on European tourism transport revealed that only 5% of all trips by EU-citizens are intercontinental and thus, necessarily based on air travel. However, the broad majority (75%) of all EU tourism trips (domestic and international) are *not* based on air travel (Peeters *et al.*, 2004).

In terms of direct and indirect employment, air traffic is certainly of importance. However, the number of jobs in the aviation sector needs to be seen in comparison to jobs in other traffic sectors. For example, the four million direct air transport jobs worldwide (Bisignani, 2005: 3) can be compared to 6.9 million direct jobs created by railways worldwide, producing 2,000 billion pkm and 7,000 billion tonkilometers (UIC, 2003), compared to 3,300 billion pkm and 150 billion tonkilometers by air (Pulles *et al.*, 2002). Moreover, it seems likely that the growth in aviation partly entails losses in other traffic sectors (e.g. ferries, railways). Turnover in the aviation sector also needs to be seen from an alternative spending point of view. Clearly, tourists might spend a share of their money on other modes of transport or other consumption goods, should there be no opportunities to spend it on air travel (cf. Alfredsson, 2002).

More generally, it is transport that generates multipliers, not necessarily *air* transport. Therefore, it seems likely that multiplier effects would also occur in other transport sectors. Statements also seek to underline the importance of air transport by making connections to the turnover generated in other sectors: 'aviation is directly linked to the tourism industry in Europe, generating receipts of 700 million Euro per day' (Collaborative Forum of Air Transport Stakeholders, 2003). Note as well that air transport creates jobs and economic growth, but economic turnover comes at a high price for the environment. As economic growth is mostly accumulated in countries with heavy air operations, while global warming will mostly affect poor developing countries (IPCC, 2001), it is also questionable whether the global distribution of benefits and costs is even or just.

Accounts of economic performance are generally difficult to validate. For example, Airports Council International (ACI Europe, 2004) states that: '... a study for the UK Government and the air transport industry estimated that restricting the growth of UK air passenger demand (with 25 million passengers in 2015) could result in a 2.5% reduction in overall UK GDP by 2015, equivalent to £30 billion a year (at 1998 prices)'. Our analysis of the references given by ACI Europe – Oxford Economic Forecasting (OEF, 1999: 46) shows, however, that the cited losses of £30 billion are not occurring in one year, but represent the projected accumulated losses over the period 1998 to 2015. Hence, expected annual losses correspond to a fraction of the amount cited by ACI Europe. Industry reports such as this one seem not always to be crosschecked, which is problematic, as economic figures usually have great weight in influencing governmental decisionmaking and public opinion. Note that an alternative view of the economic performance of air travel has recently been published by Friends of the Earth UK (2005), showing that spending abroad by UK residents resulted in net losses for the UK economy of £15 billion in 2004.

Discourses on the economic importance of air transport also include the development of 'poor' regions: 'if ministers were sincere about helping developing countries, they would be asking themselves how they could encourage, not discourage, travel and tourism to these regions' (Ulrich Schulte-Strathaus, Director of the Association of European Airlines, cited in T&E, 2005). Various tour operators, the World Tourism Organisation and IATA, present similar arguments.

While it is clear that tourism is an important pillar of national economies in many developing countries, particularly small island developing states, the argument is nevertheless simplified. Tourism in poor developing countries is often to the benefit of foreign investors who are usually from countries in transition or industrialised countries with a high concomitant backflow of money (Gössling, 2003). Within developing countries, the distribution of benefits can be skewed, with the majority of benefits being captured by few well-established actors. Hence, it needs to be questioned whether increases in national GDP through tourism adequately reflect its benefits for local, 'poor' population groups or development processes in general.

Statements also refer frequently to the importance of cultural exchange and 'world peace'. It is undisputed that air transport facilitates cultural exchange, as well as the exchange of knowledge and ideas. However, there is also evidence that not all crosscultural contacts will have 'positive' results. For the broad majority of mass leisure tourists, for instance, contacts with locals are likely to remain superficial in character and to reinforce stereotypes rather than to create insights in other cultures (Pearce, 2005; van Egmond, 2006: 89). There is, thus, reason to caution about all too optimistic views on the cultural dimension of air travel.

