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**OECD PROGRAMME ON SUSTAINABLE CONSUMPTION**

**SECTOR CASE STUDIES SERIES**

**HOUSEHOLD TOURISM TRAVEL: TRENDS, ENVIRONMENTAL IMPACTS AND POLICY  
RESPONSES**

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## FOREWORD

This case study on Household Tourism Travel is one of three case studies series of the OECD Environmental Directorate's 1999-2000 Programme on Sustainable Consumption. This Study analyses household tourism travel patterns and its related environmental impacts. The Study focuses only on the environmental policy implications *of household tourism travel* because other institutions are considering the on-site environmental impacts stemming from tourism activity.

This study has been prepared by Philippe Crist (OECD Secretariat). It is published under the responsibility of the Secretary-General of the OECD.

### **The OECD Programme on Sustainable Consumption**

The OECD 1999-2001 Work Programme on Sustainable Consumption provided new data and analysis to help OECD member countries reduce the environmental impacts from household consumption patterns. The Programme combined empirical studies of consumption trends in OECD Member countries with conceptual and policy analysis. Programme elements included: development of an economic conceptual framework to set out boundaries of analysis and policy to influence household decisions; sector case studies documenting trends, environmental impacts, and policy options in five key areas of household decision-making; policy case studies to deepen analysis of policy instruments that influence household consumption of final goods and services; and refinement of a body of indicators to assess progress towards more sustainable consumption patterns. The results of these 8 elements of work are published separately and drawn together in a Synthesis Report (see below). For more information contact the OECD Environment Directorate: [www.oecd.org/env/consumption](http://www.oecd.org/env/consumption).

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## EXECUTIVE SUMMARY

This case study on *Household Tourism Travel* is one of three studies of household consumption patterns in OECD countries and their environmental impacts. These studies are conducted through the OECD Environment Directorate's Programme on Sustainable Consumption.

The on-site impacts of tourism activity on local water and air quality, biodiversity and land-use are generally well understood. Similarly, a considerable amount of research and policy dialogue have been devoted to the environmental impacts of day-to-day household travel behaviour. However, neither of these streams of work has specifically focused on the environmental impacts of current and projected trends in household *tourism* travel. This case study is intended to help fill this gap by identifying important trends in household tourism travel, related environmental impacts, and options for reducing those impacts.

Chapters 2 and 3 describe trends in tourism activity, travel and environmental impacts. They review general international data on tourist movements and supplement these with more detailed national data in order to provide a picture of the distances tourists travel, the modes they use, and the environmental impacts they generate. This discussion shows that tourism-related travel is growing across OECD countries. And while domestic tourism continues to dominate household holiday choices, international tourism has grown at annual average rate of 7% since the 1950s and is projected to continue to grow at 4.3% per year to 2020. Long-haul travel will grow at a faster rate than intra-regional travel, and in 2020 will be as large as nearly 70% of *all* tourism travel in 1995. While the car is the dominant form of travel for domestic tourism, air travel is growing for both international and domestic tourist destinations. Rail and maritime travel account for a comparatively smaller number of tourism kilometres.

Tourism-related travel is an important source of transport energy use and CO<sub>2</sub> emissions. Currently, compared to other categories of travel (commuting or other forms of daily travel) it contributes moderately to climate change but often acutely to local air quality and noise problems through classic vehicle pollutants. The projected growth in tourism travel— particularly in long distance air travel – will increase the impacts from this sector over the next 20 years. Within the entire chain of tourism products and services, travel represent the most important source of energy use and greenhouse gas emissions.

Chapter 4 outlines some of the most important influences shaping household tourism travel patterns in OECD countries today, including the rise in post-WWII disposable incomes, longer holiday entitlements, earlier retirement and increased longevity. Globalisation has driven changes in the tourism and travel markets, increasing competition to provide consumers with a variety of relatively low-priced tourism options and stimulating vertical and horizontal integration of upstream and downstream actors to provide “seamless” tourism packages. Significant improvements in communication and transportation networks have sharply cut down the time needed to plan and take a holiday. Public and private investment in infrastructure, equipment and facilities has increased the attractiveness of many destinations for both domestic and international tourists. Combined with a growing demand by consumers for short excursions and diversity, these and other market and exogenous factors have greatly expanded tourism options for households: more people travel farther and more often than ever before.

Chapters 5 and 6 explore options for reducing the environmental impacts of household tourism travel patterns. This discussion shows a relatively limited role for using information to influence consumer

choice of tourism destination and travel mode. Although there is a growing market for “eco-tourism”, environmental considerations generally rank low in consumer criteria for choosing a holiday destination and the means for getting there. Similarly, because increased travel costs can be spread over other components of a tourism package it may prove difficult to use price mechanisms to influence consumer demand for different travel modes and distances. Section 5 also discusses technological and policy options for reducing the environmental impacts from maritime, road, rail and air transport including through technological innovation and demand management and modal shift, and in the case of air travel, air traffic control. Section 6 reviews the key arguments of the paper and concludes with a call to governments to improve their accounting of the environmental impacts of tourism travel when calculating the costs and benefits of activities in the tourism sector. It also points to the need to reinforce policies already developed in OECD countries to reduce the environmental impacts of road and rail transport and to extend these where necessary to address specific impacts and characteristics of tourism travel.

## 1. HOUSEHOLD TOURISM TRAVEL TRENDS AND THEIR ENVIRONMENTAL SIGNIFICANCE

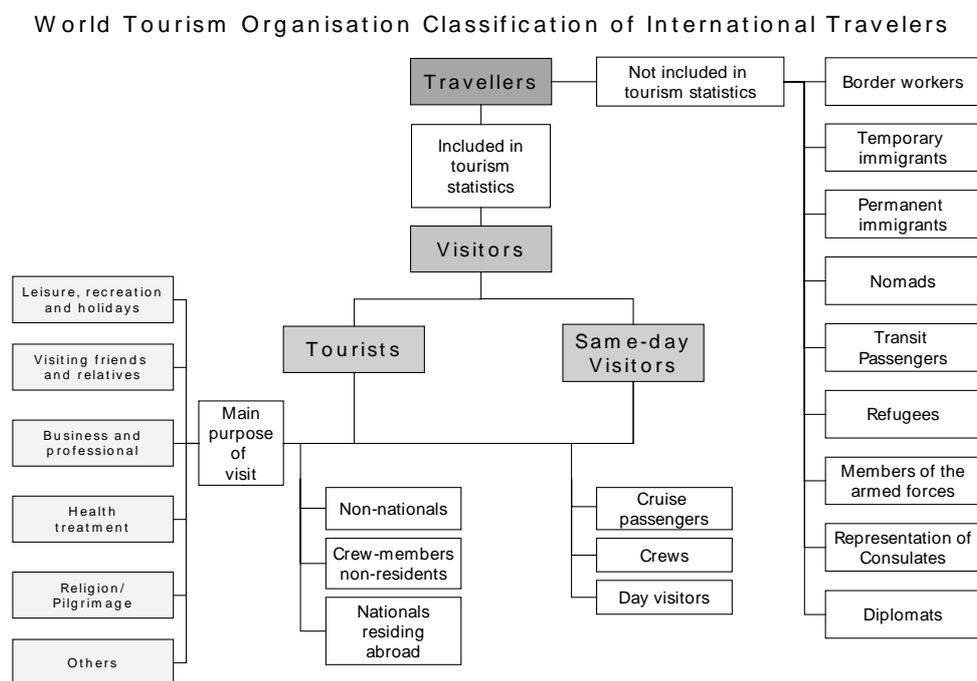
### 1.1 Defining household tourism activity

Tourism has been relatively difficult to measure and analyse in any meaningful way until fairly recently. This is true because it is an “industry” with no traditional production function, with no uniformly measurable output and no common structure or organisation across countries. It is atypical in that it is organised around the import of consumers to tourism destinations rather than the export of products from production sites to consumers. It cuts across a number of conventional economic sectors and is generally not measured in national accounts<sup>1</sup>.

The World Tourism Organisation (WTO) defines tourism as “the activities of persons travelling to and staying in places outside of their usual environment for not more than one consecutive year for leisure, business, and other purposes.”<sup>2</sup> It is important to note that tourism, in most official accounting systems, includes travel for leisure purposes per se with a number of differently-motivated trips including trips undertaken for business purposes, to visit friends and relatives and for religious or health reasons. (Figure 1). These trips are taken under vastly different sets of motivations and levels of household decision-making power. For example, households typically decide when and where to take vacations and holidays yet have relatively little say over the timing, duration and destinations involved in business travel. Likewise, households have relatively less liberty in selecting destinations (although not trip-taking frequencies) when visiting family and friends as these decisions are constrained by where each party lives. Generally, data on international tourism movements, and, to a lesser extent, domestic tourism activity, do not detail in any significant and/or consistent way the motivation underlying tourism travel. However, a broad survey of existing data indicates that business travel accounts for less than half of all international tourism trips (Figure 2). In many OECD countries, the percentage is even smaller – within Europe for instance, holiday travel accounts for 64% of all international travel by Europeans while business travel accounts for only 14%<sup>3</sup>. In 1991 in Germany, holiday travel accounted for 62% of the total number of kilometres travelled into and out of the country. For the same period, visits to family and friends accounted for 7% and business travel 30% of the kilometres travelled to and from the country<sup>4</sup>. Data from the United States for 1995 indicates that business travel accounted for approximately 38% of all long-distance trips and 27% of long distance travel distances. The corresponding shares for visiting friends and relatives and vacation travel were 50% on a trips basis and 61% as measured in kilometres travelled.<sup>5</sup>

- 
1. The OECD Tourism Committee has, with the WTO, led the way in the development of a standardised accounting methodology to develop a satellite account of the tourism sector for national accounting systems to facilitate the task of measuring the economic impact of the sector.
  2. WTO, 1997.
  3. Potier, 1999.
  4. Meurs, 1999.
  5. US Department of Transport 1995 (a).

**Figure 1. Source WTO, 1997**



## 1.2 Economic impact of tourism

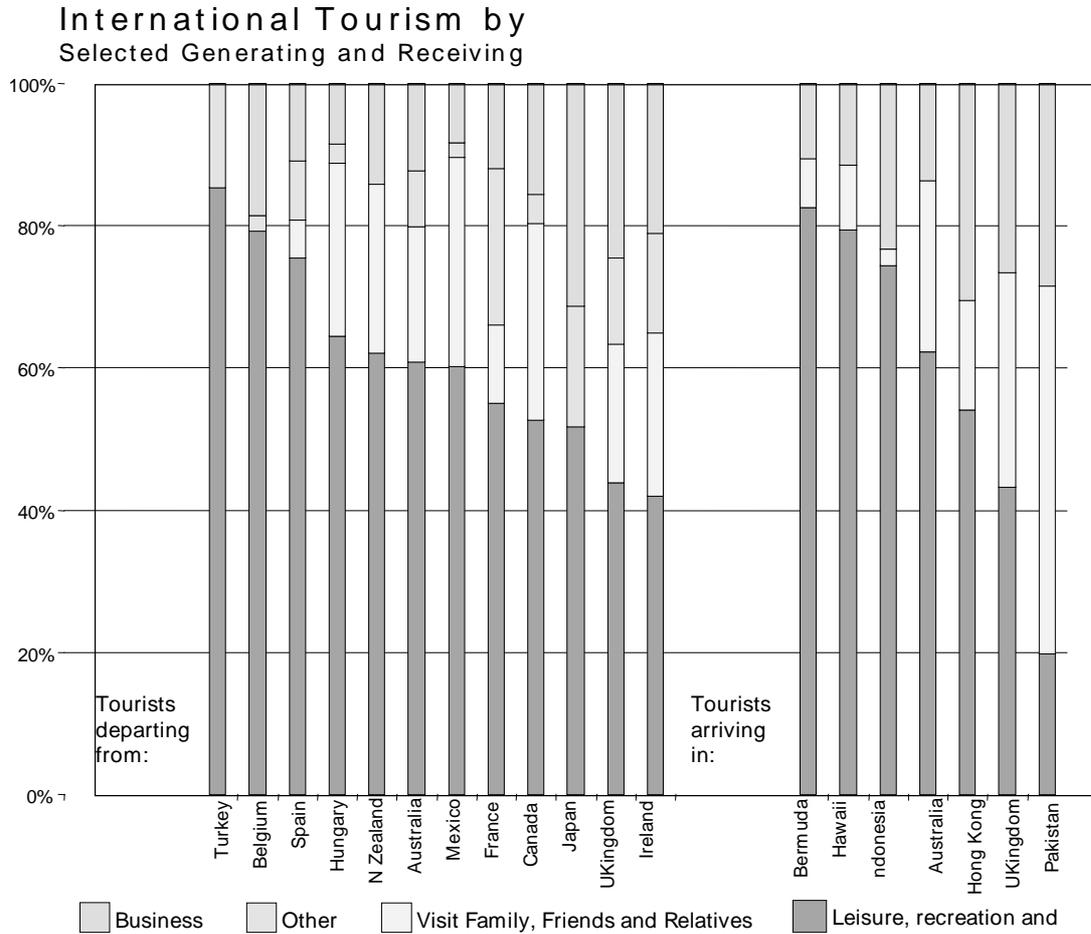
Tourism has been a major contributor to economic growth and employment both within and outside of the OECD. Work undertaken by the OECD Tourism Committee and the WTO have largely helped to make more visible the economic importance of what is a fairly diffuse sector. It is one of the world's most productive economic sectors accounting for approximately 12% of world GNP. It is also the sector credited with contributing the most to employment with over 100 million employees.<sup>6</sup> Finally, it is generally recognised that international tourism represents one of the world's most significant trade flows involving such diverse goods and services as aeroplanes, food and drink, and hotel management services. International tourism has a redistributive role in the world economy as it serves to transfer a part of developed countries household's discretionary income to less developed countries (although this is not a one-to-one relationship as a sometimes significant portion of less-developed country tourism receipts "leak" back to developed countries through, for instance, foreign control of hotels). Many countries also view tourism as a way to improve their balance of payments by "importing" consumers and their currencies.

Despite the relatively larger reliance of many developing country economies on international tourists, international tourism largely concerns the OECD. Activity within the OECD accounts for more than two thirds of all tourism expenditures (74% in 1996) and over half of all tourism receipts (63% in 1996).<sup>7</sup> These shares, however, have been declining in relative terms as many non-OECD countries have made efforts to increase their own share of international tourism.

6. Vellas, 1995.

7. WTO, 1999; OECD, 1997.

**Figure 2. Source WTO, OECD**



**1.3 Tourism and sustainable development**

Long-time heralded as a “smokeless” industry, many argued that tourism development, unlike other forms of more classic industrial or resource-based development would usher in a new era of more environmentally benign economic growth. This feeling was in part supported by the assumption that the very survival and propagation of tourism activities depends on the safeguarding of natural and cultural amenities that attract tourists in the first place. However, a growing body of observers have pointed out that, far from being environmentally benign, many forms of tourism (and of mass tourism in particular) are destructive – especially in coastal and mountain areas. This growing awareness, along with the general development of the principle of sustainable development, has brought the tourism industry and relevant international organisations to re-assess tourism activity in light of its long-term economic, social and environmental sustainability.

Tourism can also generate positive environmental and social impacts ranging from providing travellers with a broader appreciation of distant cultures and environments to the creation of income and incentives to protect and preserve natural and cultural amenities. Furthermore, the development of tourism infrastructure can have a net benefit when, for example, waste water treatment facilities are built where previously none existed. Revenue and income growth from tourism can, when distributed locally, also lead

to heightened pressure for pollution control and prevention and a general improvement in environmental quality.<sup>8</sup>

As a result, a number of initiatives have been undertaken to address and diminish the social and environmental impacts, while enhancing the economic benefits, flowing from tourism activities. These include initiatives aimed at tourism operators (*e.g.* to address energy and water use, water treatment, impact on biodiversity, *etc*) and consumers (labelling programmes, ethical charters, information programmes). These efforts have almost without exception been targeted at reducing the on-site impacts of tourism activity as these are often the most immediate and apparent. Generally, these efforts have met with some success although a relative decline in the attractiveness of mass tourism destinations may also have played a role in attenuating some of these impacts.

#### **1.4 Rationale and structure for this case study**

One source of tourism-related environmental impacts – travel – remains consistently and conspicuously absent from the general discourse on sustainable tourism. Tourism, by definition, involves travel from a point of origin to a destination or set of destinations and back again. Many tourism marketing texts underline the importance of travel to the overall tourism “experience” and economic measures of tourism activity attempt to account for travel-related expenditures. While much research has focused on general travel- and transport-related environmental impacts, relatively few attempts, have been made to address at the international level the specific environmental impacts stemming from *tourism*-related travel. This case study will build on these efforts in order to address the environmental significance of household decision-making for tourism-related travel.

