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Background for scenario making

Sustainable Destination Norway 2025

John Hille, Marte Lange Vik and Paul Peeters



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Preface

Scenario planning was originally developed as a tool in the 1970s in order to better understand the consequences of extreme business situations as well as the outcome of different development pathways. In tourism, scenarios have been used for destination planning for at least 20 years, beginning with the advocacy of “alternative” tourism planning models in the late 1970s and early 1980s and the subsequent emergence of “futures research”. In recent years, models have become ever more important in tourism studies: they are needed to deal with uncertain futures, considerable investment risks, and to facilitate policy-making.

Progress has recently been made to develop a new generation of highly complex, integrative, hierarchical, dynamic, and partially even adaptive models, which can be used for forecasting as well as backcasting, and which can combine qualitative and quantitative aspects of tourism development. These models use innovative scenario building techniques and have evolved into strategic, often online-based tools for planning. Areas that have been covered include, for instance, transport and mobility developments, climate change, greenhouse gas mitigation, or conservation.

Within the Sustainable Destination Norway 2025 project, our main ambition has been to make use of this progress in modelling and to employ scenarios as strategic tools to outline the consequences of different development pathways. At the time when the project was planned, two ambitions still dominated Norwegian politics: a) to increase tourist numbers by one million, and b) to become a climate-neutral country. These automatically became important focus points of the model, as the potential conflict between increasing tourist numbers and reducing greenhouse gas emissions is obvious: it was hoped that insights could be derived from modelling for policy makers. As a third parameter of relevance, we chose “turnover” as an output variable. After all, the purpose of tourism for the national economy is to generate jobs and income. Equipped with this, a complex model was constructed; a considerable effort that is no longer comprehensible looking at the outcome, a smooth, user-friendly surface with buttons and switches hiding equations and interrelationships, designed by our Dutch partners.

The model was presented at the third Balestrand summit in May/June 2010. As expected, participants had no difficulties to understand and use the model. Unexpected were only the results, which clearly indicated that whether this is public policy or not, international tourist arrivals in Norway will increase by more than a million. And emissions from tourism will continue to grow along with turnover. More details will soon be published. Irrespective of results, it is fair to say that our scenario building exercise has been a success, and that the potential of modelling in tourism to address complex and uncertain futures is enormous. We hope to continue our work in this direction in the near future.

Sogndal, January 20, 2011

Stefan Gössling

Project leader

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1 Introduction

In order to model the tourism scenarios developed for the Sustainable Destination Norway (SDN) study, a range of historical data on domestic and international tourism in Norway, on the Norwegian tourist industry and on various background trends were required. This report documents the input data that were used for the scenarios and their sources.

Ideally the scenarios should have been based on data covering a 20-year period up to their base year, in other words the period from 1985-2005, with data points for each year. However, not all data were available for the whole period or at annual intervals. This necessitated interpolations, extrapolations or other adaptations which were in most cases performed by the Dutch team in the course of modelling the scenarios. In other cases the input data furnished by the Norwegian team already included some interpolated or extrapolated figures, which are shown in this report.

In some other cases, the data originally requested for the scenarios proved impossible to obtain even for part of the 1985-2005 period. It was then necessary either to rely on proxy data or on combinations of other data and assumptions to arrive at estimates for the parameters required for the scenarios. Such assumptions and the reasoning behind them are explained in the report.

Aside from our own assumptions and more straightforward recalculations – for instance inflation adjustments and currency conversions - the majority of the data were taken either from official Norwegian statistics or from published reports. The main exception concerns some of data from the 1998, 2001 and 2005 National Travel Surveys and the 2006 Foreign Visitors Survey, from which detailed and unpublished tables were provided by the Institute for Transport Economics (Transportøkonomisk institutt).

1.1 Structure of the report

First, chapter 2 gives an introduction to system dynamic modelling and causal loop diagrams which constitute the methodology behind the scenario making in this project,

Then, the input data to the SDN scenarios are presented in seven chapters:

3. Background data. This chapter presents data on Norway's population, GDP, and *outbound* tourism and tourist expenditure by Norwegians. Outbound tourism is not a subject of this study in itself but among the scenario inputs because it has a dynamic relationship to domestic tourism.

4. National Accounts data on tourist consumption in Norway. This chapter presents data from the Satellite National Accounts for Tourism on consumption by foreign and domestic tourists in Norway.

5. Data on the Norwegian transport system, including transport infrastructure, economic data on transport industries in Norway, travel times within Norway, specific emissions from vehicles and fuel prices.

6. Data on tourist accommodation, including economic data on the accommodation industry in Norway, capacity and utilisation of beds, guest nights and specific energy consumption

7. Data on certain other tourist facilities (especially restaurants, museums, alpine skiing facilities and theme parks), including economic data, visitor numbers and specific energy consumption

8. Data on domestic tourism and transport generated (number of trips, estimated distances travelled and modes of transport)

9. Data on inbound international tourism (number of trips, estimated distances travelled and modes of transport, for travel to and from Norway and for travel within the country).

2 The SDN scenario model

The Sustainable Destination Norway scenario model is built as a system dynamics model (SDM). In this chapter, we will give a general introduction to SDMs and a few comments about the specific SDM for the scenario making in this project.

An SDM always calculates the state of system as a function of time. The main objective is to find out how the system (in this case the tourism system of destination Norway) works and reacts to external changes and to Norwegian policies and actions by stakeholders. To create a reliable model the first step is to find out what the main drivers are for the tourism system. It is very important to keep the model as simple as possible. Variables that are of no impact are therefore let out of the model. In cases where there is some impact, we still try to stick to the most significant relations between the variables in the model. In some cases this may mean that we also include variables we assume will become important in the future.

To create a conceptual (mental) model we have used causal loop diagrams (CLD). These diagrams show three elements:

- variables just as a bit of text giving the variable name
- relations between variables as arrows
- loop symbols indicating direction and kind of loop

A CLD gives the unique relations between variables. For instance, Figure 1 shows that if variable 3 is increasing this will cause that variable 2 also increases (because the relation is positive (blue and with a $_+$ sign). If variable 2, increases variable 1 will decrease (a negative relation in red and with a $-$ sign). Loops can be reinforcing indicated with the loop-sign and an R, or balancing, designated by a B. Reinforcing means that an increase in one of the variables in the end means that the same variable will increase as well. Such a loop results in exponential growth. If a loop consists of just positive and/or an even number of negative relations, the loop will be reinforcing. If the number of negative relations is uneven, the loop will be balancing which means that an increase in one of the variables will result in a decrease of the same variable. Balancing loops show exponential decay of a system. By combining positive and negative loops the system development may change from exponential growth to a certain equilibrium state (e.g. S-shaped growth). Most relations will be direct, i.e. when variable 3 changes then variable 4 will change immediately as well. However, some relations will have a time delay as indicated in the example between variable 1 and variable 2. These time delays may cause a system to start oscillating. Some conventions are (see also Figure 1):

- Positive relations are indicated with blue arrows with a $+$ sign
- Negative relations are indicated by red arrows with a $-$ sign
- Reinforcing feedback loops are green and indicated with an 'R'
- Balancing feedback loops are red and indicated with a 'B'
- A loop follows the direction of the arrows and can be clockwise (as for both B1 and R1) and counter-clockwise.
- A relation should always be unique: if you cannot define if a relation is always positive or always negative, then some important intermediate variable is probably missing.

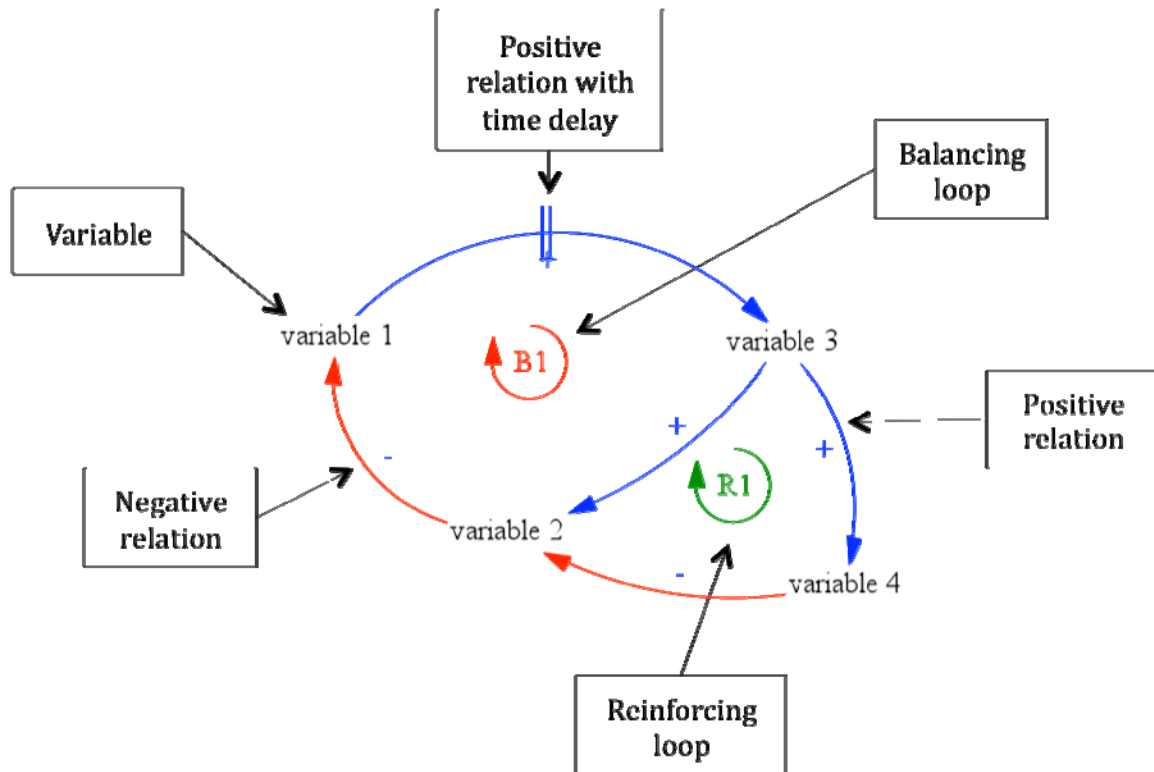


Figure 1: Example and nomenclature of causal loop diagrams (CLD)

After the conceptual model is made, we will start modeling the SDM and fill it with the best statistical data currently available. However, in many cases we will have to make use of relationships between variables that are not directly measured. For example, a basic assumption in tourism models is the assumption that there is a kind of ‘attraction’ that is built up by matters like the quality of nature and landscape, beaches, historic cities, architecture, leisure facilities, accommodations, transport system efficiency, cost, etc and that directly impacts the number of visitors and the share of visitors to Norway on the global tourism market. Hence, the attractiveness of the competitors is important as well. It is clear that no statistical office will be able to provide us with statistics of this attraction. So we will create an attraction index that is impacted by all the relevant variables. The final values of this subjective variable ‘attraction’ will be determined through a phase validating the model.

2.1 The system boundaries

One of the most important decisions when developing a system is to determine the system boundaries. This choice depends on the goals of the model and the main outcomes or insights to be gained by it. For the SDN (Sustainable Destination Norway) project the following objectives were defined:

1. The model must give insight in the development of Norwegian tourism over a period of three or four decades.
2. The model must be able to show the impacts of national policies as:
 - a. Taxes
 - b. Subsidies
 - c. Communication & campaigns to the public
 - d. Marketing of destination Norway
 - e. Infrastructure investments
 - f. Regulation
3. Policy goals for sustainability are specified as a certain reduction of carbon dioxide emissions (for the whole Norwegian economy this is 70% in 2030 and 40% in 2020) and 1 million extra visitors by 2030.
4. The model must be able to show the impacts of external developments (global economy, oil price, global climate mitigation policies, emission trading systems, global tourism market development, technological developments)
5. The model must be able to distinguish between transport modes, accommodation types, tourism regions within Norway, travel distance classes between Norway and place of residence of the visitor or destination of the Norwegian tourist, kind of food (local/import) and purpose of the visit.

The SDN system is fed by policy measures and a scenario of external factors. Both contain thus just exogenous variables like taxes, subsidies, etc in the Norwegian Policy Scenarios and the global economic growth and global tourism development in the Global external factors scenario.

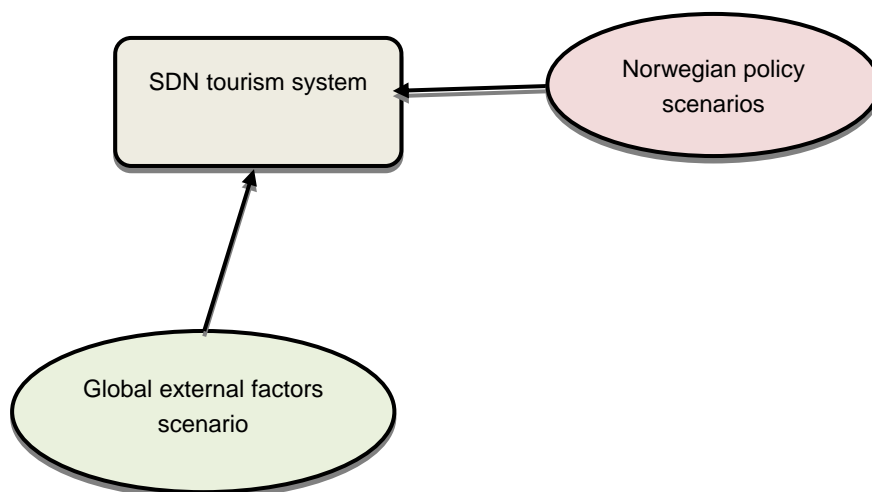


Figure 2: Feeds to the SDN scenario model

This all means that the following is excluded from the SDN system, which means that the values of the variables involved are not generated within the system dynamic model but by the user of the model (*exogenous variables and factors*):

1. All political decisions by local, regional, national and international governmental bodies
2. Global economic growth
3. Norwegian economic growth (excluding the tourism sector)
4. Global resource prices (oil, food, building material, etc)
5. Norwegian resource prices (e.g electricity, gas, diesel, petrol, food, wages, etc)
6. The level of technology of air transport actually applied (impacting on emission factors)
7. The global tourism market
8. The quality of competing destinations (like Sweden, Finland, UK, Ireland)
9. The Norwegian population

Endogenous are the following elements in the SDN model:

1. The quality of destination Norway
2. The capacity of transport systems within Norway
3. The capacity of internationally connecting infrastructure to Norway (roads and rail).
4. The capacity of the hospitality sub sector
5. The capacity of the tourism activities (leisure) sector
6. The number of domestic tourists (Norwegians travelling within Norway)
7. The number of international inbound tourists (foreigners travelling to Norway)
8. The number of outbound tourists (Norwegians travelling abroad)
9. The quality and capacity of nature & landscape

2.2 Main elements and feedback loops

A tourism industry always shows of the same three elements: transport, accommodation and attractors (leisure for holiday makers, but also business partners or some parts of the services sector for business travel and of course family and friends for VFR, visiting friends and relatives, tourism). For these elements we may draw the following simple model:

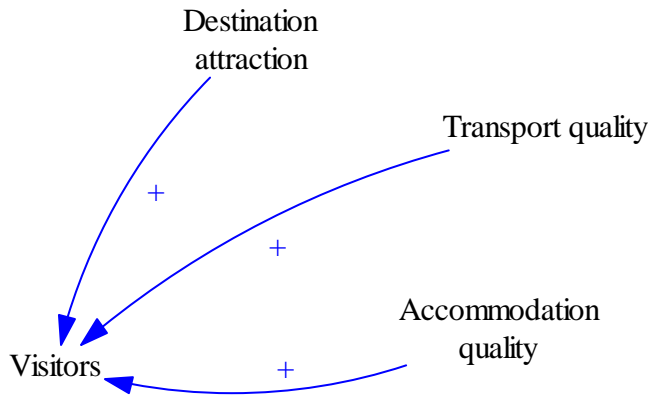


Figure 3: the main tourism system elements

The main strength of system dynamics is its ability to handle feedbacks. Also within the tourism model here are both positive “reinforcing” and negative “balancing” feedbacks. The positive ones are responsible for the growth of tourism, the negative ones may cause stagnation at some moment (the so called Life Cycle Model; see Butler 2006a, Butler 2006b). Universal feedbacks for tourism systems may be depicted as follows (red is balancing or B, green is reinforcing or R):

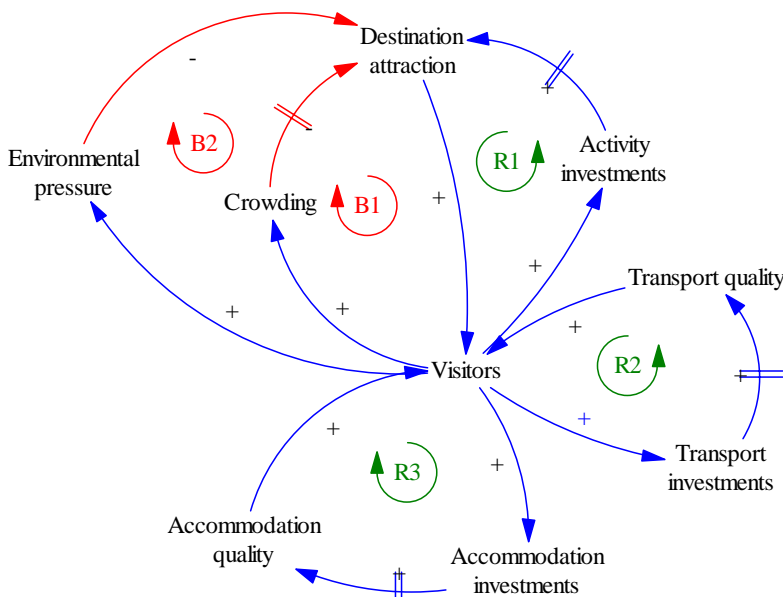


Figure 4: A universal simple tourism destination model

Figure 4 shows three reinforcing and two balancing loops in their most basic form:

1. R1 is the activity loop: more visitors means more profits for a destination, that is invested in more tourism activity facilities (from guided tours in the mountains, whaling excursions to shopping malls and discos).
2. R2 shows the transport reinforcing loop: more tourists will bring funds for investments in airports, railways, ferry systems and roads that will improve the quality and speed (and generally reduce the cost per passenger-kilometre) and thus increase the number of visitors).
3. R3 is the third reinforcing loop through accommodation (and more generally hospitality), like hotels, mountain huts, campsites, but also restaurants.
4. B1 is the balancing loop that may reduce the destination attraction as places or facilities become overcrowded. Specifically for Norway this will be important as many of its visitors seek to experience nature, landscapes and solitude. Crowding feedbacks do also exist for transport, activities and accommodation; we will return to that in the detailed models.
5. Finally there is a balancing loop through damage to the environment. In the simple model there is a direct relation from the number of visitors to environmental quality. In reality the investments in the R1, R2 and R3 loops will also cause environmental pressure. High environmental pressure will reduce the quality of nature and landscapes and thus the attraction of the destination Norway.

2.3 The tourism economy

The contribution of the tourism economy to GDP is – reasoned from the demand-side – the sum of tourism consumption, investments and exports minus imports (WTTC et al. 2009). Within the tourism economy of a country three groups of tourists should be distinguished:

- domestic tourists (Norwegians travelling within Norway)
- inbound tourists (Foreigners travelling to Norway)
- outbound tourists (Norwegians travelling abroad)

In broad terms both domestic and inbound tourists add to the GDP, but outbound tourists do not. The spending of the tourists are a proxy for the added value and thus the contribution to the GDP (WTTC et al. 2009) so as a first estimate we may use the following formula:

$$\text{Total revenues} = \text{domestic revenues} + \text{inbound revenues} - \text{outbound revenues}$$

Of course the absolute value of these revenues is not the same as the contribution to the Norwegian GDP. However, the development of the revenues as index of those for the base year (2005) may give a good proxy for the development of the Norwegian tourism economy. Figure 5 shows the scheme for this.

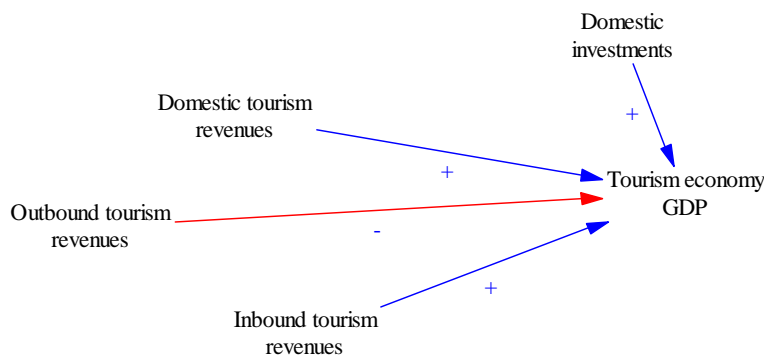


Figure 5: Overview of tourism's contribution to GDP

2.4 General tourism subsectors growth model

The subsectors (e.g., the accommodation sector, transport sector) will be modelled using a more or less standard procedure. The basic hypothesis is that the tourism subsystem consists of a demand part and a supply part that continually interact with each other developing in the destination life cycle S-shaped growth curve (see Figure 6). The demand reinforcing loop (R1) will generally be of a form like: an increase in demand will cause higher profits and investments that increase the capacity, reduce prices, increase attraction and thus attract more demand. But there are limits to growth when the capacity of supply is becoming fully used (e.g. all available beds are occupied or seats in aircraft are booked) and this creates the balancing loop B1. Other limits may be posed by the government (for economic or environmental reasons) or by saturation of the market. There will be large differences between the different subsectors as well.

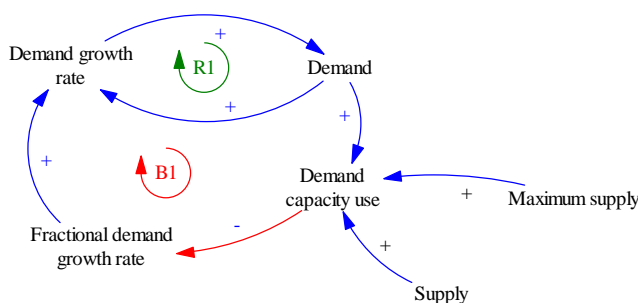


Figure 6: The general conceptual model for S-shaped growth in the sector

2.5 Detailed SDN system setup

As an example of how the causal loop diagrams for the sub sectors are formed, Figure 7 shows our first CLD of the accommodation subsector. Data may of course later be divided into several different sub-subsectors of

accommodations like hotels, hostels, cabins and campsites, but presume that the basic structure of the growth model is the same for all of them.

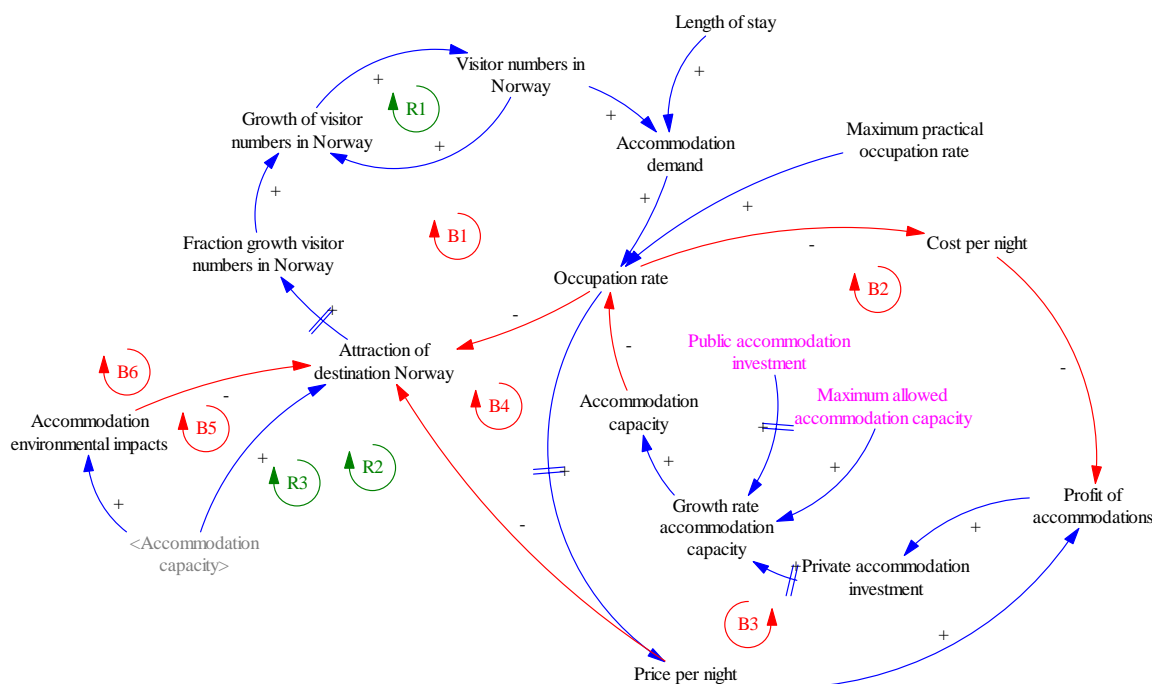


Figure 7: Accommodation sub-system

The growth is generated by three reinforcing loops:

- R1 indicates that a large tourism sector will generate a large absolute number of extra tourists (or loss of such) for a large percentage of growth (fraction growth) than a small one.
- R2 and R3 are the almost identical and run from Attraction of destination Norway through to Occupation rate and then either through Cost per night and Accommodation capacity (R2) or through Price per night and Accommodation capacity (R3). We may designate these reinforcing loops as the cost and the price growth loops

The growth is balanced by six loops:

- B1 is the capacity balancing loop that will stop the growth when the capacity limits are reached (in practice this means that tourists will have difficulty booking accommodations, causing potential customers to go somewhere else).
- B2 is the cost-investment balancing loop where an increase of occupation rate will cause an incentive for investments through cost decrease, which in the end will reduce occupation rate.
- B3 is the same as B2 but then acting through price.
- B4 also acts through price but now as balancing attraction and thus tourism growth.
- B5 and B6 are the longest loops that balance growth through the environmental impacts of growth of accommodation capacity (and use) through cost (B5) and price (B6)

Important time delays exist between:

- Private and Public investments and actual growth of capacity (the time for legal procedures, financing and building),
- Occupation rate and Price (accommodations will not always be able to change their prices immediately after a period with high demand) and
- Attraction of destination Norway and Fraction growth of visitors as implicitly this relation runs partly through word-of-mouth marketing which requires visitors to first tell at home about their positive experience causing generally the following season more visitors to travel to Norway. Also for repeat visitors the experience is required first. Finally information about changes in attraction will always take time to reach potential customers (increasing marketing budgets may reduce this time delay).

The Sustainable Destination Norway system consists of several sub-systems that all have their own dynamic mechanisms. The main sub-systems are:

1. The Transport system
 - a. International transport and access system

- b. Local transport system
2. The accommodation & hospitality system
 - a. Professional accommodation system (hotels, B&B, etc)
 - b. Second homes
 - c. Restaurant system
 - d. Food system
3. The destination attraction system
 - a. Nature and landscape
 - b. The leisure industry
 - c. The business travel attraction
4. The tourism attraction module
5. The tourism emissions module

Specific CLDs are made for all these sub-sectors, and for the sub-sub-sectors which are defined. Put together, all these CLDs form the SDM for the scenario making in this project.

3 Background data

This section presents data on the development of Norway's population and GDP and on outbound tourism by Norwegian residents.

3.1 Population and GDP

Table 1.1 shows the mean population of Norway, GDP in constant 2005 Euros and GDP per capita for each year from 1985-2005. Population figures at 1 January each year were taken from Statistics Norway's Population Statistics¹; the figures are averages of the population on 1 January of the same and the following year. GDP figures in current Norwegian kroner were taken from Statistics Norway's National Accounts²; they were recalculated to constant kroner using the Norwegian GDP deflator³ and then to Euros at a constant exchange rate of € = NOK 8.0073, which was the average rate in 2005 according to the Bank of Norway.

Table 1 Norwegian population and GDP

Source: Statistics Norway: Populaton Statistics and National Accounts

Year	Mean population (1000)	GDP (million 2005 €)	GDP/capita (2005 €)
1985	4 153	139 087	33 491
1986	4 167	144 703	34 726
1987	4 188	147 278	35 167
1988	4 209	147 024	34 931
1989	4 227	148 490	35 129
1990	4 241	151 352	35 688
1991	4 262	156 051	36 615
1992	4 286	161 549	37 692
1993	4 312	166 051	38 509
1994	4 336	174 439	40 230
1995	4 359	181 742	41 693
1996	4 381	191 010	43 600
1997	4 405	201 310	45 700
1998	4 431	206 711	46 651
1999	4 462	210 894	47 264
2000	4 491	217 760	48 488
2001	4 514	222 094	49 201
2002	4 538	225430	49676
2003	4 565	227715	49883
2004	4 592	236514	51506
2005	4 623	242993	52562

¹http://statbank.ssb.no/statistikkbanken/Default_FR.asp?Productid=02.01&PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/MenuSelP.asp&SubjectCode=02

²http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=nr

³ The GDP deflator can be imputed from the annual changes in prices at the source above (Note 2).

3.2 Expenditure abroad by Norwegian residents

Although the focus of the scenarios is Norway as a tourist destination, data on expenditure by Norwegians travelling abroad, i.e. to competing tourist destinations, belong to the background input. Ideally these should also be related to the number of outbound trips. Unfortunately there are gaps in the available data.

The National Accounts provide data on *household* expenditure outside Norway⁴, but not on expenditure by business travellers. Furthermore, not all of the expenditure by households concerns tourism according to the definition in this study, which excludes day trips. Expenditure by Norwegians on day trips across the border to Sweden (and to a much smaller extent Finland or Russia) is considerable because alcohol, tobacco and a lot of foods are much cheaper in neighbouring countries than in Norway. In other words there is a lot of cross-border shopping. Since 2004 Statistics Norway has conducted its own surveys to estimate the amount spent on such day trips⁵. Other sources have made a few estimates for the period since the mid-1990s, including a report to the Government in 2003⁶. Before 1995 we can only guess the amount spent on day trips, but it is a reliable guess that cross-border shopping was very considerably less before Sweden and Finland joined the EU in 1994. It was significant and largely "out of Norway" even before then, but Swedish and Finnish EU membership led to 1) big cuts in alcohol taxes both these countries and 2) larger differences in food prices between Norway and these countries. Also, Swedish kronor depreciated markedly vs. Norwegian kroner during the early 1990s, making cross-border shopping more attractive than before.

The gaps in data on the volume of outbound tourist traffic are also large. Since expenditure figures from the National Accounts are only available for households, i.e. for private trips, the appropriate denominator for expenditure per trip was the number of private outbound trips per year (excluding day trips). Those numbers are available from the annual Travel Surveys of Statistics Norway⁷, but only since 2002. The total number of foreign trips (including business trips) can be estimated further back from other sources, to which we shall return below.