Argument 3: Environmental impacts exist, but technology will solve the problem

The third line of argument is one of technological achievement. Here, environmental impacts are usually acknowledged, but it is simultaneously pointed out that technological improvements have already contributed to major efficiency gains, while future technology will solve the remaining problems.

> Building on its impressive environmental record, which includes a 70% reduction in [. . .] emissions at source during the past 40 years, the aviation industry reaffirmed its commitment to [. . .] further develop and use new technologies and operational procedures aimed at minimising noise, fuel consumption and emissions [. . .]. ATAG (2005a) and Collaborative Forum of Air Transport Stakeholders (2003).

> Research programmes typically aim to achieve a 50% fuel- and CO_2-reduction per passenger-kilometre by 2020, relative to 2000. ATAG (2005b)

The figure of a '70% reduction in emissions during the past 40 years' is based on the IPCC special report on aviation (Penner *et al.*, 1999: 298, Figure 9.3), which compares the least efficient long haul jet airliner that ever flew, the De Havilland DH106 Comet 4, with the most fuel-efficient commercial aircraft currently operating, the Boeing 777 and is, thus, not representing the environmental performance of the world aircraft fleet. Furthermore, the figure ignores that the last generation of long haul propeller aircraft (e.g. Lockheed Super Constellations L-1049, L-1049H and L-1649 and the DC 7C, see Figure 2) had a fuel efficiency equalling that of jets developed between 1980 and 1990 (Peeters *et al.*, 2005).

The statement also suggests that there will be further gains in efficiency in the future. However, contrary to the common presentation of constant annual increases in efficiency (Lee, 2003; Penner *et al.*, 1999), historic data for both the development of piston engined airliners after WW-II and jet engined airliners show that annual gains appear to decrease over time (see Figure 2). Peeters *et al.* (2005) show that further efficiency gains between 2000 and 2040 are likely to be in the order of 20–26%, which is substantially lower than the most conservative IPCC scenario at 43% (Penner *et al.*, 1999). The performance of the new Airbus A380 fits neatly in the regression, while the goal of 50% more efficient aircraft by 2020 (e.g. ATAG, 2005b) appears unrealistic.