The study is divided into three main sections. The first describes trends in tourism activity, travel and environmental impacts. This section reviews general international data on tourist movements and supplements these with more detailed national data in order to provide a greater understanding of the distances travelled, modes used and ensuing environmental burdens generated. This section also provides a general discussion on the relative contribution of different travel modes to the overall environmental burden generated by tourist travel. The second, more comprehensive, section undertakes a detailed analysis of household demand for tourism travel and its formation. This section discusses the structure of the tourism industry, its interaction with households and the ensuing patterns of household tourism travel. The final section draws on the analysis of the previous two sections and outlines policy issues and options for reducing and/or otherwise mitigating the environmental impacts from households’ tourism travel.

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8. WTO, 1997.

**Box 1 Linking households, tourism-related transport and environmental impacts:  
Data availability, comparability and quality.**

One major difficulty in properly addressing the environmental impacts stemming from tourism related travel remains the difficulty in collecting aggregate data at the OECD level on travel distances, modes and occupancy levels. Existing international sources of data such as those collected by the OECD and the WTO focus on measuring the economic activity of the sector (e.g. volume of trips, spending, use of lodging facilities, etc) and can only be of partial use in assessing the environmental performance of travel. Data is collected on origin of tourists and visitors arriving at the border or different forms of lodging, and as such, can be used a rough proxy for distances travelled. Furthermore, some data is collected on the number of international air arrivals which, again can be used to approximate modal split. The two, however, are not comparable and at present, it is difficult to match modes to travellers and their origin/destinations.

National sources of data are variable in their treatment of tourism-related travel statistics. Domestic tourism, with its relatively large share of automobile use is difficult to dis-aggregate from national transport statistics without the use of detailed (and periodic) travel surveys. Countries with these can provide fairly detailed insight into the environmental impacts stemming from domestic tourism travel. Many can also provide detailed information on international travel by nationals although this information tends to be less well collected (e.g. some surveys don't record distances of travel beyond national borders). A further difficulty with national information on tourism travel are the definitions and assumptions used. For one survey "holiday" travel may be measured only if the trip lasts 4 or more days while for another, all trips requiring an overnight stay may be recorded. Even within countries definitions can vary from survey to survey. Finally travel surveys vary in their ability to capture long-distance trips (which are the most relevant for measuring tourism activity). Surveys focusing on travel occurring within one representative date will likely under-report the overall scale and scope of long-distance travel. The factors outlined above make international comparisons difficult and overall measures of environmental impacts somewhat imprecise. However, some care has gone into the selection and treatment of data sources so as to ensure that they serve as a reasonable basis for describing the scope and scale of impacts stemming from tourism-related travel data.

## 2. GENERAL TRENDS IN THE TOURISM SECTOR

The tourism sector has displayed tremendous growth since the 1950s as a result of the general decrease in working hours, rise in number of days of paid leave and overall increase in wealth and disposable income. This growth has primarily benefited OECD countries although, increasingly, non-OECD countries are beginning to gain ground. This growth has also occurred differently for domestic as opposed to international tourism. Generally countries have experienced a movement towards shorter more frequent tourism trips although the long (over two-week) holiday is still the norm in many countries, especially within Europe. In 1997, 36% of European holiday makers left for more than two weeks at a time, 21% for two weeks and 19% for one week<sup>9</sup>. This contrasts somewhat with the United States and Japan where legislation and/or cultural factors result in less annual leave. Decreases in annual working hours are thought to have contributed to more frequent trips around the week-end. These tend to be somewhat shorter than annual vacation trips although even these can involve considerable travel distances.

Countries have traditionally been more interested in tracking, understanding and promoting international tourism as this form of travel generates strong trade and monetary flows between nations. Domestic tourism has received relatively less attention since those activities have principally served to redistribute national income. However, it has become clear that domestic tourism and international tourism are more linked than previously thought. Countries with strong domestic tourism markets are generally also very attractive international tourism destinations. Furthermore, countries with developed domestic tourism infrastructure and services tend to experience a higher degree of international travel substitution under the influence of external factors (*e.g.* relative growth in real income, price differences between nations, political developments, *etc.*). The general trends in each sector are examined below.

### 2.1 Domestic tourism

Most tourism trips take place within the country of origin. Exact figures vary from source to source but tend to confirm that domestic tourism accounts for 80%<sup>10</sup> to 90%<sup>11</sup> of all tourism trips. In 1995, for instance, the WTO estimates that total domestic tourism arrivals numbered about 5.6 billion. In contrast, total international tourist arrivals numbered only 567 million<sup>12</sup>. Generally domestic tourism can be broadly characterised in the following manner:

- Domestic tourism trips are typically shorter in duration, cover less distance and are principally taken by car (There are exceptions however, such as the case of the Benelux countries where even short car trips can have foreign destinations. Likewise, in the United States and Canada, aviation accounts for a relatively high share of domestic tourism travel because of the distances covered).

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9. European Commission, 1998.

10. Vellas, 1995.

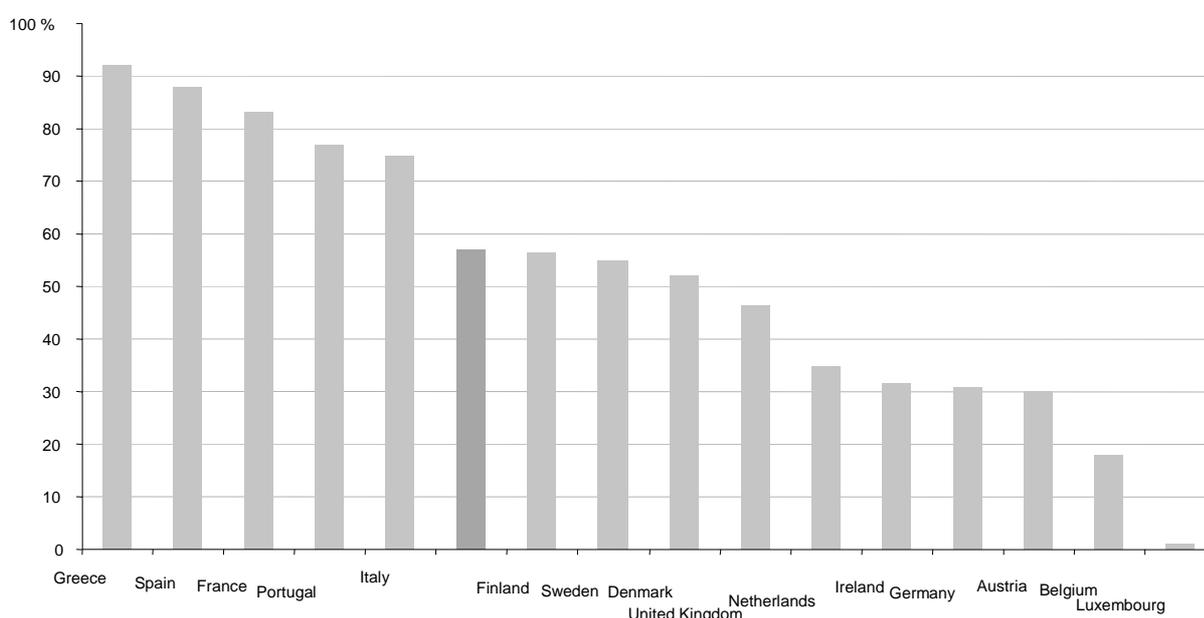
11. WTO, 1998.

12. WTO, 1996, Compendium of Tourism Statistics 1990-1995.

- Large countries such as Canada and the United States tend to have large shares of domestic tourism, smaller countries have lower shares.
- Within Europe, northern countries have smaller shares of domestic tourism, southern countries have relatively higher shares (Figure 3).
- Generally, domestic tourism displays a much flatter growth rate than international tourism. There are exceptions of course, in particular when circumstances dissuade international travel. The WTO

**Figure 3. Source European Commission, 1999.**

Holidays Spent in the Home Country  
EU-15 1997-98



predicts that domestic tourism travel will stabilise within much of the OECD before 2020.

## 2.2 International tourism

Comprehensive data on international tourism flows is collected and compiled by both the WTO and the OECD. These allow for a fairly good understanding of the characteristics and trends in international tourism travel. However, international tourism statistics can hide important environmental impacts as they do not readily allow for a calculation of travel distances and mode use. Furthermore, international tourism travel for relatively large countries like the United States cannot be compared to international tourism travel for smaller states such as the Netherlands or Belgium. A large proportion of the latter's trips will be accounted for in international tourism statistics where longer trips in the former can still be considered "domestic" since no border has been crossed. The trends discussed below relate only to *international* tourism activity as measured by the WTO.

International tourism has grown at an annual average rate of 7,1% since the 1950s (Figure 4) and is projected to grow at an annual average rate of 4,3 % through the year 2020. Past growth has primarily

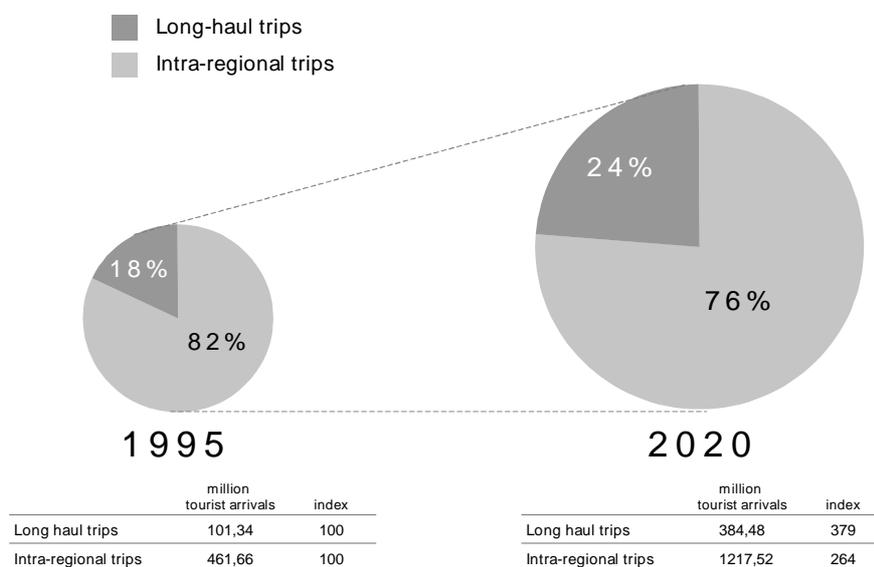
concerned Europe and, to a lesser extent, the Americas (in particular North America). These regions are projected to see a relative decline in their growth rates as tourism in the East Asia/Pacific region picks up. Growth in this region has proved to be relatively resilient despite the recent economic hardships it has experienced. Overall, the WTO predicts that in 2020, tourism arrivals world-wide will be triple their 1995 levels. One characteristic of this growth is that long-haul tourism travel (travel that takes place between world regions) will grow at a faster rate than intra-regional travel (Figure 5) and, in 2020 will be as large as nearly 70% of *all* tourism travel in 1995. This poses a significant challenge for sustainable development since inter-regional (mostly intercontinental) travel involves great distances of air travel where environmental impacts tend to be highest. The growth in long-haul travel will principally concern Europe and the Americas, as the WTO predicts that the bulk of first-time tourism travellers in the Asia/Pacific region will initially travel within the region.

**Figure 4. Source WTO**



**Figure 5. Source WTO, 1998.**

International Tourist Arrivals Worldwide:  
Long-haul vs. intra-regional trips 1995-2020 (million tourist arrivals)



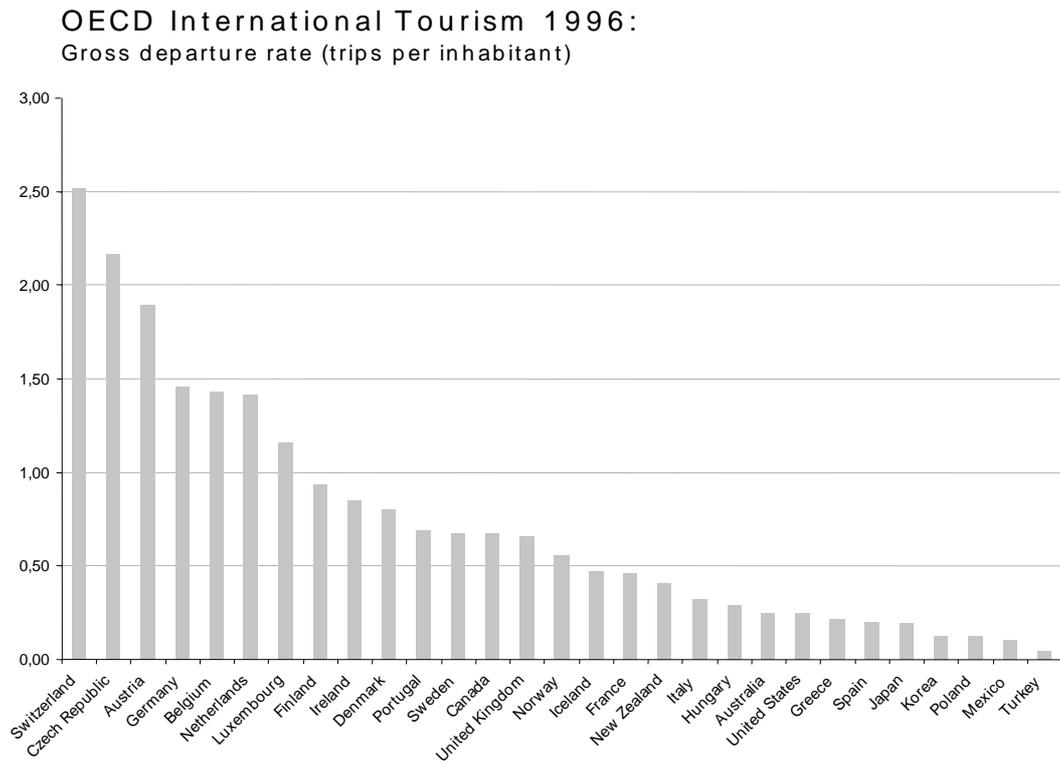
Participation in international tourism travel is generally conditioned by wealth with higher GDP/capita and levels of disposable income leading to more international trips and, to a lesser extent, longer distances travelled (although a number of other factors are also involved including the size of the country, the climate, existence of a domestic tourism market and a cultural preference or non-preference for international travel). Figures 6-8 provide an overview of OECD international tourism activity in 1996 as measured by OECD tourists' destination choices<sup>13</sup>. Figure 6 compares the gross departure rate (*e.g.* the number of trips divided by number of inhabitants) throughout the OECD. Most countries have relatively small international departure rates confirming that growth potential for international travel exists and, conversely, that international tourism travel concerns a relatively small number of people in many OECD countries (especially considering that the gross departure rate masks individuals taking multiple international trips).

As Figure 7 illustrates, two elements stand out from a comparison of international trips taken and estimated distances travelled. The first is that the five countries with the highest estimated travel distances account for more than two-thirds (67%) of all OECD international tourism travel distances. The second is that there is considerable variability between countries in the number of trips taken and overall distances

13. Based on WTO 1999 Yearbook of Tourism Statistics. All tourists originating within OECD countries were accounted for according to their destination. Because of variability in the WTO country reports, preference was given to Tourist arrivals, then to Visitor arrivals and, finally to Arrivals in all forms of accommodation. Distance calculations are based on great circle distances between the geographic centres of origin and destination countries. This may lead to distortions, especially for countries with geographically skewed population distributions such as Canada (although not necessarily for the United States with large eastern and western populations). These distortions tend to over-report distances in some instances and under-report distances in others. Furthermore, actual travel rarely follows great circle routes. Therefore, distance calculations should be seen as reflecting the *magnitude and scale* of travel distances, not the exact number of kilometres travelled.

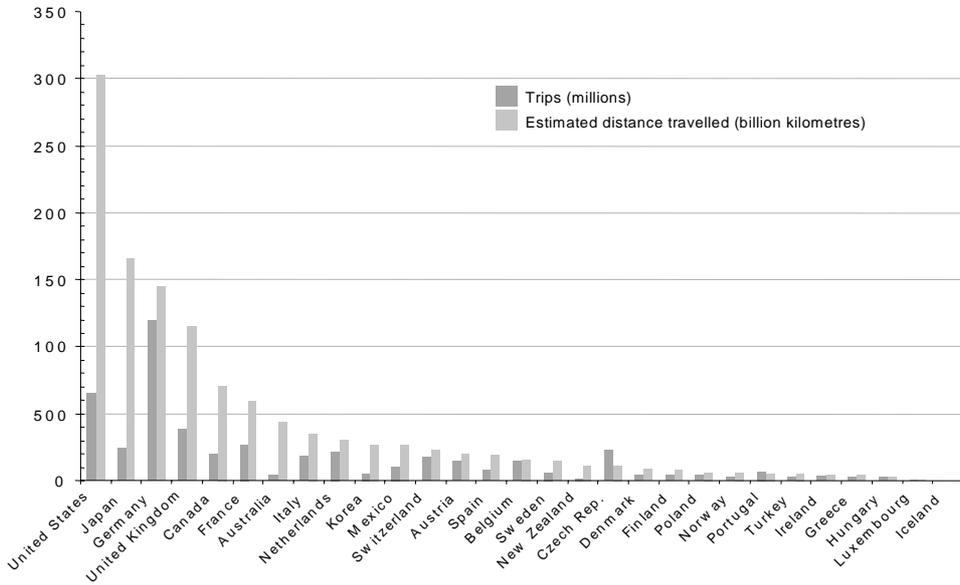
travelled. However many countries with high average lengths (*e.g.* Australia, New Zealand and Korea - Figure 8) contribute relatively little to absolute volume of travel whereas some countries with relatively low international departure rates contribute in a much higher proportion to total volume of international tourism travel (*e.g.* United States and Japan).