⁴<http://statbank.ssb.no/statistikkbanken/selectvarval/Define.asp?MainTable=KonsumHusholdn&SubjectCode=09&planguage=1&nvl=True&mt=1&nyTmpVar=true> (check "Direct purchases abroad by resident households")

⁵<http://statbank.ssb.no/statistikkbanken/selectvarval/Define.asp?MainTable=GrenseHandel3&SubjectCode=10&planguage=1&nvl=True&mt=1&nyTmpVar=true>

⁶ Grensehandelsutvalget (2003) (Commission on cross-border shopping): NOU 2003:17 Særavgifter og grensehandel (in Norwegian only) <http://www.regjeringen.no/nb/dep/fin/dok/nouer/2003/nou-2003-17.html?id=118880>

⁷http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=reise

Table 2 Expenditure by Norwegian tourists on private trips abroad
 Source: Column 1: Statistics Norway: National Accounts. Other sources, see text.

Year	Expenditure, constant 2005 NOK	Less estimated expenditure on day trips	Expenditure on overnight trips, constant 2005 €	Number of private trips by persons aged 16-79, 1000	Expenditure per trip, 2005 €
1985	21 400	-1000	2548		
1986	24 277				
1987	26 688				
1988	25 129				
1989	24 436				
1990	21 395	-1000	2547		
1991	19 131				
1992	21 290				
1993	21 718				
1994	23 570				
1995	23 744				
1996	25 388	-2600	2846		
1997	28 053				
1998	29 754				
1999	31 554				
2000	32 752	-4120	3576		
2001	32 477				
2002	34 933			4240	
2003	37 933			4090	
2004	44 542	-8944	4446	4820	925
2005	50 671	-8726	5238	4640	1129

Since 2002, SN's Travel Surveys have also provided figures on business trips, including expenditure on such trips. According to this source, total expenditure on business trips abroad grew from 9.07 billion NOK in 2002 to 12.55 billion in 2005. However, these figures are not directly comparable with those from the National Accounts in the table above.

3.3 Volume of outbound tourist traffic

We have three sources of information on the number of trips made by Norwegian residents to other countries:

- 1) Statistics on airport departures in combination with the five Air Passenger Surveys conducted by the Norwegian Institute of Transport Economics (TØI) between 1985-2005⁸. Taken together, these permit quite accurate year-by-year estimates of the number of trips residents have made by air, but they only cover people aged 12 or more.
- 2) The National Travel Surveys (NTS) carried out by TØI in 1985, 1992, 1998, 2001 and 2005⁹. These give figures for the total number of foreign trips carried out by respondents, except that in 1985 and 1992 trips

⁸ The surveys (all in Norwegian with English summaries) are published as: Stabæk, K. 1987: Passasjertrafikken med rutefly til/fra Norge i 1986 (not available online); Rideng, A. and J.M. Denstadli 1999: Reisevaner på rutefly 1992-1998, <http://www.toi.no/getfile.php/Publikasjoner/T%D81%20rapporter/1999/441-1999/441-1999-el.pdf>; Denstadli, J.M., A. Rideng and S. Strand 2004: Reisevaner med fly 2003, <http://www.toi.no/getfile.php/Publikasjoner/T%D81%20rapporter/2004/713-2004/R713-2004.pdf>; Denstadli, J.M., A. Rideng and J.I. Lian 2006: Reisevaner på fly 2005, <http://www.toi.no/getfile.php/Publikasjoner/T%D81%20rapporter/2006/828-2006/828-rapport-internett.pdf>

⁹ Results of the 1985 and 1992 surveys regarding trips of >100 km are presented in Vibe, N. 1993: De lange reisene (TØI, Oslo: not available online). The corresponding results for 1998 are in Denstadli, J.M. 1999: Reisevaner 1998 – Reiser 100 km og lengre, <http://www.toi.no/getfile.php/Publikasjoner/T%D81%20rapporter/1999/466-1999/466-1999-el.pdf>. Results for 2001 are in Denstadli, J.M. and R. Hjorthol

< 100 km were not included. However, the published NTS material does not consistently differentiate between trips involving overnight stays and those that didn't. This has to be guessed from other information given. Also, the surveys only cover residents aged 13+ (in 1985, and also in the 1992 data given here: only those aged 13-74).

- 3) The Travel Surveys, already mentioned in connection with Table 1-2, which have been conducted annually by Statistics Norway since 2002. These cover all foreign trips that do involve an overnight stay, so they fit the definition of tourism in this study.. However, they only cover people aged 16-79.

To solve the issue of bounded age groups we have to make assumptions. We have assumed that those outside the age groups covered by the two TØI surveys made 0.35 times as many trips per capita as those over 12 or 13 in 1985 and 1992, 0.4 times in 1998 and 0.45 times as many after 2000, while those too young or old to be covered by SN's Travel Surveys made 0.4 times as many trips as those in the age groups covered. This roughly corresponds to an assumption that children and the elderly made no business trips, but half as many other trips as those covered by surveys. The share of business trips seems to have declined over the period. Also, the inclusion of the elderly in NTS data post 1998 slightly reduces the frequency of travel among "those covered".

For the NTS data, this still leaves the problem of eliminating trips that did not involve overnight stays.

Below are the total numbers of foreign trips according to NTS data (1992 data have been harmonised backwards with those from 1985 by eliminating respondents aged 75+). Trips are round trips, i.e. half the number of the one-way journeys in the NTS.

Table 3 Total number of foreign trips by Norwegian residents, estimated from National Travel Survey data
Source: Institute for Transport Economics: National Travel Surveys

Year	Foreign trips per respondent	Population in age group covered (1000)	Trips by this age group (1000)	Population not covered (1000)	Estimated trips by those not covered (1000)	Est. total trips (1000)
1985	0.75	3 172	2 379	974	256	2 635
1992	0.8	3 260	2 608	1 014	284	2 892
1998	1.26	3 649	4 598	769	388	4 985
2001	1.8	3 711	6 680	792	713	7 321
2005	2.52	3 824	9 636	782	985	10 523

The NTS data suggest a very rapid growth in the number of foreign trips in every period excepting 1985-92. The lack of growth in that period is as one would expect, due to a deep recession which began in 1986-87 and bottomed out in 1992.

However, the growth trend post-1992 is exaggerated for the purposes of this study because some of it concerns trips that did not involve overnight stays. A small proportion of foreign business trips are day trips by air, but these make up only a few per cent of the overall number of foreign trips, and there is nothing to suggest that the share has increased. Most of the foreign day trips are by car or bus across the Swedish border, and the main purpose of such short trips is to shop for goods that are cheaper in Sweden. Such trips have become much more common since the mid-1990s as price differences between Norway and Sweden have increased.

Between 1992 and 1998 there was also a change in the categorisation of trips in the NTS. In 1985 and 1992 foreign trips were only specified as such if the one-way distance was >100 km. This would have excluded a large share of shopping trips to Sweden. However, this change in the survey itself is probably not the most important factor, simply because the number of cross-border shopping trips in 1985 and 1992 (when most of them were not counted) was actually much smaller than in later years.

The proportion of foreign trips whose main purpose was a "private errand" (which usually means shopping) according to the NTS has evolved as follows:

2002: Den nasjonale reisevaneundersøkelsen 2001 – Nøkkelrapport, <http://www.toi.no/getfile.php/Publikasjoner/T%D8I%20rapporter/2002/588-2002/R588-02.pdf> with more detailed information on holiday trips in Denstadli, J.M: Ferie- og fritidsreiser, <http://www.toi.no/getfile.php/Publikasjoner/T%D8I%20rapporter/2002/614-2002/614-2002.pdf> . Results for 2005 are in Denstadli, J.M: Reiseomfang og transportmiddelbruk på lange reiser, <http://www.toi.no/getfile.php/Publikasjoner/T%D8I%20rapporter/2006/865-2006/865-hele-rapporten-el.pdf> . All reports in Norwegian with English summaries.

Table 4 Percentage of foreign trips in the National Travel Surveys whose purpose was a “private errand”
Source: Institute for Transport Economics: National Travel Surveys

1985	5 %
1992	6 %
1998	10 %
2001	18 %
2005	26 %

As we would expect a real increase in the share of shopping trips between 1992 and 1998, it is actually surprising that the inclusion of trips < 100 km didn't lead to a bigger jump between these two years. However, some day trips whose main purpose was shopping are probably reported as "leisure" trips.

The share of foreign trips whose destination country was Sweden has grown rather more sharply – but nevertheless increased most *since* 1998:

Table 5 Percentage of foreign trips in the National Travel Surveys whose destination was Sweden
Source: Institute for Transport Economics: National Travel Survey

1992	25 %
1998	33 %
2001	40 %
2005	49 %

Of course many trips to Sweden do involve overnight stays.

On the basis of the published NTS data, we guessed the share of day trips among all foreign trips to be about 10 % in 1985 and 1992, 15 % in 1998, 24 % in 2001 and 33 % in 2005. This led to the following estimates for the total number of trips involving overnight stays:

Table 6 Estimated number of foreign trips with overnight stays, as derived from National Travel Survey data (thousands)

Source: Institute for Transport Economics: National Travel Surveys, and own assumptions

1985	2 371
1992	2 603
1998	4 238
2001	5 564
2005	7 051

The Statistics Norway Travel Survey data provide a check on this for the end of the period. Below are their figures for 2002 and 2005, and estimates of the approximate effect of including trips by people aged under 16 or over 80.

Table 7 Estimated number of foreign trips with overnight stays, as derived from Statistics Norway Travel Survey data (thousands)

Source: Institute for Transport Economics: National Travel Surveys, and own assumptions

Year	Foreign trips with overnight stays (1000)	Population covered (1000)	Population not covered (1000)	Estimated trips by those not covered (1000)	Total trips
2002	5 270	3 362	1 162	729	5 991
2005	6 160	3 422	1 184	853	7 037

If the intervening assumptions are reasonable, then the two data sources are quite consistent regarding the end of the period.

Finally, we shall compare the figures derived above with the evolution in the number of foreign *air* trips by Norwegian residents. These were calculated for a previous study¹⁰ on the basis of data from the Air Passenger Surveys (which cover scheduled flights only) plus statistics on departing charter passengers¹¹. For years in which no Air Passenger Surveys were carried out, the number of Norwegian passengers on outbound scheduled flights was estimated from statistics on departing passengers from Norwegian airports. The share of Norwegian residents among these passengers was interpolated between the share found in the preceding and the following survey year. All passengers on outbound charter flights were assumed to be Norwegian residents.

Table 8 Estimated number of foreign trips by air compared to previous estimates of total foreign trips (thousands)

Sources: See text

Year	Foreign air trips (1000)	Total foreign trips with overnight stays, estimated (1000)	
		From NTS	From Statistics Norway Travel Surveys
1985	1 405	2 371 (adjusted to 2800)	
86	1 489		
87	1 627		
88	1 601		
89	1 415		
1990	1 520		
91	1 359		
92	1 550	2 603 (adjusted to 2900)	
93	1 604		
94	1 793		
95	1 888		
96	2 155		
97	2 448		
98	2 602	4 238	
99	2 793		
2000	2 911		
2001	2 901	5 618	
2002	2 970		5 991
2003	2 999		
2004	3 450		
2005	3 807	7 117	7 037

The basis for the estimates of air trips is more robust than for total trips. The former rely partly on actual statistics (for charter trips) and partly on the Air Passenger Surveys whose samples are considerably larger in relation to the relevant population than those in the other surveys. Note however that no attempt was made to eliminate the small share of foreign day trips by air from these figures.

Comparing the rather robust figures for trips by air with the estimates previously derived from the National Travel Surveys, we found that the percentage of trips made by air appeared to have oscillated between 49-60 % (or a few percent less after subtracting day trips by air), with no clear trend. That there should have been no increase in

¹⁰ Hille, J. 2008: Økologisk utsyn 2008 (Framtiden i våre hender, Oslo), <http://www.framtiden.no/200811182431/rapporter/forbruk/okologiske-konsekvenser-av-norsk-forbruk.html> (in Norwegian only).

¹¹ Figures on charter passengers until 1992 are in this table: <http://www.ssb.no/histstat/tabeller/20-20-40.txt>; for subsequent years in successive editions of the Statistical Yearbook of Norway, <http://www.ssb.no/english/yearbook/>

the share of air travel in total foreign trips seemed unlikely, even in view of the fact that business trips, which were predominantly made by air even in 1985, had declined somewhat as a proportion of all foreign trips.

We found that the most likely explanation for the rather unlikely evolution of the ratio of trips by air to total trips was *underestimation of the number of foreign trips in the 1985 and 1992 National Travel Surveys*. There is a technical reason why this is likely. In the 1985 NTS respondents were asked to recall all longer trips over the past six months, and in 1992 over the past three months, while in later surveys they were only asked to recall such trips over the past month. It is well known that the longer the period, the more events people are likely to forget. Therefore, the original estimates of outbound trips in 1985 and 1992 were adjusted upwards as shown in the table. These adjustments are based on judgement only.

There being no significant discrepancy between the results derived from the National Travel Surveys and Statistics Norway Travel Surveys for recent years, the results in the NTS column of Table 1-8 for 1998, 2001 and 2005 were used with no further adjustments.

4 Tourist consumption in Norway

Since 1993 Statistics Norway has published annual Satellite National Accounts for tourism, including estimates of consumption by foreign and domestic tourists¹². The figures include estimates of expenditure on services catering especially to tourists as well as some products, e.g. motor fuel, of which the majority is sold to residents staying at home. Regarding expenditure by foreign tourists, the Satellite Accounts do not differentiate between those travelling on business and leisure, but this distinction is made for domestic tourists.

Unfortunately for the purposes of this study, the definition of tourism in the Satellite Accounts includes day trippers. This doubtless has very minor consequences in the case of foreign tourism, since the inbound traffic of day trippers and particularly their expenditure is much smaller than the outbound traffic. There are few bargains to be had for foreigners in Norway. But in the case of Norwegian residents, the contribution of day trippers to some of the expenditure categories in the Satellite Accounts may be considerable.

Although the Satellite Accounts were first published in 1993, the time series has since been broken no fewer than three times, in 1996, 1998 and 2004. The original data for 1995 were revised in a later publication, but those for 1993 and 1994 have not been harmonised with those for subsequent years. Revisions of the system of national accounts from 1998 led to a new break in the time series. However, provisional data based on the earlier SNA were published until 2000, so there is an overlap between the two latest time series from 1998-2000. Further adjustments to the Satellite Accounts were made in 2004. Therefore we only have useful data for the 1995-2005 period, and then only on the assumptions (a) that the *relative* figures for the years from 1995-1998 would not have been very different had the later definitions been applied and (b) that the consequences of the revision in 2004 were minor.

The Satellite Accounts data include not only consumption of goods and services within Norway but also payments for travel to and from Norway if purchased from Norwegian operators. This means that substantial but unknown shares of the consumption of "passenger transport" concern international travel – not only by foreign tourists visiting Norway, but also by Norwegians making foreign trips. Also, much of the money spent on "tour operators etc" no doubt concerns foreign trips. The "etc" in this category includes car rental, which is probably a large fraction of the estimated expenditure by foreigners.