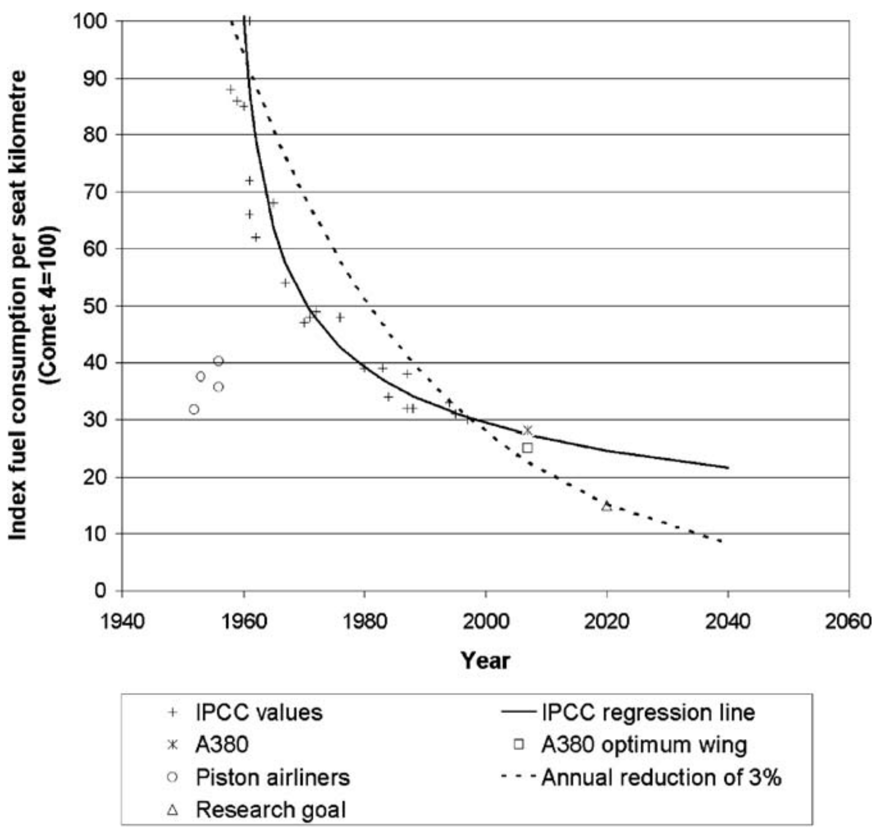

Figure 2 Long haul aircraft fuel efficiency gains since 1950 as an index (100) of De Havilland DH106 Comet 4.
Source: based on Peeters *et al.* (2005)

Clearly, the statements ignore that relative efficiency gains have decreased over time and that the projections given by the industry are optimistic. Note, however, that even with technological achievements, absolute growth in fuel use by aircraft is in the order of 3% per year (Airbus, 2004), with an overall increase from 54.3 megatons (Mt) in 1976 to 101.4 Mt in 1992 and a projected use of 266 Mt by 2015 (Penner *et al.*, 1999: 303).

Obstacles to make aviation sustainable have also been discussed by Åkerman (2005), who analysed different targets for greenhouse gas emissions in the air transportation sector. The results of two scenarios show that fuel consumption per pkm would have to be reduced by 80–90% to make the sector sustainable which cannot be achieved by current aircraft flying at high cruise speeds and altitudes. Alternative fuels are sometimes presented as a future solution to the problem. For example, hydrogen is frequently mentioned in alternative fuel contexts, even though the industry itself is not seriously engaged in developing this kind of technology. Note, for example, that Airbus does not consider hydrogen as a significant aviation fuel in the next 30–40 years (Airbus representative, 2005). Even if hydrogen-based aircraft existed, it is not clear where the vast amounts of energy needed for producing hydrogen would come from. Likewise, the use of biofuels would require vast areas for production and does not reduce the ecological footprint of fossil fuels if measured in area use (Holden & Hoyer, 2005).

Argument 4: Air travel is 'treated unfairly' in comparison to other means of transport

> In France the government makes a net profit of 67 Euros for every 1,000 passenger kilometers travelled by air. But it pays 78 Euros for the same distance by train. Airlines pay when we park, fly, land or take-off. Bisignani (2005).

'Unfair treatment' of aviation is a recurrent theme in statements released by the industry and its organisations, even though air traffic is, in contrast to other means of transport, certainly favoured, not disadvantaged. For instance, there is no tax on aviation fuels while there are various taxes on fuel for private transport – and usually, though not always, public transport as well.[1] Likewise, there is a value added tax (VAT) on most international rail and coach tickets while international aviation is exempted from VAT. It is true that airlines and their customers face charges for 'parking, landing and take-off', but these are charged by the airport authorities to cover the costs of maintaining and operating the airport. These cannot be compared to taxes. Furthermore, as a result of the ongoing trend of privatising railways in Europe, many railways do pay explicitly for the use of infrastructure. The Dutch railways, for example, pay over €100 million per year (van Goeverden & Peeters, 2005: 107). The comparison of air transport with rail transport is also inadequate, as for instance, the European high-speed rail system is profitable. Railway transport systems are, however, accumulating losses on short distances and particularly in rural areas. Government subsidies in these areas are necessary to maintain public transport systems, a state responsibility.