**Figure 6. Source WTO, 1997.**



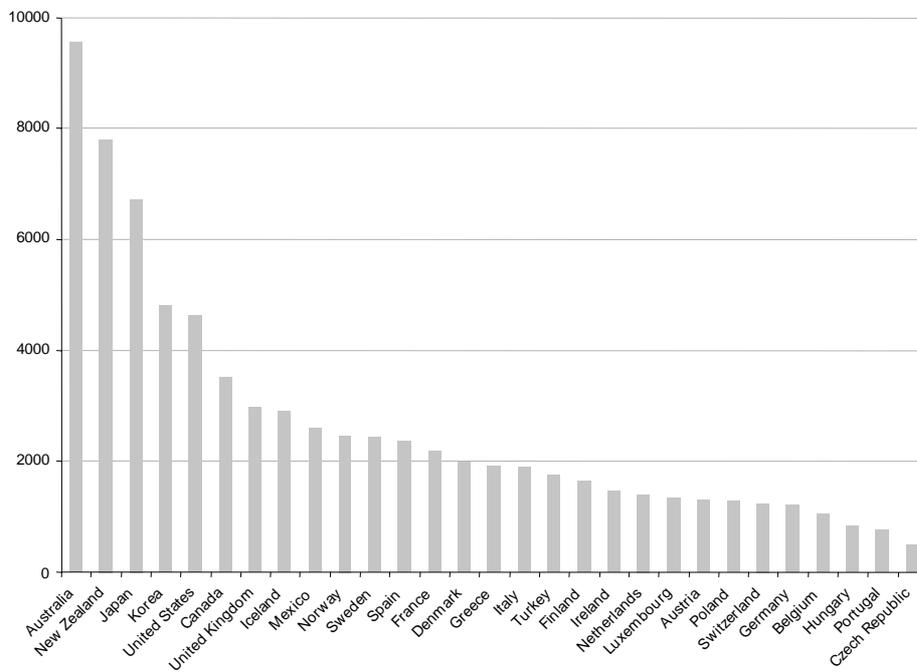
**Figure 7. Source WTO, 1997, own calculation**

OECD International Tourism 1996:  
Trips taken and estimated distances travelled



**Figure 8. Source WTO, own calculation**

OECD International Tourism 1996:  
Estimated average distance per trip (kilometres)



### 3. THE ENVIRONMENTAL SIGNIFICANCE OF HOUSEHOLD TOURISM TRAVEL

Transport contributes to a number of environmental impacts stemming from tourism activity. These impacts are generated both by travel to and from tourism destinations as well as by travel within tourism destinations. As outlined in Table 1, these impacts principally concern climate change and pollution, and, to a lesser extent, biodiversity, natural resources and visual impacts (although locally, these impacts might be fairly pronounced).

The scope and scale of tourism travel-related environmental impacts is related to the volume of travel for different modes, the specific environmental characteristics of these modes and the environment within which travel takes place (*e.g.* urban areas, sensitive ecosystems, *etc.*). However, as mentioned earlier, while there is a sufficient amount of data available to discuss general environmental impacts from transport in general, relatively little international data exists on the *specific* impacts of domestic and international *tourism* travel. Despite this limitation, it is possible to estimate these impacts by comparing international data on tourism movements and mode shares, with more detailed national data.

#### 3.1 Tourism mode shares: trips and distances travelled

The car is the dominant form of travel for domestic tourism trips despite national differences. For instance, in 1994, 54% of all holiday trips in Germany were taken by car whereas the corresponding figure for the United States in 1995 was 81%. The car is also an important travel mode for international tourism travel (Figure 9) although its use tends to decrease significantly as travel distances increase. Within Europe the car was used, in 1995, for 39% of all international trips - as much as aviation - and nearly six times as often as the train. When considering only international *holiday* trips within Europe, the share of car trips decreases slightly under 40% while aviation trips increase to slightly over 40%. Coach and train trips do not change significantly from their shares for overall international travel<sup>14</sup> (Figure 10). In the OECD Asia/Pacific region, air transport dominates international tourism travel due to the geographic isolation of the region's countries. Finally, within North America, cars accounted for 60% of trips between the United States and Canada in 1998 while aviation accounted for 30%<sup>15</sup>. In contrast, travel to Mexico from within North America is generally characterised by a higher share of air trips. As discussed earlier, projections from the WTO indicate that aviation will likely continue to gain in mode share for tourism travel as long-haul travel increases, deregulation of air transport markets lead to more national and intra-regional air travel and domestic tourism travel stagnates.

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14. Potier, 1999.

15. Transport Canada Annual Report, 1998.

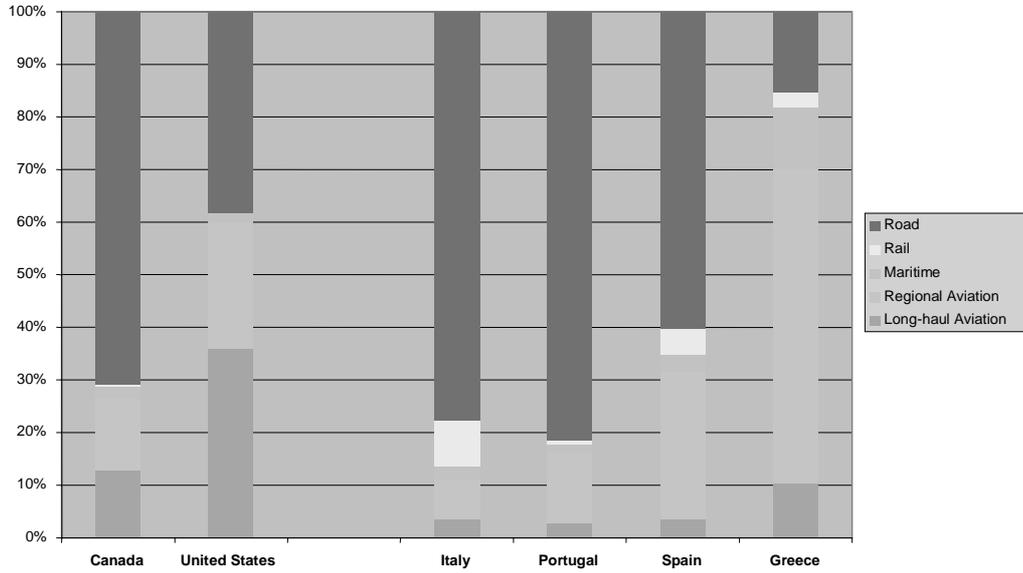
**Table 1. Environmental impacts from tourism**

Category of impact	Type of impact	Impact from Transport
Biodiversity: Floral and faunal species composition	Disruption of breeding habits	+
	Killing of animals through hunting	
	Killing of animals in order to supply goods for the souvenir trade	
	Inward or outward migration of animals	+
	Destruction of vegetation through the gathering of wood or plants	
	Change in extent and/or nature of vegetation cover through clearance or planting to accommodate tourism-related facilities and transport infrastructure	++
	Creation of a wildlife reserve/sanctuary or habitat restoration	
	Creation of monetary value and incentives for the preservation of natural amenities	
Pollution	Water pollution through discharges of sewage, spillages of oil/petrol	+
	Air pollution from vehicle emissions, combustion of fuels for heating and lighting	+++
	Acid and nitrogen deposition in sensitive ecosystems and water bodies.	++
	Noise pollution from tourist transportation and activities	++
Erosion	Compaction of soils causing increasing surface run-off and erosion	
	Change in risk of occurrence of land slips or slides	
	Change in risk of avalanche occurrence	
	Damage to geological features ( <i>e.g.</i> caves, tors, <i>etc.</i> )	
	Damage to river and stream banks, damage to dunes and beaches	
Natural Resources	Depletion of ground and surface water supplies	
	Depletion of fossil fuels to generate energy for tourist travel and activities	++
	Change in risk of occurrence of fire	
	Depletion of mineral resources for building materials	
	Over-exploitation of biological resources ( <i>e.g.</i> overfishing)	
	Change in hydrological patterns	
	Change on land used for primary production	
	Increase in land take for tourist developments and transport infrastructure	+
Visual Impact	Facilities ( <i>e.g.</i> buildings, chairlift, car park roads)	++
	Litter	
	Sewage, algae blooms	
	Smog	++
Climate Change	Radiative forcing impact from emission of greenhouse gases and water vapor at high altitudes from air transport to and from tourism destinations	+++
	Greenhouse gas emissions from ground and maritime sources	++
	Greenhouse gas emissions from energy production for tourism activities	
	Change in carbon sequestration potential due to tourism related land-use change	

Source: modified from Green and Hunter, 1992, 1995

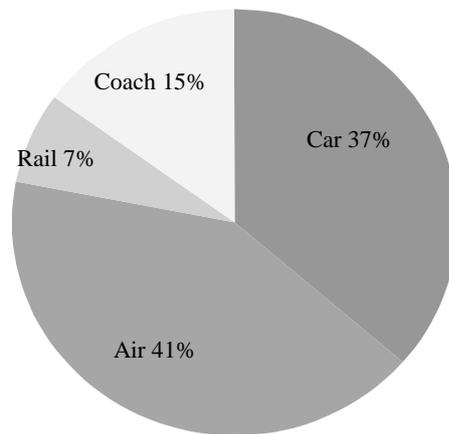
**Figure 9. Source WTO, OECD**

International Tourism Modal Split  
 Arrivals of tourists/visitors for selected Countries: 1989



**Figure 11: SourcePotier**

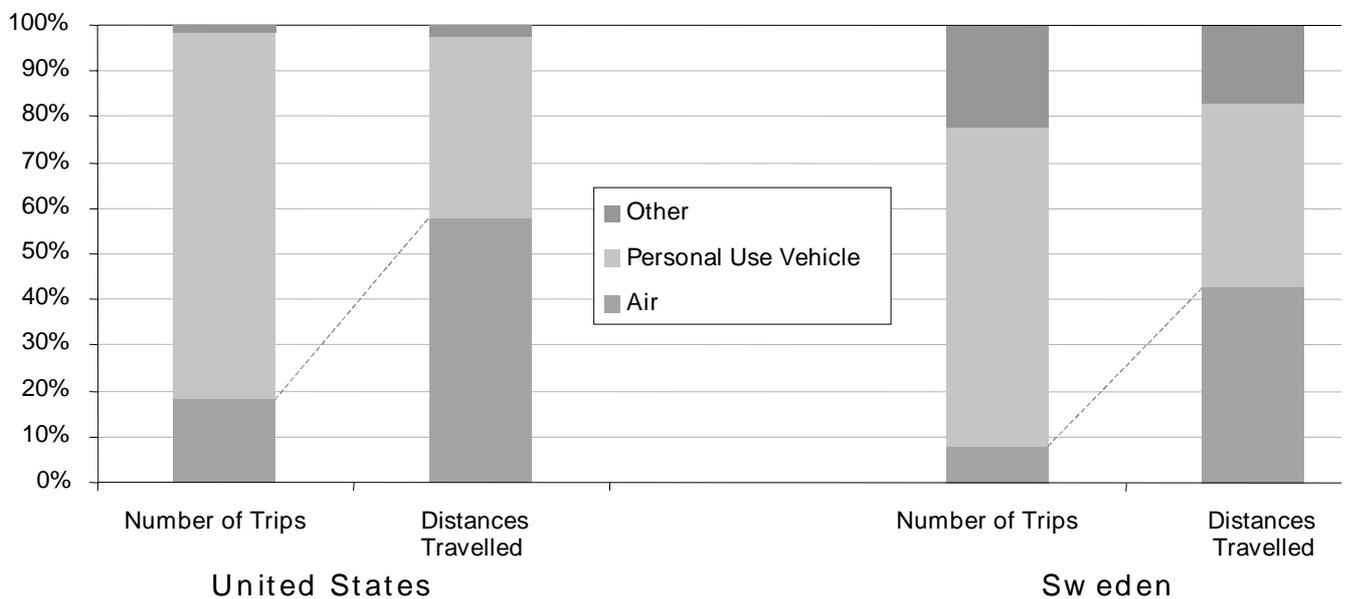
Breakdown of International Holiday Trips by Europeans in 1995:  
 by transport mode



The relative importance of air travel trips in international tourism flows is significant since these trips tend generally to account for a proportionally higher number of kilometres travelled than for automobile trips. For example, while air travel only accounted for 18% of long-distance person trips in 1995 originating within the United States, it accounted for over half (58%) of all kilometres.<sup>16</sup> Likewise, air travel only accounted for 8% of Swedish long distance trips in 1994, yet it accounted for 43% of overall travel distances.<sup>17</sup> (Figure 11). Furthermore, air tourism travel per se, and vacation travel in particular, tends to account for a larger portion of overall air travel distances whereas tourism/vacation travel by car accounts for a relatively smaller portion of overall road transport travel distances.

**Figure 11. Source Frändberg, 1998, US DOT, 1995**

**Breakdown of Long-Distance Transport  
by trips and distances, USA and Sweden**



### 3.2 Environmental impacts from tourism-related travel by mode

#### 3.2.1 Road transport

Within the OECD, road transport is a major source of environmental impacts stemming from air and water pollution, greenhouse gas emission, noise levels and land-take. Generally, road transport, and cars in particular, have greatly improved their relative environmental performance (*e.g.* per vehicle and per passenger kilometre). These gains, however, have been somewhat offset by increases in overall volumes of travel. Future growth in road transport volumes may even reverse current downward trends in absolute emissions of NOx and VOCs (both damaging in their own right and when combined as ozone).

16. US Department of Transport, 1995 (b).

17. Frändberg, 1998.

Road transport dominates tourism-related travel on a trips basis and, to a somewhat lesser extent, when considering kilometres travelled. However, it is generally more difficult to allocate tourism specific impacts for road-transport than is the case for air transport as national travel data typically does not track motor vehicle travel for tourism purposes. However, tourism-related road travel accounts for a fairly small share of overall intra- and inter-urban road transport activity. Tourism travel by road represents a somewhat higher share when considering only long-distance (over ~100 kilometres) road transport (see Box 2 and 3). The relative contribution of tourism road travel to overall environmental impacts from passenger road transport is furthered tempered by the high average vehicle occupancy for tourism trips and efficient operating conditions (*e.g.* a relatively low share of energy intensive and polluting stop-and-go traffic). Coach travel, in particular, because of relatively high load factors, represents a relatively environmentally benign form of travel, at least for its intercity component. While the overall impacts may be relatively small, the local impacts from tourism transport can be more pronounced.

On-site impacts from motor vehicle use can range from being nearly negligible for diffuse patterns of tourism where destinations receive relatively few tourist vehicles (*e.g.* in the case of much rural tourism) to being fairly acute for certain forms of seasonal and concentrated tourism flows. In these cases large flows of tourists' vehicles can overwhelm existing transport infrastructure, increase damaging emissions and cause levels of traffic congestion more typically associated with large urban areas. These impacts are oftentimes strongly felt in urban, sea-side and mountain areas although they can manifest themselves at certain constrained nodes of the road network during peak travel periods. The types of impacts caused by tourism related road transport differ from those caused by local traffic only in their scale and concentration in time. One particular exception is coach travel which has no local equivalent and contributes to considerable environmental and congestion problems at high volume tourism destinations such as historic city centres. In response, some municipalities have banned or otherwise constrained the access by coaches to parts of their cities.

Over the long-run, however, the accumulated impact of tourism-related transport emissions can be significant as in the case of accumulated acid/nitrogen deposition or ozone damage in sensitive ecosystems. Impacts related to the construction or modification of transport infrastructure are more difficult to allocate to tourism as the infrastructure oftentimes serves local inhabitants as well. These impacts, however, can be important insofar as new infrastructure is created or old infrastructure re-sized with the specific intent to handle seasonal tourism flows.

One final indirect impact of tourism-related road traffic is the contribution that households' tourism travel needs have made to environmental impacts from non-tourism road transport activity. In many OECD countries, relative increases in the operating efficiency automobile engines have been used up by increasing vehicle weights (and sizes)<sup>18</sup>. One commonly cited household vehicle purchasing criteria is having a large enough car for family vacation trips<sup>19</sup>. Insofar as this motivation leads to households purchasing larger vehicles than they would otherwise buy for their daily use, it can be inferred that tourism motivations are indirectly responsible for some of the road sector's non tourism-related travel emissions.