The tables below show estimated tourist consumption by type of consumption, in current NOK. Statistics Norway have published figures in constant NOK only since 2004, so those figures are not useful for our purposes. Tables 9-11 concern the five categories of "tourism products" in the Satellite Accounts (accommodation, food and beverage services, transport services, services of tour operators etc. and "museums and sports facilities"¹³), and show consumption by foreigners, domestic households and domestic businesses – or more precisely enterprises. Tables 12 and 13 show estimated tourist consumption of *other* goods and services by foreigners and domestic households (no such consumption is estimated for enterprises). Table 14 shows the grand totals of tourist consumption as defined in the Satellite Accounts. Table 15 shows the development of the Norwegian consumer price indices from 1995-2005 for categories of goods and services that approximately correspond to some of those in the Satellite Accounts for tourism. Multiplying the figures in previous tables by those in Table 15 may give a *rough indication* of the development of some categories of tourist expenditure in constant-NOK terms. In all tables, the figures from 1995-2000 in italics are based on earlier National Accounts definitions, while those in normal type from 1998-2005 are based on current definitions.

¹² Consumption figures since 1998 are available here:

http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=turismesat. Figures for 1995-2000 according to earlier National Accounts definitions are here: http://www.ssb.no/turismesat_en/arkiv/art-2000-06-29-01-en.html

¹³ The sports facilities counted are mainly alpine skiing facilities. Golf courses are also included.

Table 9 Expenditure on "tourism products" by foreign visitors. Million current NOK
 Source: Statistics Norway: Satellite National Accounts for Tourism

Year	Accommodation	Food and beverage services	Transport services	Services of tour operators etc.	Museums and sports facilities	Total of "tourism products"
<i>Old series</i>						
1995	3 343	3 085	4 259	70	458	11 215
1996	3 441	3 197	4 504	80	464	11 686
1997	3 560	3 287	4 294	80	467	11 688
1998	3 754	3 466	4 279	81	472	12 052
1999	3 852	3 557	5 216	82	482	13 189
2000	3 571	3 297	5 647	93	541	13 149
<i>New series</i>						
1998	2 875	3 719	4 682	93	450	11 819
1999	2 948	4 239	5 244	103	508	13 042
2000	2 935	4 233	5 702	108	519	13 497
2001	2 915	4 228	5 444	114	548	13 249
2002	2 917	4 336	4 850	124	570	12 797
2003	2 862	4 295	5 114	135	596	13 002
2004	3 098	4 515	5 397	133	631	13 774
2005	3 206	4 569	6 310	142	680	14 907

Table 10 Expenditure on "tourism products" by domestic households. Million current NOK

Source: Statistics Norway: Satellite National Accounts for Touris

Year	Accommodation	Food and beverage services	Transport services	Services of tour operators etc.	Museums and sports facilities	Total of "tourism products"
<i>Old series</i>						
1995	2 143	3 304	5 617	6 078	920	18 062
1996	2 342	3 446	5 486	6 926	962	19 162
1997	2 503	3 866	6 338	7 552	975	21 234
1998	2 644	4 213	6 796	8 350	1 015	23 018
1999	2 730	4 218	7 519	8 800	1 023	24 290
2000	2 671	4 395	8 203	9 216	1 051	25 536
<i>New series</i>						
1998	2 013	4 131	6 938	6 787	1 064	20 933
1999	2 237	4 191	6 964	8 067	1 110	22 569
2000	2 283	4 357	7 134	9 102	1 162	24 038
2001	2 413	4 363	8 058	9 448	1 276	25 558
2002	2 472	4 566	8 225	8 635	1 374	25 272
2003	2 494	4 662	7 858	8 297	1 462	24 773
2004	2 646	4 673	8 058	9 098	1 547	26 022
2005	2 810	4 810	9 455	9 331	1 663	28 069

Table 11 Expenditure on "tourism products" by domestic enterprises. Million current NOK
Source: Statistics Norway: Satellite National Accounts for Tourism

Year	Accommodation	Food and beverage services	Transport services	Total of "tourism products"
<i>Old series</i>				
1995	1 990	861	7 692	10 543
1996	2 177	1 069	8 219	11 465
1997	2 426	1 188	8 752	12 366
1998	2 708	1 295	9 744	13 747
1999	2 782	1 296	11 661	14 739
2000	2 602	1 351	11 632	15 585
<i>New series</i>				
1998	2 506	1 700	11 397	15 603
1999	2 571	1 733	11 227	15 531
2000	2 541	1 871	13 432	17 844
2001	2 603	2 412	13 012	18 027
2002	2 576	2 516	12 243	17 335
2003	2 492	2 846	10 573	15 911
2004	2 674	2 754	11 255	16 683
2005	2 922	2 883	12 542	18 347

No expenditure on services of tour operators, museums or sports facilities is estimated for enterprises.

Table 12 Expenditure on goods and services other than "tourism products" by foreign visitors. Million current NOK

Source: Statistics Norway: Satellite National Accounts for Tourism

Year	Food, drink and tobacco	Apparel	Souvenirs, maps etc.	"Other transport" (mainly fuel)	Other goods and services	Total of other than "tourism products"
<i>Old series</i>						
1995	2 750	699	556	1 561	1 310	6 876
1996	2 829	702	579	1 635	1 352	7 097
1997	2 968	702	583	1 755	1 373	7 381
1998	3 000	710	589	1 774	1 388	7 461
1999	3 061	724	601	1 810	1 416	7 612
2000	3 436	813	675	2 032	1 590	8 546
<i>New series</i>						
1998	3 418	807	669	2 035	1 442	8 371
1999	3 902	923	766	2 273	1 559	9 423
2000	4 002	955	784	2 326	1 622	9 689
2001	3 802	900	742	2 077	1 645	9 166
2002	3 551	833	692	1 942	1 643	8 661
2003	3 813	867	732	2 073	1 745	9 230
2004	4 671	1 013	870	2 671	1 847	11 072
2005	5 067	1 122	961	2 962	1 993	12 105

**Table 13 Expenditure on goods and services other than “tourism products” by domestic households.
Million current NOK**
Source: Statistics Norway: Satellite National Accounts for Tourism

Year	Souvenirs, maps etc.	“Other transport” (mainly fuel)	Other goods and services	Total of other than “tourism products”
<i>Old series</i>				
1995	234	4 062	4 836	9 132
1996	240	4 154	5 011	9 405
1997	275	4 229	5 275	9 779
1998	296	4 439	5 640	10 375
1999	284	4 688	5 655	10 627
2000	288	5 158	6 240	11 686
<i>New series</i>				
1998	272	4 139	5 859	10 270
1999	320	4 203	6 048	10 571
2000	335	4 665	6 349	11 349
2001	359	4 484	6 850	11 693
2002	371	4 379	7 314	12 064
2003	386	4 404	7 817	12 607
2004	418	4 831	10 058	15 307
2005	424	5 181	10 505	16 110

Expenditure on food, drink, tobacco and apparel by resident households is not counted as tourist expenditure even if the purchases are made while travelling.

Table 14 Total tourist expenditure in million current NOK
 Source: Statistics Norway: Satellite National Accounts for Tourism

	<i>Expenditure on "tourism products"</i>	<i>Other tourist expenditure</i>	<i>Total tourist expenditure</i>
<i>Old series</i>			
1995	39 820	16 008	48 024
1996	42 313	16 502	49 506
1997	45 288	17 160	51 480
1998	48 817	17 836	53 508
1999	52 218	18 239	54 717
2000	54 270	20 232	60 696
<i>New series</i>			
1998	48 355	18 641	66 996
1999	51 142	19 994	71 136
2000	55 379	21 038	76 417
2001	56 834	20 859	77 693
2002	55 404	20 725	76 129
2003	53 686	21 837	75 523
2004	56 479	26 379	82 858
2005	61 323	28 215	89 538

Table 15 Inverted consumer price indices for some goods and services. 2005 = 1.

Source: Statistics Norway: Consumer Price Index¹⁴

Year	CPI all items	Accommodation	Food and beverage services	Transport services	Cultural services	Food	Apparel	Motor fuel
1995	1.222	1.119	1.387	1.471	1.375	1.188	0.671	1.390
1996	1.208	1.091	1.359	1.417	1.355	1.170	0.692	1.368
1997	1.177	1.067	1.325	1.387	1.333	1.132	0.693	1.276
1998	1.151	1.026	1.268	1.336	1.301	1.080	0.707	1.275
1999	1.125	0.998	1.225	1.276	1.282	1.050	0.713	1.194
2000	1.091	1.029	1.180	1.172	1.233	1.031	0.744	1.046
2001	1.059	1.007	1.128	1.061	1.181	1.051	0.751	1.139
2002	1.045	0.960	1.085	1.041	1.141	1.068	0.794	1.184
2003	1.020	0.979	1.047	1.025	1.099	1.033	0.888	1.153
2004	1.016	0.996	1.018	1.054	1.069	1.015	0.954	1.088
2005	1	1	1	1	1	1	1	1

¹⁴ http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=kpi
 Note the inversion: the CPI for all goods and services grew by 22.2 % from 1995 to 2005, so a given expenditure in 1995, if spread across a weighted average of all items in the CPI, should be multiplied by 1.222 to convert it to 2005 NOK.

5 Data on the transport system

5.1 Transport infrastructure

Table 16 shows the length of the railway and public road networks in Norway and the number of airports at five-year intervals from 1985-2005. These data are available annually, but the changes from year to year are small. The figures on roads and railways are from successive editions of the Statistical Yearbook of Norway. The airports are listed by Avinor, the State-owned company that owns and operates the great majority of them¹⁵. Ideally, input to the SDN scenarios should have included more data on the *capacity* of the various transport systems. In the case of railways we do have data on the amount of double track, and in the case of airports on the number of runways. The latter has been 1 throughout the period at all airports excepting Oslo (2 runways at a single airport since 1998, previously only 1 at the main airport but then also a secondary airport), Stavanger (where there is an extra runway for helicopter traffic) and two other airports which have second runways for military traffic. But in the case of roads, where the best indicator of capacity would be their width, the National Roads Authority was unable to provide any historical data on that parameter.

Nor did we find any data on *harbour* capacity, or even the exact number of harbours. Norway has some 170 local port authorities of which some operate more than one physical harbour; no regularly updated statistics are available at the national level. However, knowing the number of harbours in Norway is not particularly useful for a study of tourism: many of them only handle fishing vessels, goods traffic and/or ferries mainly used by local commuters. *Capacity* might be a relevant issue in the case of major harbours with significant cruise traffic, but we judged that the capacity of harbour infrastructure as such had probably not significantly constrained or promoted cruise traffic in the 1985-2005 period.

Table 16 Transport infrastructure in Norway.
Source: Statistics Norway: Transport and Communication Statistics and Avinor

Year	Railways, km			Roads, km		Airports		
	Total	Electri-fied	Double track	Total	State roads	Total	Inter-national	Other main airports
1985	4 258	2 459	94	84 563	25 599	47	6	11
1990	4 060	2 442	99	88 174	26 688	52	6	11
1995	4 023	2 422	115	90 174	26 483	52	6	11
2000	4 179	2 519	196	90 880	26 705	52	6	11
2005	4 087	2 528	224	92 513	27 252	52	6	11

Most of the increase in the length of double-tracked railways between 1995 and 2000 is due to the construction of a new line from Oslo to the new airport at Gardermoen and onward to Eidsvoll.

State roads included all of the main highways during this period. The remainder of the public road network consisted of county and municipal roads. Much of the State road network has since been transferred to the counties.

Avinor classifies its own airports (46 out of the 52 in 2005) as “main” or “regional” airports; the 6+11= 17 main airports in the table are the 16 classified by Avinor as “main” airports plus one privately owned airport with considerable international traffic, namely Sandefjord Torp airport. The six classified as “international” in 2005 are Oslo, Bergen, Trondheim, Stavanger, Kristiansand and Sandefjord airports. Many other airports have small volumes of international (mainly charter) traffic, but the six mentioned handled some 97 % of international passengers in 2005. The constant number of international airports conceals two changes between 1995 and 2000: Sandefjord entered the list and the number of Oslo airports was reduced from two to one. Heliports and private airstrips without regular passenger traffic are not included in the totals.

¹⁵ The airports are listed by category in Avinor’s traffic statistics, see http://www.avinor.no/en/avinor/traffic/10_Traffic+statistics

5.2 Investments in transport infrastructure

Statistics Norway provides data on investments in transport infrastructure in annual structural statistics on transport and communications¹⁶. Because of changes in definitions and industry groupings, however, it is not possible to construct consistent time series from 1985-2005 based on that source.

For the purposes of the SDN study, figures from the annual State Accounts – combined with a few other sources - were found to be a more useful indicator of trends in railway, main road and airport investments. Virtually all investments in railway lines over this period have been paid for by the central government, although this was done indirectly in the case of the new line to Oslo Airport. Until 1985 the same was true of investments in State roads. Since then an increasing share of investments in State roads has been paid by motorists through road tolls, but estimates of the amounts collected in this way are also available. Aggregated data on investments in county and municipal roads are only available from 2001 on, but they are of much less importance to the development of tourism. Until 2001 most investments in airports also appeared directly in the State Accounts, with the exception of those in a new Oslo Airport (opened in 1998) which was organised as a separate enterprise. In 2002 the agency that operated State-owned airports was transformed into the publicly owned company Avinor, so that later investments appear in that company's annual reports. Investments in private airports were judged to be negligible for the purposes of the study.

Tables 17-19 show estimates of annual investments in railways, roads and airports in current NOK. The figures have been converted to *approximate* constant 2005 NOK and Euro equivalents by inflating those for earlier years through division by the price index for construction investments that is implicit in National Accounts statistics¹⁷. These results can only be approximate because unit costs of railway, road and/or airport construction may have evolved somewhat differently from those of other construction.

Table 17 shows estimates for railway investments. With one important exception, these are taken directly from the annual State Accounts, or more precisely the accounts figures for "investeringer i linjen", i.e. investments in tracks, that are presented in the Budget documents of the Ministry of Transport two years after each accounting year.¹⁸ The exception is a sum of approximately 7.7 billion NOK which was invested in the Oslo Airport line over the 1993-99 period. This money was provided in the shape of share capital and loans to two successive public enterprises which were charged with carrying out the project. The exact amounts invested per year are unknown and not of particular importance to the present study: we have distributed the 7.7 billion NOK as follows:

1993: 0.2 bn
1994: 0.5 bn
1995: 1.0 bn
1996: 1.5 bn
1997: 2.5 bn
1998: 1.5 bn
1999: 0.5 bn

¹⁶ Data from 2002 on are available here:

<http://statbank.ssb.no/statistikkbanken/selectvarval/Define.asp?MainTable=TransStruk7&SubjectCode=10&planguage=1&nvl=True&mt=1&nyTmpVar=true>. Until 1999 Statistics Norway had an annual publication, "Transport and Communication Statistics" which included investment figures. Only one edition has been published since, in 2003 – this includes data for the 1999-2003 period. The 1998, 1999 and 2003 editions are online here: http://www.ssb.no/emner/10/12/nos_samferdsel/ Pre-1998 editions are in paper format only.

¹⁷ See the National Accounts, table 28 (annual price changes for gross fixed capital formation) at http://www.ssb.no/nr_en/; the csv file gives data going back to 1970.

¹⁸ Budget documents from 1998 on are available online (in Norwegian only) from the Government's document archive,

<http://www.regjeringen.no/nb/dok/regpubl/stprp.html?querystring=&offset=1000&sortby=govsortableid&filters=dctypename,Stortingsproposisjon,!Konfigureret+S%C3%B8k,dctypestatus,qyldig,dctypename,!underside,,+showforlanguages.nb&hits=50&lang=nb&solution=cust&searchview=governmentnbsppublishe&shownavigators=dccategoryidtaxonomynavigator,dcownernamenavigator,dcparliamentperiodnavigator&id=1752>. Earlier budgets are available on paper only.