Air traffic itself is often subsidised. For instance, governments in many countries have invested substantial amounts of money in national airlines. In other cases, governments have financially supported airlines when they faced bankruptcy; there are numerous examples after September 11, 2001. Ayral (2005) concludes that governments in the European Union and the United States 'have always given the airline industry special treatment to shield it from foreign competition (. . .) ranging from price controls and restrictions on market access to tax breaks, discriminatory treatment and straightforward subsidies'. Low fare carriers such as Ryanair have received substantial subsidies to serve local, peripheral airports (DFS, 2004: 8). An example is the case of subsidies given by the Walloon Region and Brussels South Charleroi Airport to Ryanair. The European Commission decided in February 2004 that these subsidies were illegal (European Commission, 2004). Subsidies included, for example, a ground-handling fee of €1.00 per passenger, which is 90% less than European average, a conditional subsidy of €160,000 for each new route opened, €770,000 for recruiting/training pilots and crews for these new routes and €250,000 for staff accommodation at the opening of the airport as a Ryanair base. Secondary airports generally seem to receive substantial subsidies (cf. Cranfield University, 2002).

The aviation industry often seeks financial comparison with railways, but never makes reference to transport by private car which is heavily taxed, including fuel excise duty, vehicle purchase tax, vehicle excise duty and VAT (see, for example, Swedish Environmental Protection Agency, 2000). In the 15 member states of the European Union (members as of April 2004), the tax on petrol and diesel often exceeds the cost of the fuel. Nevertheless, it is clear that the internalisation of environmental costs remains insufficient for all transport modes.

Concluding Remarks

The analysis of statements by the aviation industry and its organisations on environmental performance and sustainability shows that these seek to create a positive image of aviation. Statements analysed often use 'scientific' language presenting undisputable 'facts' coupled with enthusiasm about technological progress. Comparisons are selected carefully, for instance pointing out that aviation is not more environmentally harmful than cars (not trains), that fuel is 'saved' (not used), etc. As the 'facts' presented by the aviation industry only partially match scientific insights, they can be understood as discourses. Consequently, the apparent lack of public awareness of the environmental impacts of aviation might be founded in the fact that the aviation industry puts itself in a good light environmentally.

Four major lines of argument were discussed, representing the main discourses surrounding the environmental harmfulness of aviation. It is clear that there is a considerable misrepresentation of data by the aviation industry and its lobby organisations, which might serve the goal of establishing the image of a 'green', economically and socially important industry. To some extent, the industry even takes the position of a victim of deliberate government policies hampering its development. This analysis has found little evidence that this position can be supported. Nevertheless, aviation is supported by most governments which acknowledge its economic and social importance and express optimism that sustainability will be achieved (for the UK, see Sustainable Aviation, 2005). Likewise, the European Union has now decided that emission trading is the most suitable way to deal with emissions from air travel. While this is debatable, as there is uncertainty about the contribution of non-carbon emissions to radiative forcing (Lee & Sausen, 2000), it is curious to note that aviation may possibly not be included in trading schemes before 2011/2012 (Euractiv, 2005).

We also raised the question of how discourses can come into existence. Only few 'alternative messages' provided by environmental organisations or scientific bodies seem to enter public awareness. Information factually entering the public debate, for example through newspaper articles, seems to have little influence on policies or the behaviour of tourists. Stoll-Kleeman *et al.* (2001) identify a number of attitudes that influence environmentally dependent behaviour towards non-action. These include:

- the need for personal comfort;
- the belief in technological solutions;
- the belief in personal contributions to mitigation;
- the demand for a justifiable relationship between personal costs and social gains;
- the belief that there is indeed a crisis; and
- the loss of trust in government, as well as in its capacity to deliver effective policy measures.

These attitudes correspond well to the situation found in the context in this paper. The conclusion would be that aviation discourses support attitudes justifying non-action on the individual level. Should these discourses continue to prevail, it is likely that air travel will grow and become deeply enrooted in society. This might have substantial negative consequences for sustainable development.

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Note

1. Tax laws for energy products and fuels are a complex matter within the EU. A range of reduced fuel tax rates exists for surface public passenger transport within the 25 EU member states, with rail transport, and electric trains, trams and trolleybuses, receiving especially favourable treatment. See http://europa.eu.int/scadplus/leg/en/lvb/l27019.htm

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