### 3.2.2 *Air transport*

Compared to the road transport sector, aviation represents a relatively small – but rapidly growing – source of global environmental impacts. These impacts, given the tremendous historic improvements in energy efficiency and pollution/noise reduction, will increasingly be a function of the overall distances travelled and where – and at what altitude - emissions occur, rather than the specific

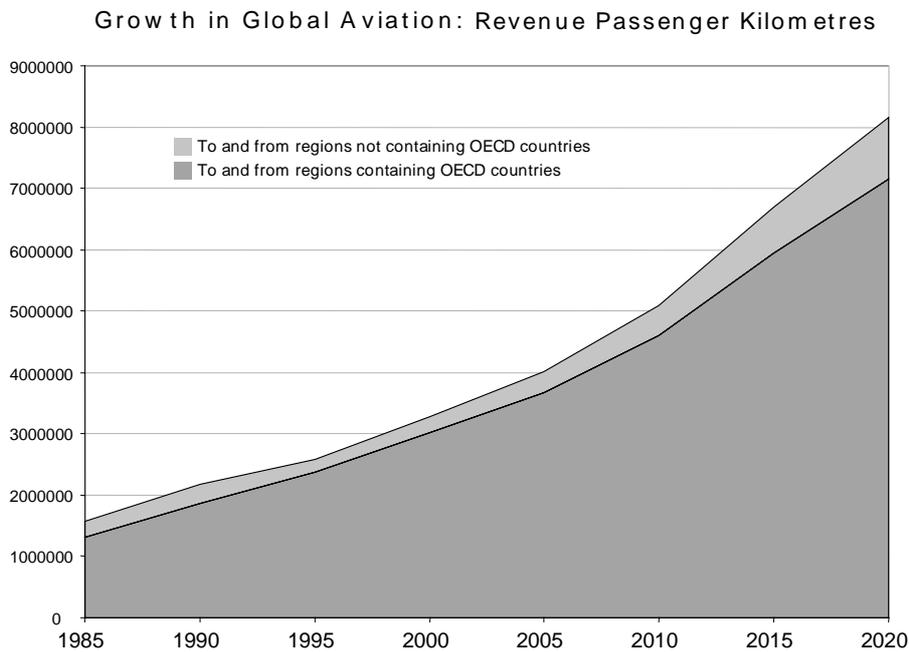
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18. IEA, 1999.

19. US DOE, 1998.

impacts per kilometre travelled. Because of improved engine performance, increased load factors, technical and operating efficiency improvements and changes in fleet composition, air travel has become nearly as energy efficient as typical automobile use on a per-kilometre basis. Short haul traffic is characterised by the lowest load factors (~65%), followed by long2 haul (~70% up to 77% for the North Atlantic Corridor) and Charter traffic (nearly 85% occupancy in Europe).<sup>20</sup> Past energy efficiency gains, will likely not continue into the future and the projected annual average future efficiency gains of 1-1,3% will not be sufficient to offset significant rises in fuel use and CO<sub>2</sub> emissions (Figure 12). Future improvements in aircraft performance are also made more difficult since there are trade-offs between reducing either CO<sub>2</sub> or NO<sub>x</sub> emissions.

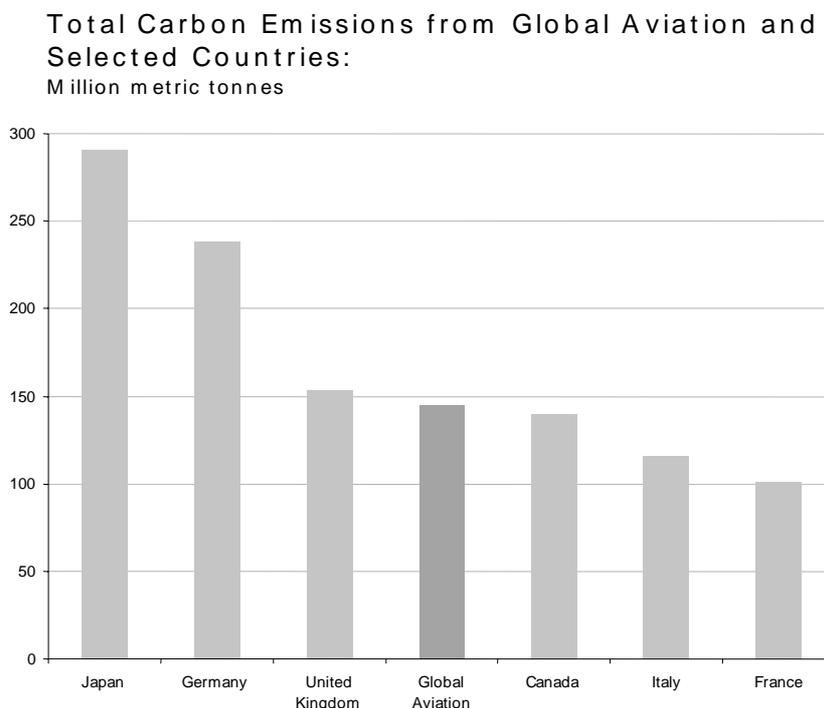
**Figure 12. Source Boeing, 1999**



CO<sub>2</sub> emissions from air transport, in absolute terms, remain important – roughly comparable to carbon emissions for certain OECD countries (Figure 13). Overall, CO<sub>2</sub> emissions from aviation represented approximately 2,4% of global fossil fuel emissions in 1992. This represented 12,4% of carbon emissions from transport activity. According to different transport scenarios, aviation’s share of carbon emissions may increase over the next two decades to 3% to greater than 7% of all fossil fuel carbon emissions.<sup>21</sup> Growth in long-haul tourism-related travel will be responsible for a significant portion of this growth and much of this growth will be from traffic to and from OECD regions.

20. Rolls Royce, 1999.

21. IPCC, 1999.

**Figure 13. Source US GAO, 1999**

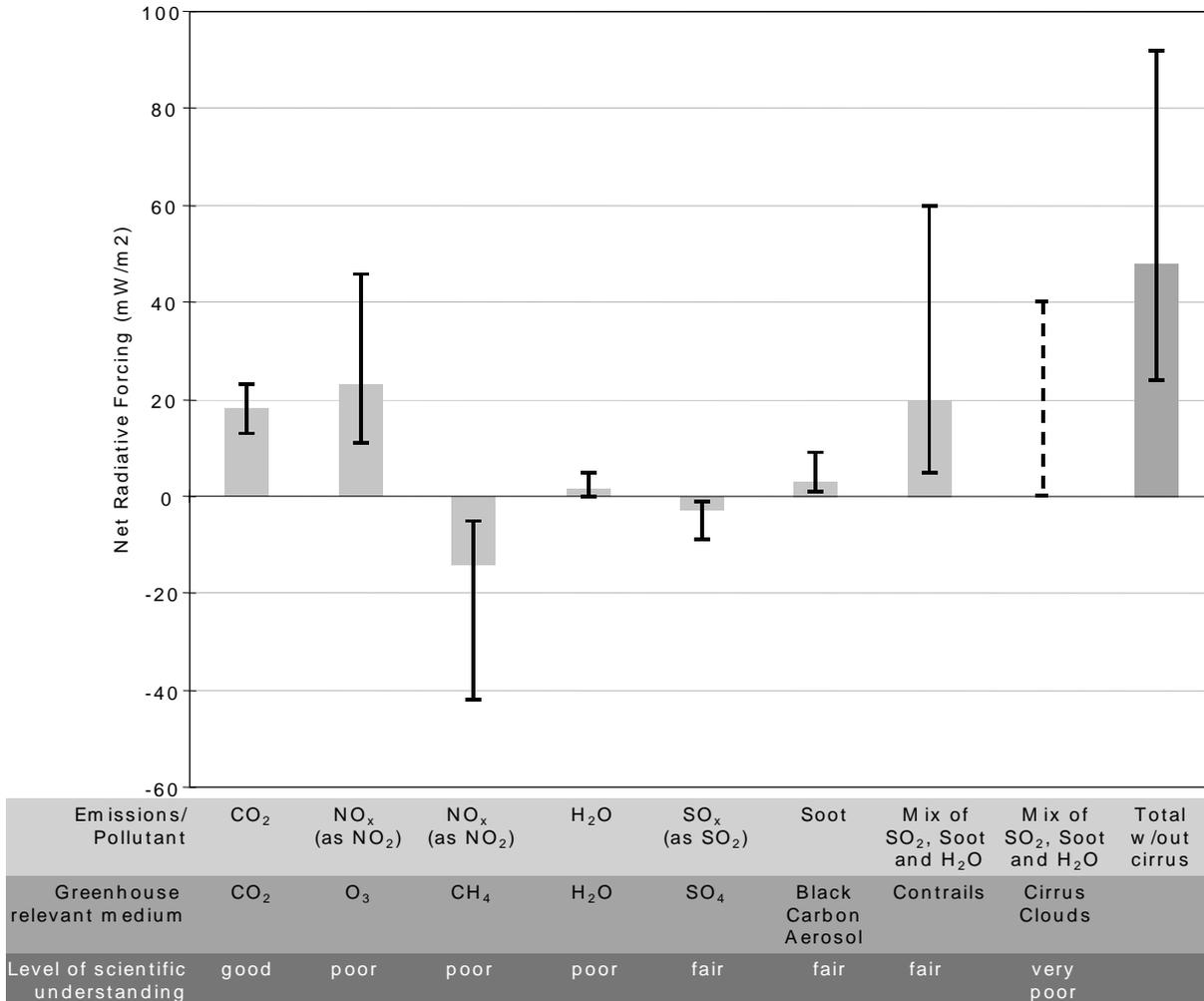
When assessing the environmental impacts linked to tourism air travel, it is important to take into account the emission of compounds into the mid- to upper-levels of the atmosphere. Indeed, burning one litre of kerosene on the ground is quite different from burning the same amount of fuel at the typical cruising altitude for aircraft. A recent report of the Intergovernmental Panel on Climate Change (IPCC) investigating the role of air travel in contributing to global climate change has outlined the global warming impacts of aircraft engine emissions in the atmosphere. The best scientific understanding of these interactions is illustrated in Figure 14. In it, one can see the relative roles certain compounds and emissions play in contributing to atmospheric warming (*e.g.* as in the case of CO<sub>2</sub>) or, inversely, attenuating atmospheric warming (*e.g.* as in the case of direct sulphate emissions). In the case of NO<sub>x</sub> emissions, the impact can both contribute to warming (through the creation of ozone) or decrease it (by breaking down methane – a highly potent greenhouse gas). On balance, however, the IPCC has concluded that the overall global warming impact from aircraft emissions amounts to *two to four* times the global warming impact from aviation CO<sub>2</sub> emissions alone.<sup>22</sup> Based on these findings and projected aviation and motor vehicle growth rates, the global contribution of aircraft to global warming will surpass the global warming impact of cars by 2030 despite aviation's comparatively low emissions of CO<sub>2</sub> alone (Figure 15). It should be noted, however, that the understanding of the radiative forcing impact of aircraft emissions is still evolving. Furthermore, the radiative forcing impact is dependent on a number of factors including the flight altitude and routing. Many shorter distance flights, for example, take place at lower altitudes, which tends to reduce the warming impact from NO<sub>x</sub> and, to the extent that these flights avoid passing through humid air layers, the impact from contrail formation. Reducing these types of flights, for which alternatives are more readily available, may not have the same impact on radiative forcing as reducing difficult-to-replace long haul flights. Finally, efforts to reduce the non-CO<sub>2</sub> emissions from aviation might conversely lead to increased CO<sub>2</sub> emissions.

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22. IPCC, 1999.

Figure 14. Source IPCC, 1999

Radiative Forcing from Aviation Emissions: 1992



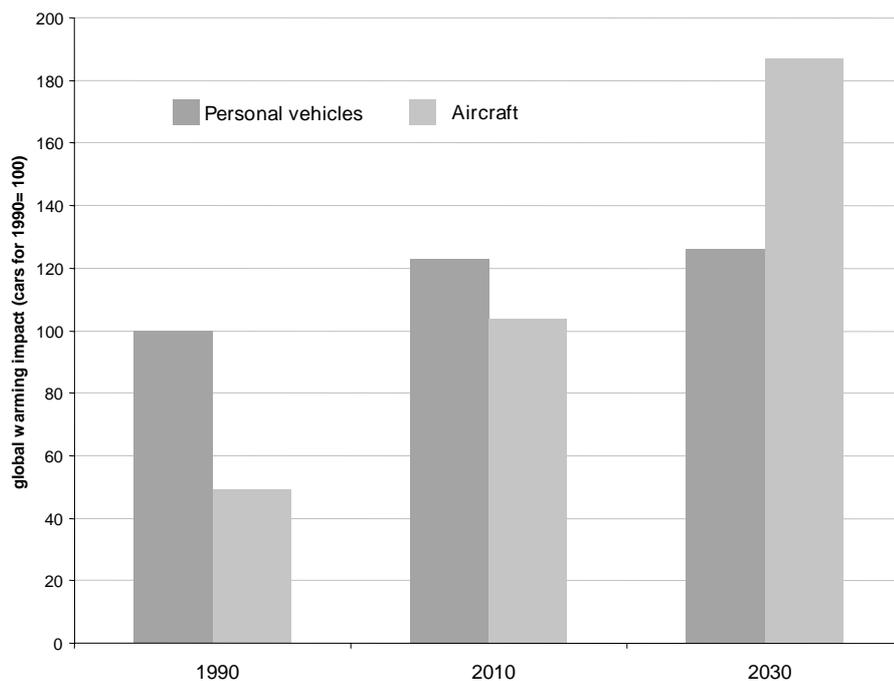
Landing and take-off cycles and the ground movement of aircraft and related ground support equipment (which tend to be heavy emitters of NOx and particulate matter) can also contribute to local air pollution in and around airports. These emissions are further compounded by the use of kerosene-burning auxiliary power units that serve to generate electricity and conditioned air for aircraft while taxiing and parked at the gate. Total ground emissions from aircraft and their support represent a relatively small share of overall urban air pollution. However, in areas with high levels of background pollution or in sensitive areas (e.g. mountain valleys) airport emissions can be a source of concern. Significant progress has been made to-date by upgrading ground support equipment and through the provision of centralised electricity and conditioned air systems<sup>23</sup>. Noise pollution also represents a problem for areas surrounding airports although here too, important noise reductions have been achieved by the gradual phasing out of older and noisier aircraft. However, a recent report by a commission of the European Parliament has concluded that not be sufficient to resolve the noise problem for people living under flight paths in the vicinity of airports.

23. EPA, 1995.

The operation of night flights also remains a problem in certain areas although these tend more to concern freight aviation rather than tourism-specific travel.

**Figure 15. Source CST 1999, IPCC 1999, OECD, 1995**

Global Warming Impact of Transport Modes World-wide:  
1990-2030



### 3.2.3 Maritime transport

As a stand-alone transport mode, maritime passenger transport is relatively energy efficient and low-polluting both in absolute terms and on a per passenger kilometre basis. However, certain environmental impacts associated with cruise ship vacations stand out when examining complete vacation packages. In particular, since the means of transport is also the place of accommodation, impacts otherwise considered to be relevant to tourism destinations only (*e.g.* solid waste and wastewater disposal in sensitive marine environments) must be considered. Furthermore, cruise vacations are often jointly packaged with air travel to and from the point of embarkation. The climate, pollution and energy use impacts of this component of the vacation package dwarf the environmental impacts produced once the ship is underway.

**Box 2**

**Environmental Impacts from Tourism-related Travel: Sweden**

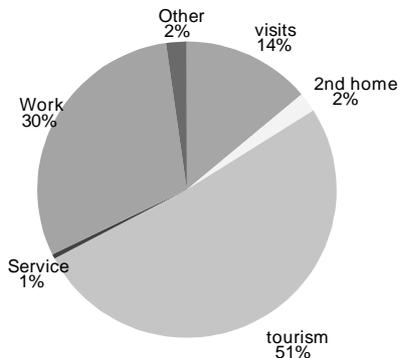
Holiday/vacation travel accounted for approximately 15% of overall Swedish mobility in 1994. When combined with other forms of travel officially defined as “tourism” by the WTO (e.g. visits to second homes, visits to family and friends) the overall share is even greater. Vacation travel in Sweden represented an equivalent of 7,5 kilometres per day of travel per inhabitant. The overall level of holiday travel (21,7 billion passenger kilometres) was roughly equivalent to the overall distance travelled by Swedes to and from their workplaces (~21,8 billion). Holiday travel, however, is characterised by a disproportionate amount of distance travelled by air in relation to the number of trips taken by air. Air travel, in fact dominates, all other forms of long-distance (over 100 km.) transport for holiday purposes as measured in distances travelled.

The overall environmental impacts from vacation travel stem not from a reliance on more energy intensive or polluting modes of travel, but, rather, from the large distances involved. Energy use by holiday travel represented approximately 14 to 18% of all energy use for personal transport. CO2 emissions are directly proportional to energy use and therefore accounted for the same approximate share of emissions from all forms of Swedish personal transport. Air transport accounted for 64% of both energy use and CO2 emissions from holiday travel. Generally, CO2 and NOx emissions from Swedish holiday travel in 1994 were not large when compared to overall transport emissions. If, however, the global warming impact of aviation emissions are factored in, holiday travel, represents slightly over 50% of the total global warming potential of all emissions from long distance travel.