Table 17 Investments in railway lines

Source: State Accounts and own assumptions, see text. Price index: National Accounts

Year	Million current NOK	Million 2005 NOK (approximate)	Million 2005 Euros (approximate)	MEMO: Price index for construction investments (2005=1)
1985	169	339	42.3	0.4990
1986	241	448	56.0	0.5374
1987	270	457	57.1	0.5906
1988	422	656	81.9	0.6432
1989	345	541	67.6	0.6374
1990	430	684	85.4	0.6285
1991	500	796	99.5	0.6278
1992	889	1 415	176.7	0.6285
1993	1 087	1 721	214.9	0.6316
1994	1 371	2 099	262.2	0.6531
1995	2 071	3 000	374.7	0.6903
1996	2 856	3 994	498.7	0.7152
1997	3 649	4 930	615.7	0.7402
1998	2 888	3 781	472.2	0.7639
1999	1 937	2 448	305.7	0.7914
2000	1 215	1 464	182.8	0.8301
2001	1 335	1 542	192.6	0.8658
2002	1 209	1 366	170.6	0.8849
2003	1 601	1 763	220.2	0.9079
2004	1 858	1 949	243.4	0.9533
2005	1 545	1 545	192.9	1

Table 18 shows annual investments in State roads. The sums consist of the amounts disbursed by central government for "Riksveginvesteringer" (investments in State roads) according to the same budget sources as were used for railway investments, plus estimates of amounts collected for the same purpose from road tolls. The latter have also been available from budget documents since 2002, i.e. for accounts starting in 2001. For earlier years the amounts from road tolls have been taken from a figure presented in a background document to the 2006-2015 National Transport Plan¹⁹. Because they were read from a figure these amounts may not be exact, but the overall errors should be quite small since income from tolls was much less than government grants until 2000.

¹⁹ Figure 11-1 in the report of the national transport authorities (Transportetatene) to the Ministry of Transport and Communications on the National Transport Plan 2006-2015 (in Norwegian only), http://www.ntp.dep.no/2006-2015/pdf/20030602_NTP_kap11.pdf

Table 18 Investments in State roads
Source: State Accounts and (for price index) National Accounts

Year	Million current NOK	Million 2005 NOK (approximate)	Million 2005 Euros (approximate)	MEMO: Price index for construction investments (2005=1)
1985	2 649	5 309	663.0	0.4990
1986	2 766	5 147	642.8	0.5374
1987	3 538	5 990	748.1	0.5906
1988	3 898	6 061	756.9	0.6432
1989	4 389	6 886	860.0	0.6374
1990	4 049	6 443	804.6	0.6285
1991	5 975	9 517	1 188.5	0.6278
1992	5 878	9 353	1 168.1	0.6285
1993	5 328	8 436	1 053.5	0.6316
1994	5 067	7 759	969.0	0.6531
1995	4 923	7 132	890.6	0.6903
1996	5 488	7 674	958.4	0.7152
1997	5 957	8 048	1 005.1	0.7402
1998	5 940	7 776	971.1	0.7639
1999	5 881	7 431	928.1	0.7914
2000	5 334	6 425	802.4	0.8301
2001	5 763	6 656	831.2	0.8658
2002	6 836	7 725	964.8	0.8849
2003	6 585	7 253	905.8	0.9079
2004	6 944	7 284	909.7	0.9533
2005	8 770	8 770	1 095.3	1

Investments in county and municipal roads are much smaller than in State roads, even though they make up most of the road network as measured in kilometres. Aggregated data on these investments are available only from 2001 on. In each of the years from 2001-2005 the total of investments in county and municipal roads was between 1.7 and 2.0 billion current NOK, i.e. some 30 % or less of the investments in State roads.²⁰

Table 19 shows investments in State-owned airports. For most years until 2001 these (“Flyplassinvesteringer”) were taken directly from the same budget documents as those on directly Government funded investments in railways and roads. Data for more recent years are from the annual reports of Avinor²¹, with some adjustments in the transition years (2002-2003). Not included in any of the sources mentioned are the investments in the new Oslo airport, which totalled 11.4 billion NOK (1992 value)²² or probably about 12.2 billion NOK at current values across the years 1993-98 in which the investments were actually carried out. That sum has been distributed between those years by guesswork and explains the whole “hump” in the data series. Investments in private airports are not included in the table. We can be certain that these were negligible with the exception of

²⁰ Statistics Norway, StatBank, tables 04668 and 04694, KOSTRA data on gross investments in roads by counties and municipalities respectively (in Norwegian only): http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=0&tilside=selecttable/MenuSelS.asp&SubjectCode=17

²¹ http://www.avinor.no/avinor/finansiellinformasjon/30_Rapporter (in Norwegian)

²² http://www.osl.no/osl/omoss/Om+Oslo+Lufthavn+AS/30_Historie (in Norwegian)

Sandefjord Torp Airport post 1997. Investments there averaged some 37 million NOK per year from 2000-2005²³, or less than 6 % of investments in Avinor’s airports over the same period.

Table 19 Investments in State-owned airports

Source: State Accounts, Avinor and own assumptions, see text. Price index: National Accounts

Year	Million current NOK	Million 2005 NOK (approximate)	Million 2005 Euros (approximate)	MEMO: Price index for construction investments (2005=1)
1985	324	649	81.1	0.4990
1986	539	1 003	125.3	0.5374
1987	510	864	107.8	0.5906
1988	682	1 060	132.4	0.6432
1989	788	1 236	154.4	0.6374
1990	676	1 076	134.3	0.6285
1991	654	1 042	130.1	0.6278
1992	635	1 010	126.2	0.6285
1993	1 032	1 634	204.1	0.6316
1994	2 564	3 926	490.3	0.6531
1995	3 650	5 288	660.3	0.6903
1996	4 025	5 628	702.9	0.7152
1997	4 409	5 957	743.9	0.7402
1998	1 867	2 444	305.2	0.7639
1999	609	770	96.1	0.7914
2000	664	800	99.9	0.8301
2001	700	808	101.0	0.8658
2002	598	676	84.4	0.8849
2003	700	771	96.3	0.9079
2004	700	734	91.7	0.9533
2005	826	826	103.2	1

5.3 Output and profits of transport industries

As mentioned above, Statistics Norway publishes structural statistics on transport industries – now in their StatBank, previously in annual “Transport and Communication Statistics”. These include data on economic output and operating surpluses of the transport industries, as well as their investments. The data go back to 1991, but at least for some kinds of transport, they were judged to be of limited value for this study. There are several reasons for this. Firstly, there is a significant break in the time series in 1998 due to changes in the System of National Accounts, and one other minor break. Secondly, changes in formal and accounting relationships between government and public transport operators appear to have had major effects on the figures. The output of “railways” was roughly halved after the National Railways were split into an agency with responsibility for tracks and a publicly-owned company running the trains; also, the statistics suggest dramatic changes in the profitability of railways as well as bus companies, which are probably partly due to changes in accounting for subsidies. For public land transport, performance in passenger-kilometres gives a better indication of real trends in output than the economic data. Table 20 shows how the transport performance of passenger trains, trams (including the Oslo Metro) and buses evolved from 1985-2005.²⁴

²³ Sandefjord Airport, Årsrapporter (Annual Reports) 2004 and 2005, http://www.avinor.no/avinor/finansiellinformasjon/30_Rapporter (in Norwegian)

²⁴ Statistics Norway, Domestic Traffic Performances, http://www.ssb.no/english/subjects/10/12/transpinn_en/tab-2010-07-16-01-en.html k

Table 20 Transport performance of land-based public transport. Million passenger kilometres.
Source: Statistics Norway: Transport and Communications Statistics

Year	Trains	Trams etc.	Buses
1985	2 112	455	3 948
1990	2 011	419	3 890
1995	2 300	381	3 752
2000	2 857	496	4 141
2005	2 685	518	4 312

For the taxi and airline industries, which receive little in the way of direct subsidies and have not undergone the kind of institutional changes that the railways have, the economic data are easier to compare over time, even though the revision of the SNA in 1998 may have had some effect on the figures.

Table 21 shows the output and operating surplus figures for the taxi industry. The conversion to constant 2005 MNOK and Euros is once again only approximate, as the figures for earlier years have been inflated through division by an implicit price index for the whole transport industry, excluding ocean shipping and pipeline transport²⁵.

Table 21 Output and operating surpluses of the taxi industry
Source: Statistics Norway: Transport and Communications Statistics

Year	Output			Operating surplus			MEMO: price index
	Current MNOK	2005 MNOK	2005 €	Current MNOK	2005 MNOK	2005 €	2005=1
1991	2 741	3 969	496	1 328	1 923	241	0.691
1992	2 939	4 100	512	1 414	1 973	246	0.717
1993	2 398	3 261	407	1 170	1 591	199	0.735
1994	3 038	4 082	510	1 263	1 697	212	0.744
1995	3 344	4 440	554	1 473	1 914	239	0.753
1996	3 517	4 569	571	1 533	1 939	242	0.770
1997	3 562	4 506	563	1 460	1 769	221	0.790
1998	n.a.			n.a.			0.825
1999	4 765	5 600	699	1 599	1 879	235	0.851
2000	5 181	5 895	736	1 656	1 884	235	0.879
2001	5 368	5 895	736	1 389	1 525	191	0.911
2002	5 640	5 944	742	1 491	1 571	196	0.949
2003	5 844	6 044	755	1 640	1 696	212	0.967
2004	6 240	6 327	790	1 742	1 766	221	0.986
2005	6 349	6 349	793	1 746	1 746	218	1

Table 22 shows the output and operating surpluses of the airline industry, on the same basis and with the same caveat as for table 21. The Norwegian airline industry includes not only Norwegian-registered companies but also the Norwegian share of 2/7 in the Scandinavian SAS company.

²⁵ See the National Accounts, table 8 (annual price changes for output by kind of activity) at http://www.ssb.no/nr_en/; the .csv file gives data going back to 1970.

Table 22 Output and operating surpluses of the airline industry

Source: Statistics Norway: Transport and Communications Statistics

Year	Output			Operating surplus			MEMO: price index
	Current MNOK	2005 MNOK	2005 €	Current MNOK	2005 MNOK	2005 €	2005=1
1991	12 991	18 813	2 350	1 706	2 471	308.5	0.691
1992	13 087	18 259	2 280	1 968	2 746	342.9	0.717
1993	14 327	19 482	2 433	-39	-53	-6.6	0.735
1994	14 394	19 341	2 415	-1 036	-1392	-173.8	0.744
1995	15 465	20 534	2 564	-158	-205	-25.6	0.753
1996	16 884	21 935	2 739	62	78	9.8	0.770
1997	17 531	22 177	2 770	-852	-1032	-128.9	0.790
1998	n.a.			n.a.			0.825
1999	20 211	23 754	2 966	-1 549	-1821	-227.4	0.851
2000	21 934	24 955	3 117	-128	-146	-18.2	0.879
2001	23 154	25 428	3 176	-331	-364	-45.4	0.911
2002	21 609	22 774	2 844	1 604	1 691	211.1	0.949
2003	20 436	21 137	2 640	1 116	1 154	144.2	0.967
2004	20 788	21 079	2 632	605	613	76.6	0.986
2005	17 750	17 750	2 217	789	789	98.5	1

The operating surplus of the airline industry has changed rather dramatically through the period, and those changes show little relation to the trends in output. However, the swings in overall profitability are quite closely related to the degree of competition in the Norwegian domestic market. In the mid-to late 1990s it increased with the entry of a third major operator (Color Air) in addition to the two already present (SAS and Braathens). With increased competition, profit margins declined and went negative. This in turn led to the bankruptcy of Color Air and the near-bankruptcy of Braathens, which was then taken over by SAS. As SAS briefly enjoyed a virtual monopoly position profitability went sharply up, but declined again as a new strong competitor (Norwegian Air Shuttle) entered the market.

5.4 Prices of passenger transport

Table 23 shows how the nominal prices of several modes of public transport evolved from 1985 to 2005, and also the evolution in nominal prices of motor fuel.²⁶ Table 24 shows the evolution in the *real* prices of the same goods and services, i.e. how their price changed in comparison to general inflation in Norway, as measured by the consumer price index for all goods and services,

²⁶ The price indices are available at http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabell/Hjem.asp&KortnavnWeb=kpi; we have rebased them from 1998 = 100 to 2005 = 100.

Table 23 Price indices for public passenger transport and motor fuel. 2005 = 100.

Source: Statistics Norway: Consumer Price Index

Year	Motor fuel	Public transport by train or tram	Public transport by bus or taxi	Public transport by ship or ferry	Airline transport
1985	43.4	43.7	38.2	40.5	46.1
1986	40.5	46.1	40.6	43.3	48.5
1987	43.5	50.3	44.7	46.0	51.1
1988	45.3	54.5	49.0	49.1	52.0
1989	48.5	58.7	52.1	53.9	56.1
1990	53.3	61.7	54.2	56.6	59.1
1991	61.1	65.5	57.0	60.6	63.2
1992	64.6	69.5	58.3	64.6	64.7
1993	68.0	70.0	60.1	66.0	66.7
1994	68.2	70.0	61.5	66.6	67.4
1995	71.9	70.2	64.6	68.2	70.3
1996	73.1	73.5	66.6	69.1	74.3
1997	78.4	74.0	68.4	67.7	77.2
1998	78.4	75.9	69.7	69.5	83.1
1999	83.8	79.3	73.0	74.3	86.0
2000	95.6	81.7	78.7	80.3	99.2
2001	87.8	85.0	85.7	85.3	118.6
2002	84.5	90.1	88.3	88.2	115.0
2003	86.7	93.0	94.4	91.3	107.6
2004	91.9	95.7	98.9	92.7	91.9
2005	100.0	100.0	100.0	100.0	100.0

Over the full 20-year period, the relative prices of the various modes of transport have not changed much. Those of bus and taxi transport (unfortunately, the two cannot be decomposed) increased slightly more than those of other modes or of motor fuel, while those of air transport increased slightly less. Note, however, that the prices of air transport were much more volatile towards the end of the period than those of other modes, again reflecting the changing degrees of competition in the Norwegian airline industry.

Table 24 Real-price indices for public passenger transport and motor fuel. 2005 = 100.
 Source: Statistics Norway: Consumer Price Index

Year	Motor fuel	Public transport by train or tram	Public transport by bus or taxi	Public transport by ship or ferry	Airline transport
1985	0.806	0.812	0.710	0.753	0.857
1986	0.704	0.800	0.704	0.751	0.842
1987	0.694	0.804	0.714	0.734	0.815
1988	0.677	0.816	0.733	0.735	0.778
1989	0.695	0.840	0.745	0.772	0.804
1990	0.733	0.849	0.746	0.778	0.813
1991	0.812	0.871	0.758	0.806	0.840
1992	0.840	0.903	0.757	0.839	0.841
1993	0.864	0.889	0.764	0.838	0.847
1994	0.854	0.877	0.771	0.834	0.844
1995	0.879	0.857	0.789	0.833	0.859
1996	0.883	0.888	0.804	0.835	0.897
1997	0.922	0.870	0.805	0.796	0.908
1998	0.903	0.874	0.802	0.800	0.956
1999	0.942	0.893	0.821	0.836	0.968
2000	1.043	0.891	0.859	0.876	1.082
2001	0.929	0.900	0.908	0.903	1.256
2002	0.883	0.941	0.923	0.923	1.202
2003	0.885	0.949	0.964	0.932	1.098
2004	0.934	0.972	1.005	0.942	0.933
2005	1.000	1.000	1.000	1.000	1.000

The table above shows that passenger transport in Norway – whether by own car incurring fuel costs or by public means – became more expensive in relation to other goods and services between 1985-2005. Motor fuel became about one-quarter more expensive in real terms, and almost the same applies to an average of the various forms of public transport. That the cost of travelling increased relative to the cost of other purchases may have put a slight damper on domestic tourism over the period. The same need not be true of inbound foreign tourism – we have not related the evolution of prices of transport in Norway to inflation in foreign tourists' origin countries, adjusted for the exchange rates of their currencies vs. NOK.