**Estimated Energy use and emissions from long-distance holiday travel: 1994 (source: Frandberg, 1999)**

	Car	Air	Train	Bus	Ship	Total
Energy Gj	19,8	28,5	1,2	,8	1,9	52,3
CO2 Mt	0,7	1,5	,01	,05	0,1	2,4
NOx kt	3,4	6,9	,10	,80	2,5	13,7

Global Warming Impact from Long-distance Transport in Sweden: 1994 share by travel purpose



source: Frandberg, 1999, own calculations

#### 4. “UNPACKING” TOURISM TRAVEL DEMAND

Understanding the formation and expression of demand for tourism is a complex task because many factors come into play when people make decisions on if, when, where and how they will go on holiday. Generally, the decision to take a holiday can be broken into three levels. These levels have important yet different impacts on the tourism decision-making process, especially regarding the choice of destination and frequency of departure, which predicate the environmental impact of tourism travel. The first can be resumed as the availability of time and money. Without enough free time or disposable income, there can be no leisure travel. The second level concerns family and work situations of people. This level will have an impact on the frequency and duration of tourism travel and, to a lesser extent, on the type of tourism products and destinations chosen. Finally, the third layer principally concerns people’s lifestyles and preferences for certain products and/or destinations. These preferences will have a strong impact on travel distances, modes used and consequently, the environmental impacts stemming from tourism travel.

The World Tourism Organisation has identified 13 exogenous and market factors that come into play in the tourism decision-making process (Figure 16). Generally, exogenous factors tend to fall into the first two levels of decision-making and therefore have an influence on the scale of tourism travel (departures and frequency). Market forces within the tourism and travel industry tend to influence the third layer of tourism decision-making and therefore have a strong impact on the structure of tourism travel (destinations chosen, distances travelled and modes used). This section will explore the impact of the most important exogenous and market factors in tourism travel.

**Figure 16. Factors that influence tourism travel demand (WTO, 1995)**

	Exogenous factors	Market forces
↑ Impact on tourism travel	<ul style="list-style-type: none"> <li>• Economic and financial developments</li> <li>• Demographic and social changes</li> <li>• The safety of travel</li> <li>• Technological innovations and improvements</li> <li>• Infrastructural, equipment and facility improvements</li> </ul>	<ul style="list-style-type: none"> <li>• Consumer knowledge of tourism possibilities, and tourism requirements</li> <li>• Destination product development and product/service development by the private sector</li> <li>• Trends in the structure of the travel and tourism sector</li> <li>• Marketing</li> </ul>
↓	<ul style="list-style-type: none"> <li>• Political/legislative/regulatory factors</li> <li>• Trading developments</li> <li>• Environmental planning and impact issues</li> </ul>	<ul style="list-style-type: none"> <li>• Supply of skilled and experienced human resources</li> </ul>

## 4.1 Exogenous factors

### 4.1.1 Economic and financial developments

#### *Income and price effects*

Increases in the disposable incomes of large segments of OECD populations have led to increased consumption of leisure services. Quantifying exactly how much of this income is devoted to tourism, as opposed to other leisure expenses, however, remains difficult at the aggregate level. Generally, rises in income lead to an increase in tourism travel and high levels of GDP are associated with increased participation in international tourism. Spending on leisure and tourism generally grows more strongly than increases in disposable income since saturation is quickly reached for lower-order goods, freeing up resources for holiday spending.<sup>24</sup> Nonetheless, some countries with high levels GDP have proportionally lower rates of participation in international tourism than other similar countries. Wealth, alone, does not determine tourism travel.

On the micro level, broadening income differentials within many countries and increased competition from other leisure activities such as hobbies leads to a situation where income levels are often inversely proportional to available leisure time for tourism. Those people most able to afford tourism travel often experience difficulty in finding time to get away for more than a short break.<sup>25</sup> One outcome of this is the steady increase in tailored vacation packages including high-speed air travel.

An important element to consider when looking at the growth of tourism travel is the impact that transport prices have on demand. Consumers will react differently according to their willingness to forego travel as prices increase or, alternatively, increase their travel as prices drop. These responses, described by the measurement of the price elasticity of demand, can be either un-responsive (inelastic) or responsive (elastic) to changes in prices. Effectively gauging these elasticities is important in order to understand how past price changes have led to changes in travel and how future changes in the price of travel may contribute to or reduce overall demand. It is difficult to make a precise estimation of price elasticities as they vary considerably across studies, national circumstances and travel modes considered. Furthermore, this uncertainty applies equally to the measurement of cross-elasticities of demand between modes (how the impact in the price of one mode effects the demand for another).

One can generally conclude that demand for car travel is relatively inelastic and that demand for leisure air travel is more elastic than the demand for business travel by air – considerably more, in fact, depending on the study and the region considered. A 1995 review of published data on price elasticities for air travel demand commissioned by the United States Federal Aviation Administration found that these could range from -.8 (a 10% increase in price would result in a 8% decrease in demand) to -2.7 (a 10% increase in price would result in a 27% decrease in demand). Furthermore, North American air leisure travel demand elasticities are relatively higher than those studied in other world regions. Business travel is generally considered to be inelastic (therefore not responsive to changes in price) and some analysts have suggested that price increases in air travel might be passed on disproportionately to this class of traveller thereby sparing leisure travellers from price increases. Price changes that are linked to fuel consumption might also have more of an impact on long haul flights since fuel costs represent a more substantial proportion of total costs for these flights.<sup>26,27</sup> Finally, recent trends towards vertical integration in the

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24. OECD, 1999.

25. WTO, 1999.

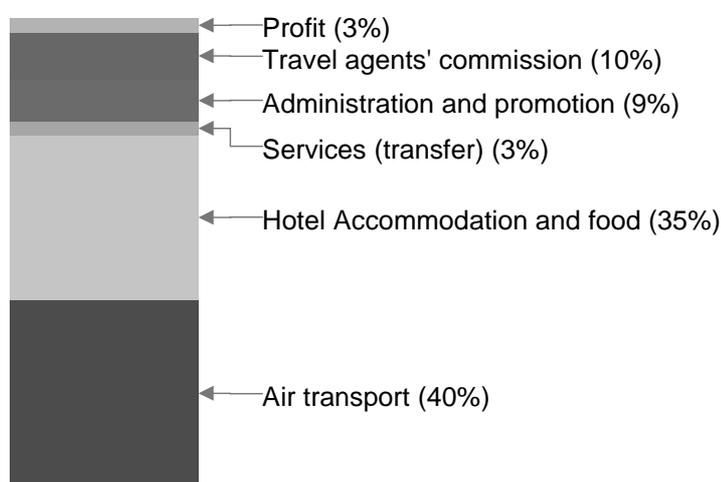
26. IPCC, 1999.

tourism industry (outlined in Section 5.2) result in a situation where increases in prices of specific components of vacation packages (transport, lodging, labour, *etc.*) are more easily compensated-for by reductions in other components thus eroding the impact of price fluctuations (Figure 17).

The social importance and psychological investment in tourism decision-making should not be overlooked as a factor influencing consumer responses to price changes. Consumer habits and preferences erode the impact of marginal price changes.<sup>28</sup>

**Figure 17. Package tour cost structure (Lickorish, 1997)**

Cost structure of a typical Mediterranean package holiday from the UK



#### *Currency fluctuations and relative prices*

Currency fluctuations between countries can lead to price differences for similar tourism products, which in turn can affect international tourism flows. The outcome of major currency changes such as the 1992 devaluation of the Spanish peseta or the 1997 devaluation of the Thai baht have often led to a rise in tourism arrivals in these countries. However, it is generally considered that traveller's habits and preferences for specific destinations will temper the impact of exchange rate fluctuations. Furthermore, the emergence of the Euro and other co-ordinated monetary policies in major tourism markets has tended to reduce the importance of this phenomenon. Exchange rate fluctuations will principally have an effect on the length of vacation rather than the choice of destination.<sup>29</sup>

27. Michaelis, 1997.

28. OECD, 1999.

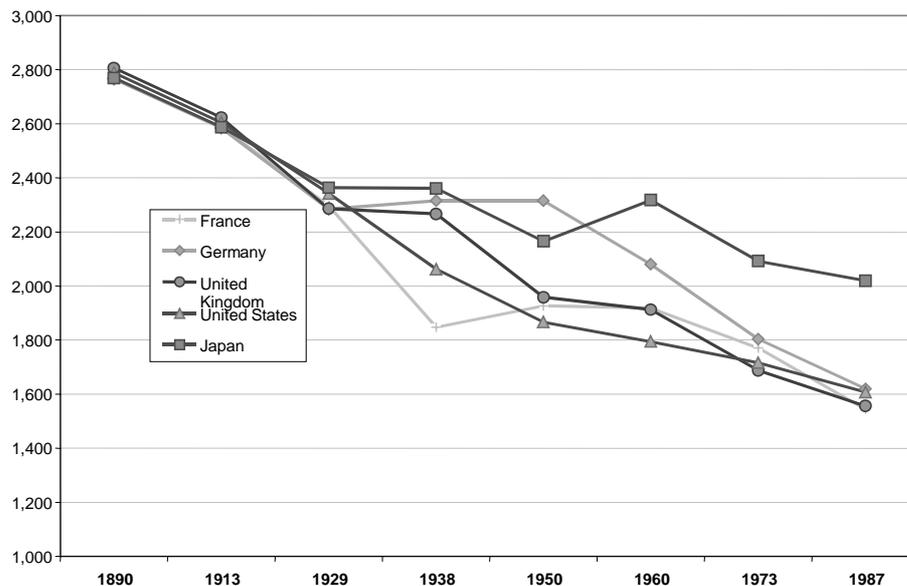
29. Vellas, 1995.

#### 4.1.2 Social and demographic changes

##### *Changes in working time and paid leave*

Generally, OECD countries have sought to reduce working hours and increase the leisure time available to their citizens this century (Figure 18). This has led to less weekly working hours, increases in paid vacation and a reduction in the retirement age throughout the OECD. While reductions in weekly working hours tend to favour local recreation opportunities, increases in paid leave and reductions in the retirement age combined with the generalised rise in life expectancy influence long-distance leisure travel behaviour. Another important outcome of the reduction in working time throughout the OECD is the shift from a society based on production to one based on consumption. The shift towards working less and living longer implies a number of fundamental changes in the structure of production and consumption. Whereas before, a person's lifetime was dominated by their productive (work activity), a typical citizen in OECD countries living 80 years now spends on balance 40 years producing and consuming and 40 years consuming only. This has important implications for tourism as it represents a major (but not exclusive) outlet for the consumption of leisure-time oriented goods and services.<sup>30</sup>

**Figure 18. Evolution of Annual Hours Worked per Capita in Selected OECD Countries: 1890-1987**



As outlined in Figure 19, citizens of OECD countries generally enjoy a relatively high level of paid leave and holiday entitlements. In the sample of countries presented, actual leave granted by employers often exceeds the minimum amount granted in national labour legislation. Two notable exceptions are Japan and Korea where, despite government efforts to persuade workers to take their full leave entitlement, average paid leave taken remains well below the statutory level. This can be explained

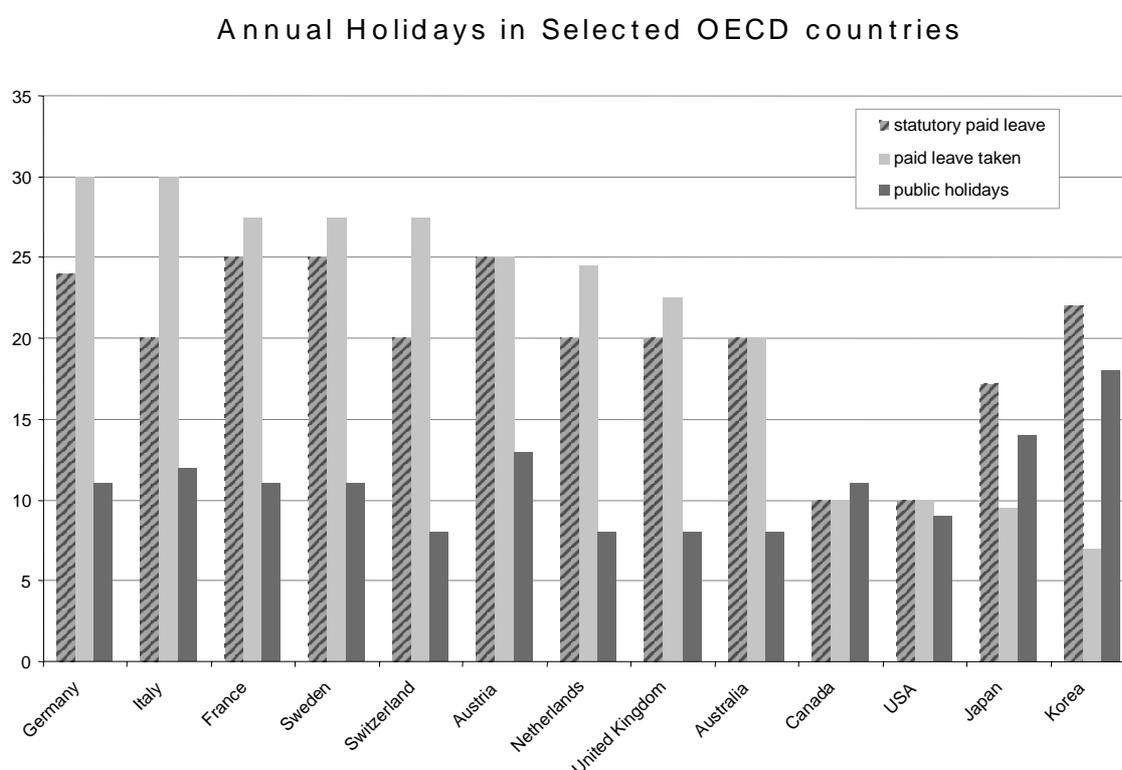
30. Grubler, 1995.

by a number of factors including cultural pressure against taking vacation leave, the economic slowdown of the late 1990s and the possibility to take cash payments for leave not taken.

Working time arrangements in a number of OECD countries are undergoing change as a need for more flexible schedules better suited to seasonal or periodic variations in activity for certain businesses or sectors of the economy has led to non-traditional work schedules. Insofar as these arrangements open new blocks of leisure time during the year, they can have an impact on the frequency of vacations taken. These new arrangements may also lead to more last-minute unplanned vacations as uncertainty in yearly work schedules may prevent long-term vacation planning. Finally, this trend will likely have an impact on the length of the main vacation period because employees may be more reluctant to be away from work for long periods of time. This trend has been confirmed as many countries now see a relative shortening of the duration of the principal holiday and the multiplication of shorter, secondary vacations. This will likely have an influence on the environmental impact of tourism travel as people depend more and more on high speed modes of transport, and aviation in particular, to minimise the share of transit time for shortened breaks.

Finally, the continued massive entry of women into the OECD work force has had a significant impact on family vacation decisions. On the one hand, this trend has led to more complicated household vacation planning which ultimately favours shorter over longer vacations and, on the other hand, it has reduced the overall amount of leisure time available to the family.

**Figure 19. Annual holiday entitlements in selected OECD countries (WTO, 1999)**



*Ageing population and changes in retirement income*

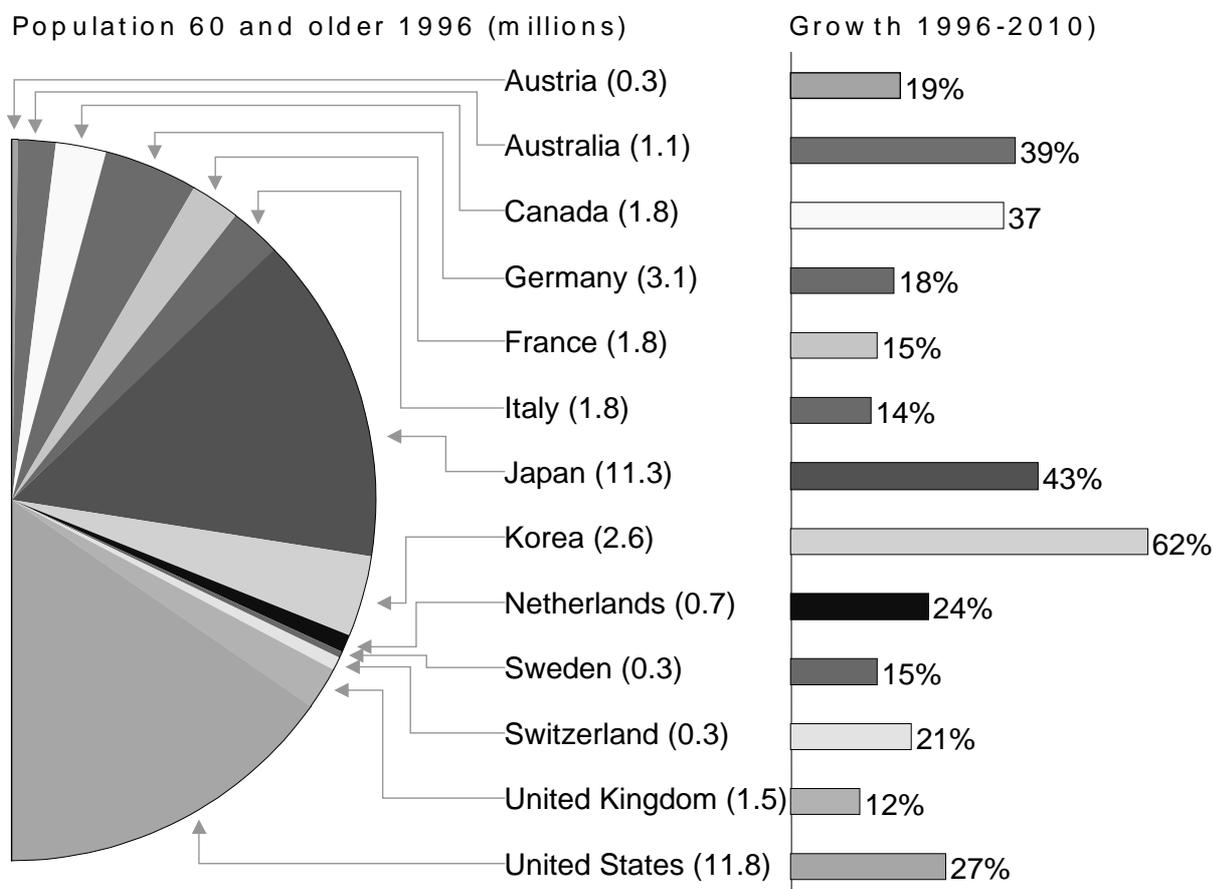
OECD populations will undergo a significant ageing in the years to come as post-World War 2 generations reach retirement age (Figure 20). The relative importance of the retired population is also expected to increase due to a general trend towards reduced family size throughout the OECD. This trend has important implications for tourism travel as retirees are generally characterised by high levels of disposable income, large amounts of free time, no work and few family responsibilities and, compared to previous generations, relatively high levels of fitness later into life. In absolute terms, the importance of the retirement population in the United States and Japan will have important implications for the environmental impacts stemming from tourism travel. They are large generators of international tourism and their geographical situation vis-à-vis the major European tourism destinations will lead to an increased use of air travel. There seems, however, to be a “window” of opportunity for tourism travel with early retirees (60-70 years old) travelling most and farthest. After 70-75, tourism travel drops off sharply as these populations start to favour closer destinations and more sedentary holidays.<sup>31</sup>

Another factor to consider when gauging the impact of ageing populations on tourism travel is the evolution of OECD pension systems. Currently, pensioners within the OECD can expect to have relatively high levels of pension income for their retirement. However, many OECD countries, concerned with the growing imbalance of working versus retired population have undertaken, or are planning to undertake, reforms in their pension systems. These can be expected to lead to an increase in the retirement age, greater participation in private pension schemes and/or reduced pension payments. The net effect of these reforms might lead to less overall participation in tourism travel than might otherwise be expected given past trends.

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31. Page, 1999.

**Figure 20. Population 60 and older in selected OECD countries (WTO, 1999)**



### 4.1.3 Other exogenous factors

#### *Factor endowments and tourism infrastructure*

The theory of factor endowments assumes that countries will specialise in the production and trade of goods or services which depend on resources which they have in abundance and/or available cheaply. For tourism, the theory implies that countries with abundant or inexpensive tourism-attracting resources will develop a strong tourism service sector and will generate inbound tourism traffic. These resources can be natural (sunny weather, attractive beaches, skiable mountains), cultural (historic cities, interesting architecture, unique local cultures) or artificially produced (*e.g.* theme parks). Natural and, to a lesser extent, cultural resources have the greatest influence in generating inbound tourism. The popularity of destinations with an abundance of natural and cultural resources (*e.g.* Mediterranean basin destinations for sun-centred vacations, the Alps for winter skiing vacations and historic European cities for urban holidays) attests to their importance.

The presence of natural and cultural resources alone, however, is not sufficient to ensure high levels of inbound tourism travel. Successful destinations must also have a developed accommodation sector, efficient transport infrastructure and a number of supporting services. This helps to explain why countries with relatively high levels of GDP (and capital investment capacity) are the most successful tourism destinations. As developing countries increase their capacity to generate or attract investment

capital for tourism-related infrastructure, they will become more attractive tourism destinations. Their developing capacity, combined with relatively low labour costs and inexpensive transport prices has already allowed these countries to gain market shares from OECD destinations. Insofar as these destinations generate new trips, or are further away than the destinations they are replacing, their development will lead to heightened environmental impacts, in particular from aviation.

#### *Domestic tourism markets*

Much in the same lines of the discussion above, countries that have developed their internal domestic tourism markets such as the United States, France, the United Kingdom and Italy are also attractive destinations for international travel. Indeed, high levels of domestic tourism demand have been shown to create an environment favourable for international tourism since both domestic and international travellers benefit from the same infrastructure and services. This has important implications for countries that may wish to seek to bolster domestic tourism as a way of reducing environmental impacts from long-distance transport. In practice, however, almost all countries within the OECD seek to increase international tourism as this represents an influx of foreign currencies and a trade surplus for national accounting systems (tourism is generally considered a service *export*).

#### *Political/Legislative/Regulatory factors*

A number of factors impacting tourism decision-making can be considered under this heading. These include recent changes in political regimes that have opened new inbound and outbound tourism opportunities and the general regulatory environment concerning tourism related services.

Political changes in Central and Eastern Europe, as well as CIS states have led to an opening of these regions as important new tourism destinations. These changes are already having an impact on the balance of tourism flows within Europe where these regions are projected to gain market shares at the expense of other western European nations. Limited rail links with the rest of Europe will imply that most international tourism growth to these countries will be by car, coach and air. Households in these regions will also participate more actively in international tourism as their incomes grow and as they are able to respond to long distance product offerings. This will likely mean that the current situation in these regions, where most international tourism is comprised of relatively short-distance trips to neighbouring states, will undergo a shift towards longer distance European and overseas travel.

Other important political changes in a number of formerly closed countries, such as Vietnam, China and Cuba, will allow for growing tourism travel from OECD regions. In the case of the OECD Asia region, the emergence of China as an important tourism destination may replace some trips currently going to Europe and North America although the net effect on travel distances will likely be minimal as Chinese markets may stimulate new demand from Asia, North America and Europe.

Finally, the regulatory structure framing tourism services has an impact on tourism travel. This is perhaps most important in the transport sector. Increased deregulation of the airline industry has been a major factor in reducing the cost of air travel throughout the OECD. The continued trend in moving away from bilateral agreements between nations towards more comprehensive regulatory frameworks allowing for free access to national markets will likely keep steady downward pressure on air fares within the OECD. This has important implications for the environmental impacts stemming from tourism travel since, at least in Europe, a concomitant deregulation of the less environmentally damaging rail sector has yet to be fully engaged.

## 4.2 Tourism market forces influencing travel

As stated earlier, many of the exogenous factors outlined in the previous section have an impact on whether and how often people engage in tourism travel. The industry generally views these factors as framing a population's tourism *potential* for participating in tourism. How that potential is expressed will depend on the interaction between the industry, the services and products it offers and the desires of consumers. From an environmental policy perspective, the principal outcome of this interaction is that consumers will select certain products and destinations that will entail more or less travel by more or less impacting travel modes.

### 4.2.1 Consumer knowledge of tourism possibilities

Tourism decision-making, like consumption decisions in general, is rarely characterised by a rational ranking of options based on perfect information. Many tourists may be unaware of the full range of options available to them or, alternatively, may be aware of them yet make seemingly irrational decisions as emotions or other aspects of the psyche take the upper hand to logic. Oftentimes tourism consumer behaviour is characterised by both of these phenomena simultaneously.<sup>32</sup>

Despite this, tourism services are different from many other common consumption goods in that they are relatively expensive and infrequently purchased. Furthermore, they must often be bought sight unseen since they are intangible and can only be experienced as they are consumed. They also have high emotional significance since a failed or unpleasant vacation experience cannot be made up until enough new vacation time is accrued (at least for non-retirees). Thus the tourism decision-making process is characterised by non-routine behaviour, an extensive search for information and a high level of involvement by the consumer. Despite recent developments in last-minute travel and spur-of-the-moment purchases, tourism travel is still motivated by high levels of commitment on the part of consumers. The marketers of tourism products, therefore, attempt to provide tourists with as much targeted information as possible in order to sway their destination choices. This means not only tailoring messages about products to meet the specific desires of different types of consumers (*e.g.* emphasising budget packages for cost-conscious travellers, specific activities for special interest groups or luxury for more well-off tourists), but also, as explained in Section 5.2.2, developing specific new tourism products to match changing consumer preference.

Information on tourism products is gathered from a number of commercial sources either independently by travellers or through the intermediary of different actors within the tourism industry (see box 3). Foremost among these are travel agents who provide direct booking services for a number of tourism transport and accommodation products (Figure 21). Travel agencies also serve to distribute information on packaged tourism products for tour operators and wholesalers. Because of their reliance on commissions from the sales of air travel (~60% of their revenue<sup>33</sup>), agents typically provide travel information for this mode at the expense of others. Although travel agents principally provide transport and accommodation booking services for people who have already decided upon a destination, they can have a strong influence on the destination choice of undecided travellers, especially for booking tourism packages.

As an alternative to travel agents, the development of tourism e-commerce web sites that enable consumers to interact directly with tourism product databases represent an important new trend. Information on tourism destinations, services and prices throughout the world can be quickly accessed, compared and used in holiday decision-making therefore broadening the scope of destinations/services

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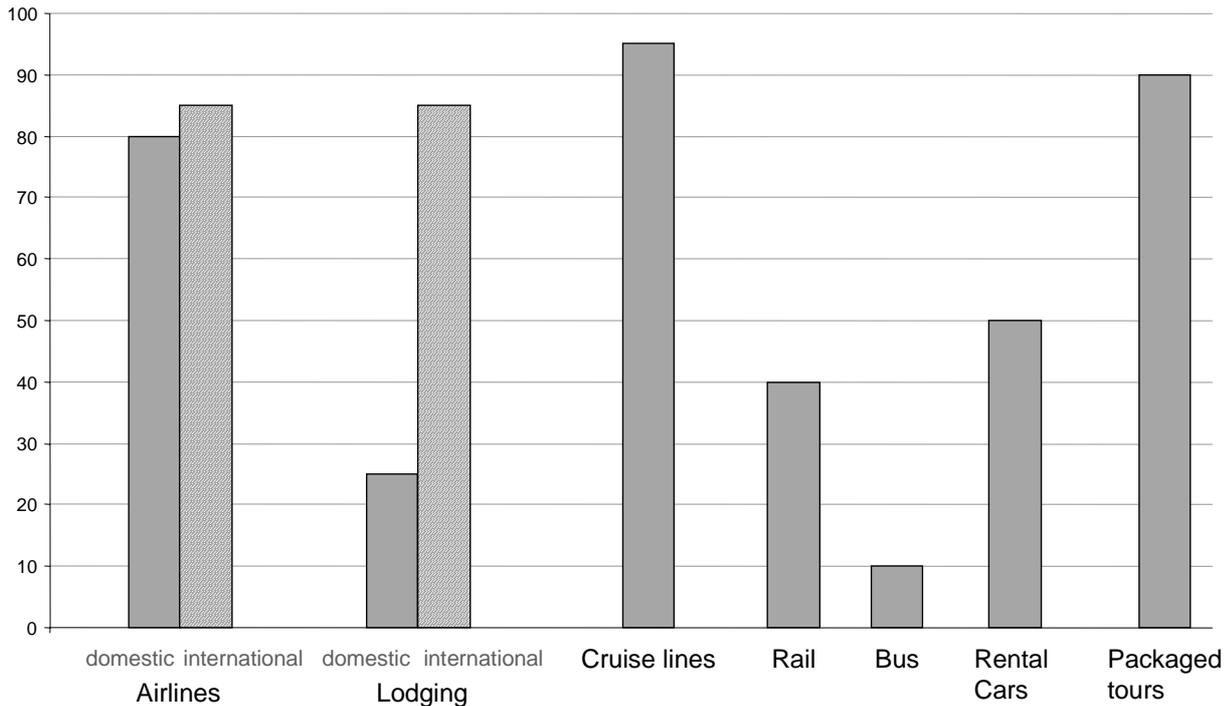
32. Swarbrooke, 1999.

33. Vellas, 1999.

typically considered by households. This interaction with potential clients, linked with “push” technologies where information specifically tailored to the Internet tourist’s tastes (as extrapolated from their Internet browsing habits), comprises a powerful new tool for influencing tourism decision-making.

**Figure 21. Travel bookings through travel agents**

Estimated Percentage of Volume booked by Travel agents (US data, 1995-96)



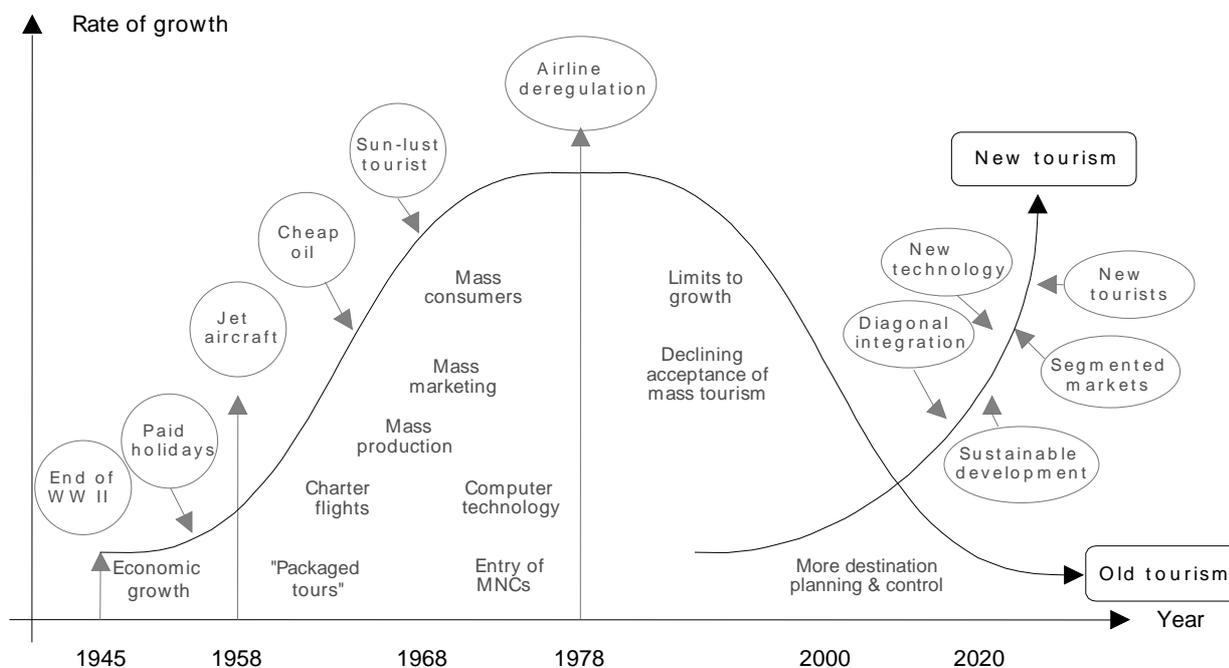
With some notable exceptions, tourism marketing rarely seeks to provide information on the environmental impacts stemming from travel. When environmental concerns are incorporated into marketing messages, these tend to involve only on-site impacts, which, as outlined in Section 3, are for many vectors dwarfed by the impacts produced by travel to and from tourism destinations. There is potential, however, for providing consumers with information on the environmental impact of their travel without necessarily implying a change in their vacation preferences. For a broad segment of the “Sun and Sea” market, for instance, there is little difference between a resort-based vacation in Ibiza, Jamaica or Bali since the discovery of new cultures often ranks relatively low on the list of desired vacation attributes for these type of all-inclusive packages. The environmental impacts from travel to these three destinations are, however, significantly different.

Although marketing messages are generally effective in helping consumers pick one destination over another, they are certainly not the only - nor in many cases the dominant - source of information underlying the tourism destination decision. Perhaps the most important of these other sources of information is the example and/or advice of friends, family and or representatives of lifestyle groups that the tourist most identifies with. Another important determinant, is the tourist’s own past experiences. This implies that past and current travel experiences will have an impact on future travel decisions. Insofar as two generations of OECD travellers have become accustomed to relatively inexpensive long haul travel, and first-time tourists in emerging markets aspire to the same travel patterns, it seems difficult to envisage a significant reduction in the demand for long-distance tourism in the near future.

4.2.2 Consumer trends and tourism product and service development

Until the post World War II era, tourism was generally an elitist phenomenon characterised by limited public participation and extremely expensive products tailored to the wealthy. The spectacular change in vacation entitlements, decreases in working time, rise in disposable income and advent of new transportation technologies have rapidly changed tourism into a mass phenomenon. The mass arrival of tourists on the world stage in the 1950s and 1960s was both facilitated by, and was an outcome of, the supply of rigid, standardised, mass-produced tourism products whose purpose was to achieve returns to scale through the volume of sales. These services were principally oriented towards seasonal and thematically simplified products (summer sun holidays, winter ski vacations and European capital cities). A strong motivator was the desire to escape from work stress and to seek relaxation. This motivation factor, while still important, has gradually weakened as tourists have sought to address a multiple holiday objectives including sun-seeking, relaxation, new contact development, comfort, recreation, activity and distraction.<sup>34</sup> Many tourism products and services have adjusted to these new desires and the emergence of a “new tourism” can be seen in many countries of the OECD (Figure 22).