5.5 Travel times

The scenario model used in the SDN study ideally requires data on the development of travel speeds by various modes between important points in the country. Unfortunately it was not possible to produce historical series of this kind for Norway over the 1985-2005 period, only a snapshot of the present situation. This was not considered an important problem regarding rail or air transport. Travel times by train between main centres have not changed very much since 1985, as only very short stretches of new or double track have been laid, cf. section 4.3.1. An attempt to cut travel times significantly by introducing new rolling stock in the 1990s had to be abandoned after the new trains proved unable to tackle the curvature of existing Norwegian tracks at the speeds they were designed for. The end result was only a very slight reduction in travel times between some of the main centres in Southern Norway. Nor have flight times changed appreciably. Total travel times by air could nevertheless have changed because of changes either in travel times to and from airports or in time spent at the airports themselves. It is possible that new security requirements have affected the latter, but if so only at the very tail end of the 1985-2005 period. No actual data were found on this. Travel times from city centres to airports and vice-versa could be affected either by relocation of airports or by new connections. In fact there has been only one really important

relocation over the period, when the secondary Oslo Airport at a distance of some 50 km from the city centre was expanded to become the sole airport, displacing the old main airport only 9 km from the centre. However, the relocation was accompanied by a new fast train connection, making travel time from the city centre not very much longer for those passengers who choose this connection.

The most important changes in travel speeds over the 1985-2005 period probably concern travel by road and stem partly from incremental straightening and widening of the main highways and partly from new tunnels and bridges (the latter eliminating ferry connections). There is no doubt that such improvements have shortened road travel times between several important points over the past quarter-century, but no consistent time series data to illustrate this were found.

Table 25 shows estimated travel times in 2009 by various modes between several main centres in Norway and between some of these and a few other important tourist destinations. In the case of car travel, travel times between points are taken from a calculator provided on the Norwegian Yellow Pages' website²⁷. (Another online calculator, provided by the National Roads Authority²⁸, tends to give slightly longer travel times. For most of the stretches shown in Table 25 the discrepancy between the two sources is between 1 and 6 per cent. The exceptions among stretches of >200 km are Oslo-Geiranger, Bergen-Trondheim and Tromsø-North Cape, for which the other source makes travel times between 8-12 per cent longer.) In the case of trains, travel times were taken from timetables of the Norwegian State Railways²⁹, of long-distance buses from those of Nor-Way Bussekspress³⁰, of ships from those of the Norwegian Coastal Express³¹ and of the fast ferry from that of the operator, Tide³². Time for car ferry crossings is included in the Yellow Pages' calculations of travel times by road. Where there is more than one daily service and travel times are not identical, approximate averages have been used, but night trains between Oslo and Bergen or Trondheim (which are slower than daytime connections on the same routes) have been disregarded in calculating averages.

Flight times were taken from timetables of SAS³³ and Norwegian³⁴. Travel times from city centres to and from airports are by car (again based on the Yellow Pages' calculator) except where a public transport connection was known to be faster – notably for Oslo. "Car" may of course mean a taxi or rented vehicle. In estimating city centre to city centre travel times by air, the following assumptions were made: Travel time = flight time + shortest travel time from airport to city centre + 10 minutes waiting time for transport at each end (except Oslo 5 minutes, as connections are very frequent) + 1 hour spent in arrival and departure terminals combined, except where one end is a small local airport, if so combined time in terminals = 45 min. Time in terminals is influenced by the assumption that tourists (as opposed to day-tripping business travellers) have bags to check in and to collect at the other end. Apart from this point, the waiting times are probably at the low end of the realistic spread.

Distances by road were taken from the Yellow Pages' calculator, those by rail from the National Rail Administration³⁵, flight distances from a great circle calculator³⁶, and ship distances from the Coastal Express website. Car ferry crossings are not counted in the road distances. In the case of air travel distances and average speeds are shown both from airport to airport (actually runway to runway) and from city centre to city centre.

²⁷ <http://kart.gulesider.no/>

²⁸ <http://visveg.vegvesen.no/Visveg/mapviewer.jsf?lang=no>

²⁹ http://www.nsb.no/?lang=en_US

³⁰ http://www.nor-way.no/?lang=en_GB

³¹ <http://www.hurtigruten-web.com/ruteplan.html>

³² <http://www.tide.no/Default.aspx?pageid=1127>

³³ <http://www.flysas.com/en/uk/?vst=true>

³⁴ <http://www.norwegian.com/en/>

³⁵ <http://www.jernbaneverket.no/no/Jernbanen/Jernbanen-i-tall/>

³⁶ <http://www.gcm.com/>

Table 25 Distances, travel times and average speed of travel between some points in Norway. A-A = airport to airport, C-C = city centre to city centre, (F) indicates that car journey includes one or more ferry crossings. Data refer to 2009

Sources: See text

Trip and mode	Distance, km	Travel time (hr:min)	Average speed (km/h)	Frequency of services	Comments
City connections:					
Oslo-Bergen, car	512	7:21	70		
Oslo-Bergen, train	527	6:58	76	4/day	
Oslo-Bergen, air A-A	330	0:55	375	c. 30/day	
Oslo-Bergen, air C-C	402	2:50	142	c. 30/day	
Oslo-Trondheim, car	502	7:25	68		
Oslo-Trondheim, train	553	6:43	82	3-4/day	Also 2 connections by longer route
Oslo-Trondheim, air A-A	364	0:55	414	c. 30/day	
Oslo-Trondheim, air C-C	450	3:00	150	c. 30/day	
Bergen-Trondheim, car	633	9:36	66		
Bergen-Trondheim, bus	c. 650	14:15	46	1/day direct	Other connections exist
Bergen-Trondheim, air A-A	463	1:00	463	12/day	More connections via Oslo
Bergen-Trondheim, air C-C	515	3:10	163	12/day	More connections via Oslo
Bergen-Trondheim, ship	638	36:15	17	1/day	
Bergen-Stavanger, air A-A	159	0:35	273	13/day	
Bergen-Stavanger, air C-C	193	2:30	77	13/day	
Bergen-Stavanger, fast ferry	c. 170	4:30	38	2/day	
Bergen-Stavanger, car (F)	186	3:54	48		
Bergen-Tromsø, ship	1681	90:30	19	1/day	
Bergen-Tromsø, air A-A	1224	2:20	525	1/day direct	More connections via Oslo
Bergen-Tromsø, air C-C	1249	4:10	300	1/day direct	More connections via Oslo
Oslo-Tromsø, air A-A	1118	1:50	608	11/day	
Oslo-Tromsø, air C-C	1178	3:30	337	11/day	
Oslo-Tromsø, train+bus	1721	27:58	62	1/day	Also 1/day taking 40 hours

Trip and mode	Distance, km	Travel time (hr:min)	Average speed (km/h)	Frequency of services	Comments
To some tourist destinations:					
Oslo-North Cape, car	2146	31:16	69		
Oslo-North Cape, air A-A + car	c. 1480	4:30	329	2/day	Via Trømso-Honningsvåg; more routes possible
Oslo-North Cape, air C-C	c. 1532	5:40	270	2/day	Via Trømso-Honningsvåg; more routes possible
Tromsø-North Cape, car	530	8:38	61		
Tromsø- North Cape, air A-A + car	c. 340	2:00	170	2/day direct	To Honningsvåg airport
Tromsø- North Cape, air C-C	c. 345	2:45	125	2/day direct	To Honningsvåg airport
Oslo- Lillehammer, train	184	2:13	83	c. 20/day	
Oslo-Lillehammer, car	190	2:40	71		
Oslo-Hemsedal, bus	217	4:45	46	3/day	
Oslo-Hemsedal, car	217	3:18	66		
Bergen-Hemsedal, car	277	4:00	69		
Bergen-Flåm, train	176	2:42	65	2-3/day	
Oslo-Flåm, train	390	5:55	66	2-3/day	
Ålesund-Geiranger, car (F)	107	1:46	60		
Oslo-Geiranger, car	423	6:21	67		
Oslo-Geiranger, air A-A + car	500	3:05	162	11/day	Via Ålesund
Oslo-Geiranger, air C-C + car	552	4:05	135	11/day	Via Ålesund
Kristiansund-Veidholmen, car (F)	73	2:00	37		
Trondheim-Røros, train	163	2:29	66	3/day	
Trondheim-Røros, car	156	2:22	66		
Oslo-Røros, train	399	4:54	81	3/day	
Oslo-Røros, air A-A	265	0:50	318	2/day	
Oslo-Røros, air C-C	319	2:15	142	2/day	

5.6 Car occupancy

Emissions per passenger kilometre from cars – or from other vehicles – will be influenced by the percentage of seats occupied. Direct data on occupancy were requested for cars only. Average occupancy of cars on Norwegian roads is calculated annually by the Institute of Transport Economics (TØI)³⁷. Their figures are shown in Table 26. However, these data are not exactly valid for tourist traffic. On longer journeys, and holidays in particular, occupancy tends to be higher than on shorter trips. Presumably this applies both to Norwegian residents and to foreign visitors travelling by car. Average occupancy on longer trips (>100 km) was estimated at

³⁷ Rideng, A. and L. Vågane 2008. Transportytelser I Norge 1946-2007 (Transport Performance In Norway, in Norwegian with English summary), Table 3.9, <http://www.toi.no/getfile.php/Publikasjoner/T%D8I%20rapporter/2008/979-2008/979-hele%20rapporten%20nett.pdf>

2.2 persons per car in 1998 in a study by Lundli and Vestby³⁸. It was probably somewhat higher on holiday trips: we guessed that 2.4 would be a likely figure for such trips at the same time.

Although occupancy of tourists' cars is almost certainly higher than of other cars, it is also very likely that it has shown a declining trend since 1985. The mere fact that households – in Norway and many other countries – have become smaller suggests this. However, we have no indications of whether tourist occupancy has declined faster or more slowly than average occupancy.

Table 26 Average occupancy of cars in Norway
Source: Rideng and Vågane 2008

Year	Persons/car		Year	Persons/car
1985	1.88		1996	1.79
1986	1.87		1997	1.78
1987	1.86		1998	1.77
1988	1.85		1999	1.77
1989	1.84		2000	1.77
1990	1.83		2001	1.77
1991	1.82		2002	1.76
1992	1.82		2003	1.73
1993	1.82		2004	1.71
1994	1.81		2005	1.71
1995	1.80			

5.7 GHG emission factors for passenger transport

Table 27 shows estimates of GHG emissions per passenger kilometre for various modes of transport in Norway. They are derived from calculations in a previous study at the Western Norway Research Institute³⁹. The emission factors are on a well-to-wheel basis, i.e. they include emissions from the fuel chain, but they do not include emissions from production of energy infrastructure, e.g. oil rigs, pipelines or power plants.

Where transport runs on electricity – so far mainly in the case of trains – emissions will obviously depend on the mix of electricity used. In Norway some 98-99 % of national generation is hydro and wind power; and as Norway is a net exporter of electricity in most years the power consumed within the country could be claimed to be 100 % CO₂-free. However, the table also shows the consequences of other geographical perspectives – either assuming that the electricity mix is an average of that in the NordPool market (four Nordic countries) or an average of that found in all European OECD countries. See section 6.5 for more details on estimates regarding electricity.

The figure for emissions from cruise ships is taken from a study of cruise traffic to the Antarctic⁴⁰, as we found no specific figures for ships visiting Norway.

³⁸ Lundli, H.E. and S-E Vestby 1998: Luffart og miljø – Ein sammenligning mellom fly og andre transportmidler for energi, utslipp og areal. Vestlandsforskning, Sogndal (in Norwegian only, not available online.)

³⁹ Hille, J., C. Aall, H.L. Sataøen and H.N. Strøm 2008: Miljøbelastningen av norsk forbruk og norsk produksjon 1987-2007 (Environmental load of Norwegian consumption and production – summary only in English), <http://www.vestforsk.no/rapport/miljobelastningen-av-norsk-forbruk-og-produksjon-1987-2007>

⁴⁰ Eijgelaar, E., C. Thaper and P.M. Peeters (2010): Antarctic cruise tourism: The paradoxes of ambassadorship, "last chance tourism" and GHG emissions. *Journal of Sustainable Tourism*, 18 (3).

Table 27 Estimated emission factors for various modes of transport in Norway and for air and cruise transport to/from Norway. g CO2 equivalents per passenger kilometre.

Main source: Hille et al. (2008) (see text)

Mode of transport	1987	1997	2006	Comments
Trains				
Trains, diesel		90	117	
Trains, electric, assuming Norwegian electricity		0	0	
Trains, electric, assuming Nordic electricity		70	42	
Trains, electric, assuming European electricity		223	201	
Trains, Norwegian mix, Norwegian electricity		12.1	9.0	
Trains, Norwegian mix, Nordic electricity		72.9	71.8	
Trains, Norwegian mix, European electricity		205	213	
Buses				
Norwegian average	88	78	68	Occupancy between 25-28 %
Scheduled long distance buses	40	38	34	Occupancy 50 %
Touring buses	22	21	19	Occupancy 90 %
Cars (all trip lengths average)				
Petrol	144	136	128	Figures for all traffic should be reduced for tourists due to higher occupancy, cf. 4.3.6
Diesel	113	102	96	
Norwegian fleet average	143	133	123	
Motorcycles				
	138	137	130	
Ships and boats				
Short-distance car ferries	140	144	144	
Other domestic passenger boats (mainly high speed)	493	635	Probably <635	Emissions have recently declined due to lower speeds
Cruise ships			169,000	Figure refers to emissions per passenger day
Aircraft				
Domestic	303	260	209	
International	n/a	n/a	n/a	

6 Data on tourist accommodation

Ideally, the scenarios in this study require data on the economic performance of accommodation enterprises, their capacity, numbers of guest nights split both by type of accommodation, the residency of guests (domestic v. foreign), their purpose of travel (business v. leisure), the region of stay, and also on specific energy use and emissions. In fact there are substantial gaps in all these categories of data over the 1985-2005 period in Norway, and some discrepancies between sources where more than one is available. Many of the data series are therefore incomplete, while others have been filled in or adjusted by various estimation procedures, including simple judgement.

6.1 Economic data on accommodation enterprises

Tables 28-20 show data and estimates of accommodation enterprises' aggregate turnover, operating surpluses and investments. Data on turnover are all from structural statistics and concern accommodation enterprises specifically⁴¹. There are, however, breaks in the time series in 1993, 1996 and possibly 1998/99, so comparisons spanning the 1990s will not be altogether valid. Data on operating surpluses from 1994 on are also from structural statistics, as are those on investments from 1997 on. For previous years, they are from National Accounts statistics. The figures for operating surpluses until 1993 refer to the whole HORECA (hotel, restaurant and catering) industry. We guessed that on average some 55 % of these surpluses as well as investments might have been related to accommodation, but this might not even be approximately true for all years. (The Statistics on Tourism from 1987 onwards do include data on operating surpluses – as well as other main figures from the accounts – of accommodation enterprises, but these do not cover nearly all enterprises and the selection that are covered has changed substantially over time, so we did not find these figures useful. The data series that includes turnover (and also employment, but not other figures from accounts) of accommodation enterprises and from which the figures in Table 28 are drawn is a separate one with more complete coverage.)