Figure 22. Evolution of tourism product offerings (Poon, 1993)



As a result of many of the demographic and social trends outlined earlier, production in the tourism sector has become more demand-driven focussing on “custom-tailored”, shorter and high-quality tourism products. Destinations become commodities that can be adapted and interchanged in order to suit new and/or changing demand. Many products, such as “Club Méditerranée” resort-type vacations or tour wholesaler offerings allow for a steady and recognisable level of quality across a range of geographically diverse destinations providing tourists with increased choice – and contributing to greater tourism travel.

34. OECD, 1999.

Another trend that has had an impact on tourism patterns is the relative decrease in repeat visits that has emerged as travellers become more experienced, sophisticated and avid for new experiences. This has further contributed to the development of destination networks by some actors in the tourist industry. In these, tourists become repeat patrons of a company while continually changing their holiday destinations.<sup>35</sup>

Other trends leading to changes in tourism product development include (excerpted from OECD, 1999):

- *The trend towards a "second home"*  
People want comfortable holiday accommodation that combines refuge qualities with maximum convenience.
- *The trend towards sunny destinations*  
People want guaranteed sunshine, especially in a wet and foggy winter.
- *The trend towards cheap trips*  
People want low-priced products; a trend that is fuelled by low-budget packages and growing market transparency.
- *The trend towards spontaneous decisions*  
People want trips that can be booked at the last minute or even second, that are cheap and include a surprise effect.
- *The trend towards more mobile travel behaviour*  
People want products that offer lots of different destinations as their main attractions.
- *The trend towards more frequent and shorter trips*  
People want trips for a quick change of scene (over the weekend or on public holidays).

#### **4.2.3 General trends in the structure of the travel and tourism sector: globalisation, integration and consolidation**

The second half of the 20<sup>th</sup> century has seen a rapid acceleration of international trade in goods and services, capital movements, corporate alliances and mergers, technological exchange and a general increase in the interdependence of national economies on a global scale. This process of globalisation serves both as a backdrop to changes in – and as a characteristic of – the tourism sector.

One outcome of this trend, coupled with the rise in international mobility facilitated by air travel, has been for destinations throughout the world to compete directly for tourists. This competitive pressure has led to a blurring of lines amongst different tourism service providers and between these providers and tourism product distribution networks. This blurring occurs in a number of ways, *e.g.* operators vertically integrate in order to better control costs and gain new markets, wholesalers seek to package different services into single tourism products and airlines seek to gain market shares through alliances with other airlines serving different geographic bases. It is not uncommon for airlines to own hotels, for tour operators to lease aircraft and for tourism wholesalers to own travel agent distribution networks. The overall result has been that prices have generally decreased for equal or better quality services and that tourism products have become more far-ranging and resistant to price changes in any one of the individual tourism trades.<sup>36</sup>

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35. OECD, 1999.

36. OECD, 1999.

**Major Components of the Tourism Industry Impacting Travel**  
**(adapted from WTO, 1997)**

*Transportation Services*

Without transport services, there can be no tourism. These services enable tourists to reach their destinations and move about freely once there. The efficiency, comfort and safety of transport have a major impact on the quality of the tourism experience. On the other hand, the transport services used and the distances travelled have, as detailed in Section 3, a strong incidence on the overall environmental impacts stemming from tourism. The most important modes of transport for tourism purposes are – in decreasing importance – automobiles, air, coach travel, rail and water-based transport.

*Automobile services*

Automobiles do not constitute a transport service per se as most tourists driving on holidays use their own cars. Car rental companies are, however, major transport service providers that often package their services jointly with air and – to a much lesser extent and principally within Europe – rail travel. Joint packaging of “Fly and Drive” services may make it more difficult for travellers to use local rail or public transport modes, if the latter exist and if the former were so inclined.

*Air travel*

The airline industry represents the largest tourism transport service provider. It can be broadly broken down into scheduled carriers, which account for the majority of air travel and charter or leisure airlines. The latter account for a significant share of seasonal and/or regional traffic, particularly in Europe where charter air travel is projected to account for more than today’s combined transatlantic and transpacific air travel by 2020. European charter travel is often packaged with accommodation and other tourism services as an integrated tourism product. Scheduled airlines are operating in a progressively more deregulated environment with a move to more open access to national markets and an acceleration away from state ownership of airlines and airports. Airline markets have become global in nature and strongly competitive. The practice of yield management where fares are more precisely set to actual demand conditions has been one outcome of these trends. For the tourist, this has resulted in lowered fares as reduced prices for leisure air travel have been compensated-for by price premiums in the relatively inelastic business travel market. Another outcome of global competition in the airline sector has been the emergence of new global airline alliances. These have come about as airlines have sought access to other airlines’ regional markets rather than developing this capacity themselves. Better co-ordination and seamless ticketing among alliance members is expected to lead to greater overall travel – especially for long haul routes (Rolls Royce, 1998, 1998). Another major trend in air travel has been the rise of travel delays due to airport and route congestion. Responses to this problem have included a move towards larger aircraft for certain congested routes, air traffic routing improvements and a shift towards secondary airports and, in some cases, other travel modes for short haul traffic.

*Coach and Bus travel*

Coach travel represents an important tourism-related transport service throughout the OECD. This service can take the form of either scheduled intercity bus routes or charter coach services. The latter are often packaged together with hotel accommodation, meals, and entrance fees for tourist attractions and guide services. Coach travel is usually more flexible and less expensive than comparable travel packages built around rail transport.

*Rail*

International tourism initially was highly dependent on rail networks to open up mass markets through the

1950s. Rail's ability, however, to move many people over large distances quickly and inexpensively was overtaken by the introduction of jet travel in the 50's and, later, by wide-body intercontinental aircraft. In terms of volume, rail travel for tourism is extremely marginal in North America and falls significantly behind car, air and coach travel in Europe (Figure 10). Currently in Europe, rail travel is considerably hampered in its ability to attract further tourism traffic because of the lack of an interoperable and co-ordinated network for international travel. Except for a small number of cases, the rail sector is dominated by State-owned enterprises that are only now undergoing tentative steps towards deregulation. One outcome has been the splitting of infrastructure and track maintenance responsibilities from the commercial operation of trains. Tourism travel by rail concerns mainly domestic travel in a number of European countries and Japan. In these countries, the introduction of high-speed intercity connections has allowed rail travel to gain some ground on short-distance feeder air travel.

#### *Maritime Transport Services*

Until relatively recently, maritime transport was the only way for travellers to visit overseas destinations. Now however, there exist very few long-distance passenger lines as these were quickly replaced by air travel. Short-distance passenger services such as ferries still play an important role in certain areas (*e.g.* cross-Channel traffic and some parts of Scandinavia and Greece) and are often used in conjunction with car travel. The most important development in maritime transport in the tourism sector has been the rapid development of cruising as both a form of transport and as an integrated tourism product combining air travel to and from the port of embarkation, the sea voyage itself, accommodation, food and entertainment services. North American cruise operators currently dominate the market although the popularity of cruise vacations is growing in Europe.

#### *Accommodation Services*

Although accommodations do not themselves directly impact tourism travel, they do have an indirect influence on tourism destination choice. The majority of accommodations available to tourists are in privately owned independent hotels. One third of these hotels book directly with the client while the other two thirds are handled by marketing consortia, travel agents or tour wholesalers. The international hotel chain is also an important segment of the hotel market that traditionally targets the business traveller. These hotels are often either owned or operated in close partnership with airline companies. Resorts and time-share properties also represent important tourist accommodations that are centered on longer-term and activity-oriented stays. Resorts are often marketed as all-inclusive packages that include air travel to and from the destination. Another important accommodation sector is privately owned secondary residences. These tend to anchor household travel for principal vacations.

#### *Travel Intermediaries and Distribution Systems*

##### *Tour Wholesalers*

Tour wholesalers design, prepare, promote and sell tour packages. They do this by taking advantage of economies of scale realised through the purchase of a large quantity of tourism services from a number of suppliers (*e.g.* air travel, hotel rooms, meals, guide services, *etc.*). These packages are sold to tourists through travel agencies who, in some cases, may themselves be owned by the tour wholesalers. Wholesalers are usually able to offer tourists vacation packages that are significantly less expensive than if the tourist had arranged for its separate components directly. Margins are usually tight in this sector rate a high volume of sales in order to reap profits.

##### *Tour Operators*

Tour operators, as their name suggests, are concerned primarily with the operation of tour packages in tourism destinations. They are responsible for the delivery of the ground-based components of a tour to the tour buyer (who may be a tour wholesaler, an airline, a hotel, *etc.*) The distinction between tour operators

and tour wholesalers has become blurred as tour operators have designed, sold and carried integrated vacation packages. The emergence of “group inclusive tours” that are comprised of essentially the same product offering as that of tour wholesalers, is evidence of this trend. The United Kingdom and Japan are major markets for these type of products where they accounted for 63% and 57% respectively of the outbound holiday market.

#### *Travel Agents*

Travel agents principally serve as intermediaries between individual travellers and tourism service suppliers such as airlines, hotels and car rental companies. They also serve as an important intermediary between tourists and tour wholesalers and operators. They are often the first and main contact tourists have with different suppliers and wholesalers. Their principal source of income is from commissions off the sale of travel products, and in particular air travel products. While most agency clients already have a destination in mind when they arrive, undecided clients and purchasers of tour packages are often strongly influenced by the travel agent’s suggestions.

#### *Computerised Global Distribution Systems (GDS)*

An important element in the distribution of tourism services are centralised reservation systems. These initially started in the 1960s as closed internal reservation systems for airlines and it was only in the mid-70’s that these were progressively opened up to other airlines and travel agents. Other service providers such as hotels and car rental companies later joined as these systems became more interconnected through a series of mergers, acquisitions and alliances. These systems are gradually becoming open to the general public through the bias of internet portals and have given new power to travellers to tailor their holidays to their specific needs. Internet access to airline reservation systems has also opened new possibilities for extremely discounted last-minute air travel, which, insofar as they avoid planes flying with empty seats, do not necessarily have a negative environmental impact.

#### *National Tourism Organisations*

The degree of government involvement in tourism varies across the OECD although there is a general trend for governments to divest themselves of any direct control over the sector. Most countries and/or regions, however, do have government departments or agencies that seek to promote international in-bound tourism. These agencies work in partnership with the private sector to carry out market analysis and develop marketing campaigns designed to draw visitors to the country. These campaigns can be quite effective in certain cases although there is still debate on the necessity for governments to carry out this promotion. Governments generally view these efforts as necessary since international inbound tourism has a positive effect on trade balances and can serve to boost employment.

## 5. OPTIONS FOR REDUCING THE ENVIRONMENTAL IMPACT FROM TOURISM-RELATED TRAVEL

### 5.1 Options targeting households: vacation frequency and destination choice

As outlined in Section 3, the environmental impacts from tourism-related travel are related to the frequency of departure and the destination choice. These two issues arise upstream in the vacation planning process and involve decisions made at the household level. However, directly targeting the frequency of departure and/or choice of destination through limitations on travel or restrictions on destination choice is not a realistic option (although several OECD countries have, in the past done both). Nonetheless, there remain several indirect strategies for influencing the departure rate and destination choice that should be further explored if countries wish to reduce the impact of their citizens' travel. These include:

- *Providing information on the environmental impacts of travel*

Tourists invest themselves in their destination choices are generally receptive to and/or pro-active in seeking information about possible destinations. This would seem to indicate that there exists a "window of opportunity" to provide information about the environmental impacts of different travel choices. Especially since "green" or "eco-tourism" – tourism with an environmental connotation represents a rapidly growing segment of the tourism market. "Green" tourism marketing, however, typically only concerns environmental aspects of tourism in destination areas and not travel to and from these areas. Furthermore, "green" tourism, despite its growth, remains a niche market in the industry. Most tourists environmental concerns are limited to the cleanliness of destinations and the preservation of picturesque landscapes/cityscapes. Travel industry studies indicate that tourists are generally not aware nor overly concerned with the impacts of their travel.<sup>37</sup> It is therefore unlikely that providing information about the travel and environmental impacts of destination choice will have a significant effect on reducing the environmental burden of tourism travel without a broader, long-term effort to raise awareness on the impacts of all forms of travel. Nonetheless, information about travel alternatives within certain destinations can prove to be effective since the use of these heightens the overall attractiveness of the destination (*e.g.* bicycles in resort areas, public transport in European capitals, *etc.*...).

- *Promoting other forms of leisure activity*

Disposable income and available leisure time contribute to tourism travel. Reducing the amount of either of these by facilitating other forms of non-tourism leisure activities might represent a way for people to voluntarily forego long-distance tourism travel. Strategies might include developing closer-to-home leisure destinations like urban and/or regional parks or promoting secondary home ownership. Indeed countries with a high incidence of secondary home ownership (*e.g.* France and Italy) have relatively less international tourism travel than other countries. Linking these two phenomena, however, is not a straightforward affair, as these countries also have very strong domestic tourism resources. Nonetheless, secondary homes can reduce disposable income and do tend to take up

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37. Consumer behaviour in Tourism, 1999.

a fair amount of vacation time. Promoting secondary home ownership can have a negative impact on rural development in some cases (by putting housing markets out of reach of local populations) and can lead to international travel when people purchase secondary homes in foreign countries.

- *Promoting domestic tourism*

Countries promote domestic tourism for a number of reasons . These include a need to retain a favourable trade balance (overseas tourist travel is considered an import in that the other countries are the beneficiaries of international tourist spending), the will to reduce the national tourism industry's vulnerability to variations in international tourism flows and the will to use tourism as a rural development strategy. One positive outcome from successful attempts to strengthen domestic tourism is that people generally have a wider range of closer-to-home destinations to consider when making their vacation decisions. It is not clear, however, whether people will act on these if they can travel to far-off destinations that offer, at the same or lower price, sought-for features (*e.g.* beach holidays in the winter) that cannot be found at home. Furthermore, in the United States, Canada and Australia – all countries with high levels of tourism travel – domestic tourism can still involve considerable travel distances by air. Even within Europe, there has been a sharp rise in the amount of domestic air travel. Finally, efforts to promote domestic tourism by improving tourism infrastructure and developing tourism resources will likely lead to increased in-bound international tourism thus mitigating the overall environmental impact from hypothetical reductions in out-bound travel.

- *Promoting long stays.*

Promoting longer vacations, while keeping vacation entitlements constant, can lead to fewer tourism trips. However, as pointed out in Section 4, there are strong countervailing trends against this. Policies would have to address these if they were to seek to reduce the frequency of tourism trip-taking by, for example, setting up labour codes that allow for flexibility in working arrangements while guaranteeing access to uninterrupted vacation time. Incentives for longer holidays might include digressive value-added or visitor taxes based on length of stay. Changes in revenue streams, especially flowing to local communities from the room taxes, would have to be compensated-for.

## **5.2 Options targeting travel modes**

### ***5.2.1 Options for reducing the environmental impacts of tourism-related maritime transport***

Options for reducing the environmental impact from maritime leisure transport are relatively limited as these impacts are low to start with. These measures would focus on ensuring a general decline in the sulphur content of shipping bunker fuels and addressing the introduction of non-native species into new habitats by curtailing the practice of changing ballast water while at anchorage. Other measures would tighten control and monitoring of effluent discharges by ships, especially at ports of call. Generally, however, these measures would only have limited impacts in reducing the overall environmental impacts from the cruise ship package holiday if no measures were introduced to curb emissions from air travel to and from the port of embarkation. These measures are discussed in Section 5.2.3.

### ***5.2.2 Options for reducing the environmental impacts of tourism-related ground transport***

Most tourism travel is by car over short-to-medium distances. It involves relatively high load factors for both automobile and coach travel. The environmental problems stemming from ground transport for tourism are mainly localised in tourism generating urban centres and tourism destination areas. For many of the latter, these impacts can be generally characterised as “more of the same” – that is,

tourism traffic accentuates many of the same environmental problems already associated with the operation of motor vehicles (noise, land-take, surface water run-off and air pollution). However, many tourism destination areas are not equipped to deal with the massive seasonal variation in motor vehicle use and lack comprehensive plans and alternative transport possibilities address the problem. On a global scale, insofar as leisure transport is an important element of overall transport activity (up to 50% of trips), the CO<sub>2</sub> emissions from ground transport for tourism can be significant (yet difficult to distinguish from other non-tourism leisure CO<sub>2</sub> emissions).