Turnover and surpluses have been converted to approximate constant 2005 values by inflating current values for earlier years through division by the implicit price index for output of the HORECA industry that appears in the National Accounts⁴². Investments have been converted using the corresponding implicit price index for HORECA investments.

⁴¹ Structural statistics since 1999 are available here:

http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&iilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=shtotell
Some data for earlier years are available here on the Norwegian version of the Statistics Norway website: <http://www.ssb.no/shtotell/arkiv/> Other data until 1997 are from Statistics Norway's "Statistics on Travel" (Reiselivsstatistikk) which appeared annually until 1997.

⁴² Annual price changes for output and investments are given in the Annual National Accounts, Tables 8 and 28 respectively: <http://www.ssb.no/hr/en/> (the .csv files give data going back to 1970).

Table 28 Aggregate turnover of accommodation enterprises. Note: There are breaks in the time series between 1993/94 and 1996/97.

Source: Statistics Norway: Statistics on Tourism: Price index: National Accounts

Year	Million current NOK	Million constant NOK (approx.)	Million constant € (approx.)	MEMO: Price index for HORECA output, 2005=1
1985	5 100	10 783	1 347	0.473
1986	6 078	11 779	1 471	0.516
1987	7 064	12 502	1 561	0.565
1988	7 418	12 235	1 528	0.606
1989	7 250	11 389	1 422	0.637
1990	7 422	11 221	1 401	0.661
1991	7 876	11 406	1 424	0.691
1992	8 003	11 166	1 394	0.717
1993	10 341	14 062	1 756	0.735
1994	11 330	15 224	1 901	0.744
1995	11 968	15 891	1 985	0.753
1996	13 282	17 256	2 155	0.770
1997	13 793	17 449	2 179	0.790
1998	15 438	18 706	2 336	0.825
1999	15 472	18 184	2 271	0.851
2000	15 555	17 697	2 210	0.879
2001	15 846	17 402	2 173	0.911
2002	15 928	16 787	2 096	0.949
2003	15 709	16 248	2 029	0.967
2004	16 524	16 755	2 093	0.986
2005	17 211	17 211	2 149	1.000

Table 29 Aggregate operating surplus of accommodation enterprises. Note: Figures until 1993 refer to the entire HORECA industry (see text). There is also a break in the time series between 1996/97.
Sources: Statistics Norway: Statistics on Tourism and National Accounts, and own assumptions

Year	Million current NOK	Million constant NOK (approx.)	Million constant € (approx.)	MEMO: Price index for HORECA output, 2005=1
<i>Figures for HORECA</i>				
1986	941	1 824	227.7	0.516
1987	722	1 278	159.6	0.565
1988	340	561	70.0	0.606
1989	386	606	75.7	0.637
1990	662	1 001	125.0	0.661
1991	935	1 354	169.1	0.691
1992	328	458	57.2	0.717
1993	550	748	93.4	0.735
<i>Figures for accomodation</i>				
1994	528	709	89	0.744
1995	463	602	75	0.753
1996	575	727	91	0.770
1997	822	996	124	0.790
1998	806	947	118	0.825
1999	796	936	117	0.851
2000	347	395	49	0.879
2001	178	196	24	0.911
2002	258	272	34	0.949
2003	-11	-11	-1	0.967
2004	461	467	58	0.986
2005	687	687	86	1.000

Table 30 Aggregate gross investments of accomodation enterprises. Note: Data until 1996 are only roughly comparable with those for later years.

Source: Statistics Norway: Statistics on Tourism and National Accounts

Year	Million current NOK	Million constant NOK (approx.)	Million constant € (approx.)	MEMO: Price index for HORECA investments, 2005=1
1988	1 022	878	110	1,164
1989	1 096	953	119	1,150
1990	781	698	87	1,118
1991	618	559	70	1,106
1992	667	610	76	1,094
1993	726	661	83	1,098
1994	804	722	90	1,114
1995	872	775	97	1,125
1996	938	843	105	1,112
1997	661	581	73	1,138
1998	1 614	1 411	176	1,144
1999	922	816	102	1,130
2000	773	682	85	1,133
2001	925	801	100	1,155
2002	824	751	94	1,097
2003	514	510	64	1,007
2004	632	626	78	1,010
2005	617	617	77	1

6.2 Accommodation capacity

Table 31 shows hotel capacity in terms of available beds and rooms at the end of each year from 1985-2005, and the percentage of available room-nights that were utilised through each year (except 1985 for which figures are not available). The table also shows the number of cabins (or rooms in cabins with more than one separate room) from 1988 on, and corresponding figures for “hyttegrender” or “holiday dwellings” (mainly enterprises letting cabins only) from 1998 on. Data for camping grounds and on other capacities at camping grounds, such as spaces for tents or caravans, are not available, nor are data on capacity at other enterprises such as youth hostels. Neither are utilisation figures for other enterprises than hotels. All figures are from Statistics Norway's StatBank⁴³. There is a break in the time series for camping grounds in 1998, with greater coverage from that year on, but the actual effect appears to have been small.

⁴³

http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=overnatting

Table 31 Capacities of hotels, camping grounds and “holiday dwellings”, and capacity utilisation at hotels. Capacity figures for hotels refer to the end of each year, those at other establishments to July of each year.

Source: Statistics Norway: Statistics on Tourism

Year	Hotels, available beds	Hotels, available rooms	Room-nights utilised at hotels, per cent	Camping grounds, available cabins or rooms	Holiday dwellings, available cabins or rooms
1985	66 769	34 605			
1986	71 692	36 026	55.6		
1987	82 545	41 022	54.5		
1988	83 647	41 899	49.9	12 583	
1989	86 377	42 874	48	12 913	
1990	93 459	45 858	46.8	12 893	
1991	97 497	47 311	47.2	13 398	
1992	100 263	48 007	47.5	13 084	
1993	102 052	48 316	49.6	13 027	
1994	107 384	50 008	50.6	13 118	
1995	110 081	51 111	49.7	13 000	
1996	111 514	51 965	50.5	12 596	
1997	112 372	52 437	51.7	12 711	
1998	115 969	54 372	53.7	13 416	1 201
1999	115 582	54 618	53.1	13 127	1 317
2000	120 653	56 721	51.3	12 962	1 396
2001	123 534	58 056	50.7	12 609	1 640
2002	124 191	58 641	49.5	12 312	1 636
2003	121 920	58 222	48.2	12 038	2 272
2004	120 773	58 083	50	11 915	2 420
2005	125 232	59 301	52.1	12 221	2 573

6.3 Hotel room prices

Prices of accommodation are available for hotels only. The table below shows how average room prices evolved from 1985-2005 according to Statistics Norway⁴⁴. As we are now considering a consumer good, the figures for earlier years have been inflated to 2005 NOK using the consumer price index for all goods and services.

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http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=overnattning

Table 32 Average prices of hotel rooms

Source: Statistics Norway: Statistics on Tourism and Consumer Price Index

Year	Current NOK	Constant 2005 NOK	Constant 2005 €	MEMO: CPI, 2005=1
1985	314	584	72.9	0.538
1986	347	602	75.2	0.576
1987	388	619	77.4	0.626
1988	434	650	81.1	0.668
1989	473	677	84.6	0.699
1990	501	689	86.0	0.727
1991	526	699	87.3	0.752
1992	556	722	90.2	0.770
1993	559	710	88.7	0.787
1994	572	716	89.5	0.798
1995	578	706	88.2	0.818
1996	593	716	89.4	0.828
1997	616	725	90.5	0.850
1998	643	740	92.4	0.869
1999	678	763	95.3	0.889
2000	682	744	92.9	0.917
2001	695	736	91.9	0.944
2002	702	734	91.7	0.957
2003	707	721	90.1	0.980
2004	705	716	89.4	0.984
2005	721	721	90.0	1.000

6.4 Overnight stays by type of accommodation, purpose of travel and region

Since tourism in this study is defined as travel involving overnight stays away from home, information on the number of nights spent in such other places is an important indicator of the volume of tourism. However, actual statistics on the subject only cover nights spent at tourist establishments – not in second homes or the homes of friends or camping outside camping grounds. In Norway, statistical coverage even of nights at commercial establishments is not quite complete. Surveys provide some supplementary information on overnight stays both inside and outside of commercial establishments, but none cover all groups of tourists nor the whole 1985-2005 period, and the information they do provide is in some cases contradictory, either to statistics or to information from other surveys.

Below, we shall first present data from the accommodation statistics on guest nights split by type of accommodation, purpose of travel and guests' nationality (Norwegian or foreign). Nationality has to serve as a proxy for residence in this case because that is what the statistics record. Secondly, we shall look at figures from two recent surveys of foreign (in this case meaning foreign resident) visitors, which also give information on their (main) type of accommodation in Norway and the purpose of their visits. We shall then compare the results from these two sources with each other and with results from two series of surveys of travel by Norwegian residents, which also give some information on their choices of accommodation. – Finally we shall return to the statistics to see what they tell about the split of guest nights between tourism regions in Norway.

The accommodation statistics⁴⁵ provide data on guest nights at hotels since 1985, at camping grounds since 1988 (but with a break in the time series in 1998) in “holiday dwellings” since 1998 and in youth hostels since 1999. Except for youth hostels, however, the smallest establishments are not counted: the cut-off for hotels is at a minimum of 20 beds, for camping grounds presently at 8 cabins or 50 spaces for tents, camping vehicles or caravans, and for holiday dwellings at 3 cabins. The break in the time series for camping grounds in 1998 involved not just more complete coverage of enterprises but also the inclusion of stays under seasonal contracts. The changes appear to have affected the number of recorded stays by Norwegians significantly, but less so those by foreigners. There is also a minor break in the time series for holiday dwellings in 2003 as some enterprises previously registered as hotels were transferred to this category.

The next two tables show the numbers of recorded guest nights in hotels and camping grounds split by nationality, and the corresponding figures for holiday dwellings and youth hostels.

Table 33 Guest nights (1000) at hotels and camping grounds, by guests’ nationality
 Source: Statistics Norway: Statistics on Tourism

Year	Hotels			Camping grounds		
	Norwegians	Foreigners	Total	Norwegians	Foreigners	Total
1985	8 193	3 713	11 905			
1986	8 356	3 298	11 653			
1987	8 708	3 965	12 673	<i>Old series</i>		
1988	8 497	3 356	11 853	2 767	1 829	4 595
1989	8 193	3 431	11 624	2 798	1 909	4 707
1990	8 485	3 537	12 022	2 961	2 111	5 072
1991	8 908	3 917	12 825	2 880	2 189	5 070
1992	9 022	4 275	13 298	2 611	2 212	4 822
1993	9 447	4 557	14 004	2 494	2 325	4 819
1994	9 643	5 041	14 685	2 512	2 202	4 715
1995	9 862	4 985	14 847	2 296	2 074	4 370
1996	10 261	5 050	15 312	2 096	1 936	4 032
1997	10 680	5 039	15 719	<i>New series</i>		
1998	11 252	5 168	16 421	4 969	2 295	7 264
1999	11 319	5 208	16 526	4 985	2 169	7 154
2000	11 398	4 967	16 365	5 054	2 094	7 148
2001	11 599	4 817	16 416	5 049	2 070	7 119
2002	11 482	4 706	16 188	5 265	2 118	7 383
2003	11 262	4 375	15 636	5 144	2 013	7 157
2004	11 764	4 596	16 360	5 498	2 150	7 648
2005	12 349	4 761	17 110	5 646	2 114	7 760

⁴⁵

http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=overnatting

Table 34 Guest nights in holiday dwellings and youth hostels (1000), by guests' nationality

Source: Statistics Norway: Statistics on Tourism

Year	Holiday dwellings			Youth hostels		
	Norwegians	Foreigners	Total	Norwegians	Foreigners	Total
1998	145	157	302			
1999	178	201	379	146	238	384
2000	193	208	401	157	199	356
2001	214	245	459	149	191	340
2002	223	259	482	139	193	332
2003	303	298	601	144	180	324
2004	409	515	924	161	181	342
2005	472	605	1077	161	171	332

From 1986 on, the accommodation statistics also split guest nights at hotels by purpose of travel (business or leisure). No such split is available for other kinds of accommodation. It is safe to assume that the great majority of guests at camping grounds, in holiday dwellings and in youth hostels are leisure travellers, but not 100 %.

Table 35 Guest nights(1000) at hotels, by guests' purpose of travel

Source: Statistics Norway: Statistics on Tourism

Year	Business	Leisure	Total
1986	5 538	6 115	11 653
1987	6 410	6 263	12 673
1988	5 745	6 108	11 853
1989	5 491	6 133	11 624
1990	5 590	6 432	12 022
1991	5 780	7 045	12 825
1992	6 002	7 296	13 298
1993	6 165	7 839	14 004
1994	6 491	8 194	14 685
1995	6 578	8 269	14 847
1996	6 891	8 421	15 312
1997	7 318	8 401	15 719
1998	7 857	8 564	16 421
1999	7 857	8 669	16 526
2000	7 574	8 791	16 365
2001	7 595	8 821	16 416
2002	7 469	8 719	16 188
2003	7 266	8 370	15 636
2004	7 651	8 709	16 360
2005	8 403	8 707	17 110

It would have been useful for this study if we could have split hotel guests by nationality and purpose of travel at once, i.e. into four categories, but the design of Statistics Norway's data collection does not permit this.

Since 1995, the Institute for Transport Economics has conducted annual surveys of foreign visitors⁴⁶, a sample of whom are asked to respond to a questionnaire at their point of departure from the country. Unfortunately for our purposes, the design of these surveys has changed several times, making it difficult to construct consistent time series for longer periods. We found the estimates of total numbers of foreign visitors and the percentages travelling on business vs. leisure to be comparable over the 1998-2005 period, but comparable figures on visitors' type of accommodation in Norway were available only from 2002-2005. The table below shows the aggregate figures by purpose of travel, while the following table shows the breakdown by reported type of accommodation in 2002 and 2005.

Table 36 Foreign visitors by purpose of travel, average numbers of nights in Norway per visit and number of guest nights in all. Estimates from Foreign Visitors Surveys
Source: Institute for Transport Economics: Foreign Visitors Surveys

Year	Business			Leisure		
	Visitors (1000)	Average stay (nights)	Guest nights (1000)	Visitors (1000)	Average stay (nights)	Guest nights (1000)
1998	788	4.9	3 881	2 467	7.8	19 284
1999	797	5.0	3 952	2 427	7.5	18 201
2000	777	5.0	3 890	2 327	7.5	17 451
2001	776	4.7	3 672	2 297	7.3	16 799
2002	738	4.7	3 470	2 373	7.3	17 363
2003	749	4.2	3 182	2 520	7.5	19 003
2004	848	4.6	3 906	2 780	7.6	21 000
2005	913	4.4	3 980	2 946	7.5	22 125

Table 37 Guest nights (1000) by foreign business and leisure travellers, split by main type of accommodation in Norway. Estimates from Foreign Visitors Surveys 2002 and 2005
Source: Institute for Transport Economics: Foreign Visitors Surveys

Type of accommodation	Business		Leisure		Total	
	2002	2005	2002	2005	2002	2005
Hotel	1 700	1 900	4 341**	5 360**	6 041**	7 260**
Camping ground	104	110	2604	2 390	2 708	2 500
Free camping	35	30	695	1 030	720	1 060
Cabin	243	350	4 514**	5 080**	4 757**	5 430**
With friends/relatives	312	400	3 993	5 800	4 305	6 200
Other	1 041	1 190	1 215	1 570	2 256	2 760
Totals*	3 435	3 980	17 362	21 230	20 787	25 210

* Minor discrepancies with figures in Table 35 are due to inflation procedures and rounding.