### *Technology*

Changes in automobile technology and fuels have led to significant improvements in the environmental performance of cars on a per vehicle basis. This has especially been the case for reductions in lead, NO<sub>x</sub> and VOC emissions. Fuel efficiency has improved and a decrease in per vehicle CO<sub>2</sub> emissions has been observed. These improvements, however, have been eroded by increases in overall travel volumes and vehicle weight. Thus, despite a drop in NO<sub>x</sub> and VOC (both ozone precursors) emissions, many urban areas and heavily-visited tourism destinations (especially in enclosed mountain valleys), are expected to continue to experience health- and ecosystem-damaging peaks in ozone concentration. Noise and particulate emissions (especially ultrafine particles) will also continue to be a problem although, in the case of noise, rail transport will also be a major source in certain areas.

Planned and expected changes in technology, such as the spread of latest generation fuel efficient cars, “clean” diesel engines equipped with catalysts and particle traps, hybrid engine vehicles and eventually fuel cell technology will greatly contribute to reduce the impacts from motor vehicle use. These improvements, however, may be offset by a general rise in travel volumes associated with the rise of short break holidays and will take time to have an impact as these new technologies work their way into the overall vehicle fleet. There are few technology-oriented policies for tourism-related motor vehicle that are specific to the tourism sector. Rather, general policies that facilitate the development and uptake of these new vehicles (*e.g.* research, “green” fiscal measures, instruments aiming to accelerate fleet turn-over, vehicle emission testing, *etc.*) should be pursued since these will have an impact on the environmental performance of vehicles used for tourism travel. One possible exception might be a special focus on reducing emissions from buses and coaches since these have a particular incidence on air quality in a number of tourism destinations.

### *Demand management and modal shift*

It is generally recognised that technology, alone, will not be sufficient to reduce the environmental impacts stemming from motor vehicle use to a level compatible with sustainable development. Managing demand for tourism-based motor vehicle transport is as important a strategy as focusing on supply-side technology issues. The underlying assumption of most demand management approaches is that transport systems ultimately serve to provide *access* to people, places and goods, rather than to simply move people about. While mobility is an important component of providing access, it (and car-based mobility in particular) is not the only way to ensure that citizens have high levels of access.

Demand management instruments for tourism can be effective in reducing many of the environmental impacts from car traffic in tourism destinations. Examples of existing or planned demand management instruments include the provision of outlying coach and tourist parking coupled with efficient shuttle services, the creation of adapted public transport passes, information about public transport services, outright car bans, differential road or area pricing and dissuasive parking policies. A recent survey of 214 popular tourism sites throughout France found that 55% of these had implemented a parking

policy for tourist cars, 36% have or are planning on implementing a parking policy for coaches and 38% have developed or are will soon be developing a comprehensive plan to address overall traffic impacts from tourism.<sup>38</sup>

Many tourism destinations have used demand management strategies and the ensuing reduction of motor vehicle traffic as a selling point since one commonly-cited motivation for tourism destination choice is escaping from the congestion of urban areas. In particular, a number of Swiss and Austrian Alpine tourism destinations have developed and explicitly targeted “car-free” tourism as their marketing strategy. These destinations have implemented a partial or complete ban on car traffic within their communities and have compensated for this with a number of measures aimed at providing high levels of non car-based access and mobility. These destinations seek to co-ordinate the entire network of tourism providers (hotels, transport services, restaurants, cultural attractions, *etc.*) to provide a seamless transport network based on public transport, bicycle/ski and pedestrian access and mobility services (baggage handling, car-sharing, freight and delivery services, information provision, *etc.*). In the most advanced cases, these communities have co-ordinated with tour wholesalers and upstream tourism transport service providers such as railways and coaches to organise and provide a complete car-free door-to-hotel-door-and-back transport chain.<sup>39</sup>

### 5.2.3 *Options for reducing the environmental impacts of tourism-related air travel*

As outlined in Section 3, while a large majority of tourism trips are not by air, this form of transportation contributes disproportionately to the environmental – especially the climate change – impacts of tourism travel. A range of options exists to address these impacts as outlined below. Technology and air traffic control measures principally target the environmental performance of aircraft while modal shift measures and certain pricing options tend to target overall levels of traffic. However, given the large projected growth rates and climate change impact of aviation, it is doubtful that any of these measures, in isolation, will be sufficient to significantly reduce environmental impacts from aviation. Furthermore, if a strong reduction in radiative forcing from aviation is targeted by governments, it is unlikely that technology, flight control and mode shift measures will be sufficient.

#### *Technology*

Latest-generation commercial jetliners are approximately 70% more fuel efficient on a passenger kilometre basis than 40 years ago. These past improvements have been led by improved engine design and, while engine improvements will continue to be a source of increased efficiency gains, better airframe design will play a larger role in future efficiency improvements. However, because of the long lifetimes of aircraft and the low replacement rates within the global aircraft fleet, these technologies will take some time to penetrate and have an impact. Overall improvements in aircraft efficiency will be of the order of 1% per year.<sup>40</sup>

Currently aircraft emissions are only regulated for the landing and take-off cycle. As a result engine makers have focussed on developing new technologies that reduce these emissions (mainly NO<sub>x</sub>). However, there exists a trade-off between NO<sub>x</sub> reduction and CO<sub>2</sub> emissions. At present, without advances in engine combustion chamber technology, any increase in the fuel efficiency of aircraft engines

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38. AFIT, 1998.

39. BUMWAL, 1999.

40. IPCC, 1999.

will lead to increased NO<sub>x</sub> emissions while any effort to reduce NO<sub>x</sub> emissions will lead to increases in CO<sub>2</sub>. Another trade-off to consider is that more fuel efficient engines tend to have lower-temperature exhaust which, for the same water content, leads to increased contrail formation. It seems that in the short-run, technology policies seeking to address the range of climate change impacts from aviation should seek to break the inverse correlation between energy efficiency and NO<sub>x</sub> emissions through innovation in engine design technologies. Longer-term possibilities include radically changing aircraft engine design away from a dependence on kerosene towards alternatives such as hydrogen. Although such a switch would eliminate in-flight CO<sub>2</sub> emissions, water vapour would continue to pose a potential problem. Furthermore, as in the road sector, it is not entirely clear that the overall lifecycle CO<sub>2</sub> impact would be reduced substantially from the present depending on the way in which the hydrogen is produced.

### *Air traffic control*

For a number of operational, safety and military reasons, commercial flights rarely follow efficient point-to-point routing. By addressing some of the contributing factors (by, for example attributing militarily-restricted airspace on a real-time or daily basis or implementing free-flight rules in uncongested corridors), changes in air traffic control could lead to a 6% to 12% increase in fuel efficiency. Furthermore, more precise navigation information regarding humid air layers could lead to reduced contrail formation which, despite increasing fuel use and CO<sub>2</sub> emissions, would in many cases lead to an overall decrease in radiative forcing. Many air traffic control authorities are already considering a number of changes in order to reduce the incidence of congestion, air travel delays and costs to airlines. If air traffic control authorities receive no clear mandate to address radiative forcing arising from flight mission control, it is unlikely that any air traffic control improvements will contribute significantly to reducing the radiative forcing impact of aviation. Indeed, recent evidence indicates the contrary where, for example, time saving flight paths are given at lower altitudes leading to increased fuel use and CO<sub>2</sub> emissions.<sup>41</sup>

### *Regulatory and market-based measures*

The IPCC has reviewed a number of potential economic instruments for reducing the environmental impacts from aviation including the following (excerpted from IPCC, 1999):

- a) Fuel taxes and charges/levies aiming to stimulate fuel efficiency improvements and reduce overall demand.
- b) Emissions charges aimed at encouraging adoption of lower emitting technologies and/or practices.
- c) Emissions trading to encourage emission reductions through market forces.
- d) Ticket taxes or charges.
- e) Levies on empty aircraft seats to promote higher load factors.
- f) Levies on excessive traffic per destination, destinations served, or type of equipment serving a destination.
- g) Levies on route length to reduce the number of flights that are less than a minimum distance.
- h) Subsidies or rebates to act as an incentive for polluters to change their behaviour.

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41. CNN, 2000.

One important element of any levy or charge will be its capacity to provide specific signals regarding the entire range of aircraft emissions contributing to radiative forcing rather than focussing on CO<sub>2</sub> alone. One prospective German study has proposed a differentiated levy package addressing CO<sub>2</sub> and NO<sub>x</sub> emissions and contrail formation that would provide incentives to account for trade-offs in emissions and reduce the overall radiative forcing from aircraft.<sup>42</sup> Most studies and/or experience with charges/levies have a more limited scope as they typically consider only one target (*e.g.* Fuel use/CO<sub>2</sub> emissions, NO<sub>x</sub> emitted in the landing and take-off cycle or noise).

Studies carried out by the OECD and the Dutch Centre for Energy Conservation and Environmental Technology (CE) have concluded that taxes and levies resulting in fuel price increases have relatively less impact on travel demand than they do on increased fuel efficiency. In the short-term, airlines will seek to pass on increases in fuel prices to business travellers whose demand for air travel is relatively inelastic and cut non-fuel costs elsewhere. Furthermore, as outlined earlier, the vertical integration of the tourism industry enables tourist wholesalers to compensate for transport price increases by reducing the prices of other components of the vacation package. These studies conclude that relatively large increases in fuel prices would only serve to offset approximately one year's growth in travel demand under current trends while more than a doubling, yet would have a proportionally higher effect on the development and uptake of more fuel efficient technologies and practices.<sup>43,44,45</sup>

Another study carried out by the International Civil Aviation Organisation (ICAO) investigating the potential economic impacts and environmental effectiveness of environmental levies concluded, unlike the findings of the previous two studies, that increases in prices would be passed on to all airline customers resulting in a subsequent decrease in demand. The study also found that price increases would have a supply-side impact, although to a lesser degree than the OECD and CE studies. Finally, the study points out that insofar as a portion of these price increases cannot be passed on to customers, airlines will have to pay for these out of their profits which will reduce their capacity to invest in new, more efficient aircraft and engines.<sup>46</sup>

Finally, an important aspect to consider when developing pricing instruments for aviation is the geographical scope of the instrument. International treaties and negotiated bilateral agreements exempt fuel from being unilaterally taxed on international flights. However, within a region such as the European Union, there exists the possibility of reaching a common accord on kerosene taxation. Furthermore, existing international aviation law tends to discourage – but not prohibit – the application of environmental or service levies and charges. For a charge to be effective and not lead to competitive disadvantages, it is important that the geographic scope of application be as wide as possible.

### *Modal shift*

In the relatively long-term, if aviation came under strong pressure to reduce its contribution to radiative forcing, it is possible to envisage the return of ocean liners (albeit at higher speeds and fuelled by hydrogen) to handle some of the demand for intercontinental travel. While these journeys would be on the order of 5-7 days and would entail less frequent cross-ocean trips, the possibility of using much of this time

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42. Brockhagen, 1999.

43. OECD, 1997.

44. IPCC, 1999.

45. CE, 1998.

46. IPCC, 1999.

for productive work purposes because of efficient communication and computing technologies make oceanic liners an interesting possibility for long haul travel.<sup>47</sup> In the short- to medium-term, however, there exist no travel modes that can effectively replace long haul air travel. Discussions of mode shift possibilities for aviation therefore focus on short haul travel. The IPCC concluded that the overall scope for replacement of short haul air travel with its next-most competitive mode – high speed rail - is ~10%.<sup>48</sup>

In Europe, many airlines face pressure to switch short haul slots at congested airports to long haul flights which represent the most profit-making routes and quickest growing traffic segments. One result has been the emergence in Europe of increased co-operation between airlines and rail operators (Lufthansa-Deutsche Bahn, KLM-NS and United Airlines-SNCF). These partnerships take advantage of well-developed high-speed rail connections to replace short haul regional feeder travel<sup>49</sup>. This trend confirms that high speed rail in Europe is competitive with air travel over distances up to ~500 kilometres. Given that Eurocontrol, the European Air Traffic Agency, estimates that almost 50% of European air traffic involves flights of less than 500 kilometres, this indicates considerable potential for substitution as high speed rail networks develop. Similarly, in Japan, the extensive high-speed rail network has been singled out as a factor in limiting the development of regional airlines.

Notwithstanding this potential, the likely net effect of substitution of rail for short haul air travel may be increases in long haul aviation travel as short routes are replaced by long distance flights<sup>50</sup>. Furthermore, because short haul flights tend to fly at lower altitudes, they contribute less to the non-CO2 (especially NOx and Contrail formation) radiative forcing impacts of aviation. Despite the aforementioned trend in more efficient engines producing cooler exhaust at lower altitudes (and thus more contrail-forming condensation) and the overall fuel use (and corresponding CO2) penalty from flying at these lower altitudes, it is likely that reducing short-haul flights will not result in a proportional reduction in the radiative forcing impact from aviation.

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47. CST, 2000.

48. IPCC, 1999.

49. Rolls Royce, 1998.

50. Robinson, 1999.

## 6. CONCLUSIONS

This case study on the environmental impacts from tourism-related travel has sought to describe general trends in tourism activity and specific trends relating to travel for tourism purposes and relate these to the decision-making processes of households regarding their vacation choices. In order to understand how to develop policy responses aiming to reduce the environmental impacts from household consumption in this sector, it is important to understand to what degree travel for tourism constitutes a problem, to what extent the *structure*, as opposed to the *scale*, of tourism related travel contributes to environmental impacts, to what extent households can make effective and meaningful decisions to reduce these impacts and to what extent governments can play a role in reducing tourism travel's environmental burden. These conclusions are summarised below:

### 6.1 Extent of the problem

Tourism-related travel represents an relatively important source of transport energy use and CO<sub>2</sub> emissions, although certainly not as large as other forms of travel. The environmental impacts range from moderate, concerning climate change, to locally acute, concerning more classic vehicle pollutants. However, projected growth in tourism-related travel – especially longer distance travel by air – will only increase the importance of this form of travel from an environmental policy stand-point. As far as the relative impacts of travel vs. other tourist activities are concerned, tourism-related travel represents the most important source of energy use and greenhouse gas emissions from the sector.

### 6.2 Scale and structure

These are related insofar as current trends in tourism travel point to a rise in the number of departures (structure) by aeroplane (structure) to far-off destinations (scale). Concretely, long-distance travel seems to be more a cause for concern than short distance travel despite the fact that short distance trips are much more numerous. Travel by air places more of a burden on the environment than does any other mode – principally because of the distances travelled and the amount of mid- to upper- level emissions of climate-affecting compounds. Policy responses will have to address trends in these two areas if they wish to curb the overall environmental impacts stemming from tourism travel.

### 6.3 Role of households

Households have a relatively large degree of control the frequency of their tourism trips and almost complete control over their destination choices. A number of factors come into play in these decision-making processes including the desired attributes of their vacation experiences and the relative prices of securing these. Tourists also invest themselves quite heavily in searching for information about their vacation options. All of these factors indicate that, given information about the travel impacts of their destination choices and information about alternative destinations and/or modes that might satisfy their desires, households might change their trip-making patterns. However, tourists are typically not looking for such information and even if they are open to re-evaluating their destination choices based on the

environmental impact of travel there and back, typically rank such concerns after a number of other factors relating to the features of various destinations. Furthermore, trends in tourism travel develop against a backdrop of trends in economic activity, demography and social development. Information about tourism travel environmental impacts, alone, will likely be able to counter these since they are strong, pervasive and bring about multiple benefits. However, the provision of such information, when coupled with longer-term and more pervasive feed-back about transport choices generally should not be ignored.

Households also make their decisions within a framework where many costs are external to the price structure of the tourism market. This is especially true for the external climate costs of air travel and, to a certain extent, the external costs of tourism transport in many tourism destinations. As long as market pricing or government regulations fail to account for these market failures, household decision-making will be biased against reduced environmental impacts.

#### **6.4 Role of governments**

Governments help to set the general framework in which households make their tourism choices. They do this through actions concerning the degree of market openness, through labour policies, through the setting economic orientations, through the provision of transport infrastructure and through assistance to the tourism industry. Most of these actions (with the exemption of the latter) have indirect impacts on the frequency of household trip-taking and tourism destination choice. Given the large and growing importance of environmental impacts from tourism travel, governments can and should improve their accounting-for tourism travel when making policy decisions (*e.g.* when modifying tax codes, labour laws, *etc.*). When looking at the integration of environmental concerns into sectoral policies, impacts on the scale and scope of tourism travel should be accounted-for.

This will likely prove to be difficult since governments typically view tourism as a relatively environmentally benign sector of the economy (compared to industry, energy, urban transport, *etc.*), that generates tremendous amounts of economic activity and in-flows of foreign exchange. Many National Tourism Organisations have as a stated goal to contribute to a favourable balance of trade by maximising the ratio of incoming versus outbound tourists. In a situation where these strategies contribute to growth in international aviation and where there is no accounting for international greenhouse gas emissions from this mode, this can lead to policies that generate new emissions while simultaneously extracting them from international monitoring processes. Assigning responsibility for the radiative forcing impact of aviation represents a key hurdle to overcome when developing government responses to reduce the environmental impacts of tourism travel. Generally, governments should make a proper accounting of the climate impact of tourism (including tourism travel) when evaluating the costs and benefits of the tourism sector. Finally, all OECD countries have developed policies to reduce the environmental impacts of ground-based transport and these should be pursued and extended to take into account the specific impacts and characteristics of tourism travel.

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