** These figures were adjusted for the purposes of the SDN scenarios. See text below.

The Foreign Visitors Surveys (FVS) differ from the statistics in covering all types of accommodation. Entirely absent from the statistics are "free camping" (which is generally permitted in Norway if staying in a tent or in the open⁴⁷, but not necessarily in a vehicle) and stays with friends or relatives. The "cabin" group should in principle cover what are called "holiday dwellings" in the statistics, but also – and more importantly, to judge from the figures – includes stays in cabins or second homes owned by individuals who let them for part of the year. The "other" category in the FVS should in principle include youth hostels, but the numbers show that most of the people reporting "other" accommodation must have stayed elsewhere. The explanation(s) for the large "other" category are unclear.

⁴⁶ Published annually as "Gjesteundersøkelsen yyyy"; editions from 2000 onwards are available online (in Norwegian with English summaries), see <http://www.toi.no/category.php?search=true&fd=1&fm=1&ld=31&lm=12&sort=relevance&categoryID=8&fy=-1&pubnr=&author=&query=gjesteundersøkelsen&x=15&y=8>

⁴⁷ Under Norwegian law anyone may camp out anywhere for up to three nights in the same place, except in built-up areas or on cultivated land.

On one score, there is a major discrepancy between the statistics and the FVS. The FVS show 1.3 million more guest nights by foreign residents in Norwegian hotels in 2002 than the number of guest nights by foreign nationals in the statistics, and in 2005 the gap is a full 2.5 million guest nights. Now the statistics slightly underreport nights in hotels because very small hotels are left out. It is also conceivable that more nights are spent in hotels here by Norwegian nationals normally residing abroad than by foreign nationals residing in Norway, but we have no indication that this is so. In any case the factors just mentioned are unlikely to explain a gap of more than a few hundred thousand guest nights. According to one of the researchers responsible for the FVS⁴⁸, the most likely explanation for the rest of this gap is that some visitors who actually stayed in cabins report stays in hotels.

For the purposes of this study, the numbers of guest nights by foreign visitors in 2002 and 2005 were assumed to be identical with those in Table 36, except that 1.0 million nights by leisure travellers in 2002 and 2.2 million nights in 2005 were transferred from "hotels" to "cabins".

This leaves the question of stays by Norwegian residents. The accommodation statistics cover an even smaller share of domestic than of inbound foreign tourism, since residents are more likely (a) to have friends and relatives within the country and to stay with them and (b) to own cabins or second homes in the country and to go there, or to cabins owned by friends, relatives or other connected people.

We have other sources of information about stays away from home by Norwegian residents, namely the National Travel Surveys by the Institute of Transport Economics (particularly the 2001 survey) and a series of Holiday Surveys conducted sporadically by Statistics Norway since 1968 and annually since 1997. Unfortunately neither the NTS nor the Holiday Surveys were designed primarily to provide information about tourism as such: the NTS focus mainly on daily travel and give much more limited information about longer trips, while the Holiday Surveys were conceived mainly to provide information about an aspect of social conditions, i.e. to find out how many people got no holiday, one holiday or more than one holiday in the course of a year.

Although five NTS were conducted between 1985 and 2005, only the last three of them (1998, 2001 and 2005) clearly identified trips involving overnight stays, and only the last two included questions about accommodation on such trips. In fact only the 2001 survey makes it possible to calculate the number of nights spent in various kinds of accommodation away from home – and then only on leisure trips where the distance travelled was <100 km each way. The 2005 survey gives less information on overnight stays in general but some useful supplementary information on second homes.

According to the 2001 survey, Norwegian residents aged 13 or more spent an average of 8.6 nights away from home on longer (>100 km) leisure trips within the country. Assuming that the number was the same for children under 13 (who are not covered by the survey) the total number of nights away from home was 38.9 million. However, many more nights must have been spent away from home at distances of <100 km, even if we disregard such groups as people in relationships who have not yet moved together, children of divorced parents visiting the one not granted custody, children visiting each other, adults looking after sick and elderly parents etc. These are not tourists by our definition, but people staying in their own second homes or those of relatives, friends or others are. Many Norwegians own cabins by the sea or in the mountains that are less than 100 km from their main residence, and these nearby cabins are probably used more frequently than those further away. Hille et al. (2007)⁴⁹ implicitly guessed the number of nights spent at second homes <100 km away to be about 28 million in 2001. In these cases, the typical length of a stay is over the weekend.

The 2001 NTS gives no breakdown of business trips by type of accommodation in 2001, but we can probably assume that the great majority of stays on such trips were either in hotels or in private homes (rather than camping grounds, cabins or the like).

The table below compares the results of the 2001 NTS with data from the accommodation statistics for the same year.

⁴⁸ Petter Dybedal, TØI (personal communication).

⁴⁹ Hille, J., C. Aall and I.G. Klepp 2007: Miljøbelastninger av norsk fritidsforbruk – en kartlegging (Environmental impacts of Norwegian leisure consumption; in Norwegian with English summary) <http://www.vestforsk.no/filearchive/rapport-1-07-fritidsbruk.pdf>

Table 38 Nights spent way from home (1000) on longer leisure trips within the country by Norwegian residents according to the 2001 National Travel Survey (inflated to include children), and total nights spent in some types of accommodation by Norwegian nationals in 2001 according to Statistics Norway
 Source: Statistics Norway, Institute for Transport Economics and own assumptions (see text)

	Nights on leisure trips >100 km (1000) and percentages of all nights on such trips (NTS)	Total nights by Norwegians (Statistics Norway)
Hotel	2,300 (6 %)	11,599
Camping ground	1,200 (3%)	5,049
Borrowed or rented cabin	3,100 (8 %)	214 (refers to "holiday dwellings" only)
Friends or relatives, >100 km from residence	20,000 (52 %)	
Own cabin or other second home, >100 km from residence	10,900 (28 %)	
Other	1,200 (3 %)	Youth hostels: 149
Total	38,900 (100 %)	
On trips of 1-3 nights	28,800 (74 %)	
On trips of 4+ nights	10,100 (26 %)	

The figures suggest significant underreporting of overnight stays at hotels and camping grounds in the NTS material. The NTS figure for stays at hotels etc. is simply not compatible with the statistics (except on the very improbable assumption that millions of holiday stays at Norwegian hotels were made by the 6 % of Norwegian residents in 2001 who were not Norwegian citizens). Even if no foreigners had stayed at Norwegian hotels on business, the number of business nights at Norwegian hotels in 2001 would not make up the difference. The 2002 Foreign Visitors Survey indicated that foreigners travelling on business spent 1.7 million nights in Norwegian hotels. If the figure was the same in 2001, then the number of nights spent in hotels by Norwegians travelling on business would have been about 5.9 million (cf. Table 34), and the number of nights by Norwegians not on business therefore about 5.6 million. As the accommodation statistics themselves slightly underreport hotel stays, the figure is actually more likely to have been a bit higher than a bit lower.

Stays at camping grounds would seem to be underreported by an even wider margin in the NTS than those in hotels (assuming that only a small fraction of stays at camping grounds were by business travellers). A possible explanation, or partial explanation, is that some nights spent in cabins-at-camping-grounds may have been reported in the "rented cabin" category. On the other hand, the statistics on "holiday dwellings" do not even purport to represent more than a small subset of rented cabins, namely those belonging to establishments with 3 or more cabins for rent. Individual cabins that are let or lent by households are absent from the statistics. So the sum of overnight stays at camping grounds *and* borrowed or rented cabins should be *quite significantly larger* than the 5.3 million shown in the statistics, whereas NTS figures make the sum only 4.3 million.

The total number of nights in cabins more than 100 km from home according to the 2001 NTS was some 14 million. As mentioned above, another source suggests that the figure for nights in cabins closer to home may have been twice as high. Data from the 2005 NTS suggest that this is not improbable. This survey includes a table showing the percentages of owners of "hytter" – the term is used almost interchangeably for "cabin" or "second home" in Norwegian - had these in their own county of residence. In all but 3 of the 19 counties (the exceptions were the capital region, i.e. Oslo and Akershus counties, and the county of Vestfold) a majority – in many cases a very large majority – of cabin owners had them within their own county. It is likely that most of this majority had their cabins within 100 km of their residence (as must some of those with cabins in neighbouring counties). Also, it is likely that nearby cabins were used more frequently than more distant ones. That 2/3 or more

of nights in “cabins” should have been spent less than 100 km from home is in fact quite plausible. – Other information in the 2005 NTS supports the conjecture that over 40 million nights may have been spent in cabins. 40 % of respondents said they had “access to” a cabin, and this group visited it 1.2 times per month on average, Assuming the figures were the same in 2001, that makes 14.4*1.8 million = 26 million visits that year. Unfortunately the NTS gives no information on the average length of stays in cabins, but two nights is a fair guess, in which case the number of nights becomes 52 million, not counting rented cabins.

The last source of data on overnight stays by Norwegian residents is the Holiday Surveys⁵⁰. As the name suggests they too cover leisure trips only, and then mainly a subset, namely trips involving four or more nights away from home. Until 1994 the Holiday Surveys did also include simple questions on trips of 1-3 nights’ duration, to which we shall return in another context, but they gave no information on accommodation during these shorter trips. Since the 2001 NTS also distinguished between trips of this duration and shorter ones, we can compare the results for the four nights plus group. According to the Holiday Survey, Norwegian residents aged 16-79 spent 23.8 million nights away on holidays within Norway during 2001. This probably makes about 30 million nights for the whole population, including children and the elderly. That is three times more nights than the NTS would suggest for trips of 4+ nights’ duration *and distances of >100 km each way*. In other words, part of the apparent discrepancy could be explained by trips of <100 km, for instance to second homes. They cannot be identified from the published results of the Holiday Survey. However, it seems unlikely that trips of <100 km explain *much* of the difference. Although it is altogether plausible that Norwegians annually spend an eight-figured number of nights in second homes less than 100 km from their primary residence, most of these stays almost certainly involve fewer than 4 nights away at a stretch, and therefore do not enter into the Holiday Survey.

Another matter is that the total numbers of domestic overnight leisure trips which can be calculated from the Holiday Surveys from 1994 – i.e. the sum of trips lasting 1-3 nights and 4+ nights – are only in the range of 14-18 million per year, as we shall see in section 4.6. If so, then trips to cabins must have been at least a factor of 3 less in this period than what the 2005 NTS would suggest was the case in 2005. It is highly improbable that there was a real change of anything like that magnitude; in other words, we must assume either that very many trips to nearby cabins were unreported in the Holiday Surveys, or that they are heavily over-reported in the 2005 NTS, or both. Because the latter survey asked directly and specifically about visits to cabins, it is probably more reliable on this point. Fortunately, the issue is much less important in estimating transport volumes and emissions than the sheer number of overnight stays, precisely because most of the trips are short.

Table 38 shows the breakdown of trips by main type of accommodation in the 2001 Holiday Survey. Note that the basis is numbers of trips and not nights – the average number of nights per trip may differ between different types of accommodation, but the published results give no information about this.

Table 39 Holiday trips (4+ nights away from home) by type of accommodation in 2001, according to the Holiday Survey. Per cent

Source: Statistics Norway: Holiday Survey 2001

Hotels etc.	11.1
Camping grounds	6.1
Other commercial establishments	1.7
Own second homes or cabins	23.6
“Rented private accommodation” (probably mostly cabins?)	9.2
Other private accommodation (“friends and relatives”)	46.9
Unspecified	1.4

Now if stays at hotels were of the same duration as other stays, this would suggest that about 3.3 million nights were spent there on trips lasting 4+ nights. In fact it’s likely that stays at hotels lasted fewer nights on average than those in cheaper accommodation, but by the same token we would expect a large share of leisure stays at hotels to be of 1-3 nights and therefore not counted in the Holiday Survey. If the latter is true, then the Holiday

⁵⁰ Results of the Holiday Surveys since 2002 are available here http://statbank.ssb.no/statistikbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=0&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=ferie and surveys going back to 1997 here: <http://www.ssb.no/emner/00/02/20/ferie/arkiv/>

Survey results are quite compatible with a total number of ~5.6 million nights in hotels by Norwegian residents on leisure trips, as the accommodation statistics in combination with the Foreign Visitors Surveys would suggest.

On the other hand, the share of stays at camping grounds seems too low to fit easily with the accommodation statistics, even allowing for trips of less than 4 nights' duration. One would expect most camping holidays to last for more than three days and therefore to be included in the Holiday Survey. However, if camping holidays of 4+ nights' duration are *longer* than other holidays of 4+ nights, which is not altogether improbable, then their share of the ~30 million nights mentioned will be larger than 6.1 per cent, and not necessarily at odds with the accommodation statistics.

The table below shows the evolution of the total number of nights spent away from home on trips of 4+ nights' duration within Norway by residents aged 16-79, according to the Holiday Surveys since 1999. Remember that the figures must be inflated, probably by ~25 per cent, to reflect the whole population. Corresponding figures for earlier years have not been published.

Table 40 Nights spent away from home (1000) on holidays in Norway lasting at least four nights, by residents aged 16-79. Data from Holiday Surveys
 Source: Statistics Norway: Holiday Surveys

1999	28,047
2000	24,004
2001	23,823
2002	22,947
2003	26,072
2004	24,002
2005	23,779

Since 2000 there has been no clear trend in the number of nights spent on holidays in Norway, although there was a significant drop from 1999 to 2000. Other data to which we shall return below suggest that the volume of domestic leisure tourism was in fact fairly stable over the whole 1985-2005 period, aside from fluctuations due to economic conditions. Norwegians have made a growing number of leisure trips, but the growth has been in foreign rather than domestic travel.

The available data leave big gaps in our knowledge of domestic leisure tourism and accommodation. It is impossible to say anything about long-term trends in overnight stays by type of accommodation between 1985 and 2005, except what can be deduced from the accommodation statistics for hotels, which only represent a small fraction of overnight stays by domestic leisure tourists. Regarding the situation around 2001, it is probable that there were some 5-6 million nights spent annually by domestic leisure tourists in hotels, some 4-5 million at camping grounds, possibly upwards of 40 million in privately owned cabins, and anywhere upwards of 20 million with friends or relatives in their permanent residences. 20 million is the figure we derived from the 2001 NTS for stays with friends or relatives at distances of over 100 km. As the distance shrinks below this, so probably does the share of nights with "friends or relatives" that can reasonably be related to tourism. However, the Holiday Survey of 2001 suggests that some 13-14 million nights were spent at homes of friends or relatives on trips which lasted at least four nights and were considered holidays. Including stays of 1-3 nights, the total number of nights at friends' or relatives' places that can be related to tourism is unlikely to have been much less than 20 million.

The table below summarises these guesstimates:

Table 41 Nights spent away from home by Norwegian leisure tourists c. 2001, by type of accommodation: rough estimates from available evidence. Million nights per year

Source: See text

Hotels	5-6
Camping grounds	4-5
Cabins outside camping grounds*	40-50+
With friends or relatives	20+
Total	70-80+

* Estimate based on NTS data. Holiday Survey data for years up to 1994 suggest that numbers are very much less.

Regarding accommodation during domestic *business* travel, we have no other real data than those provided by accommodation statistics for hotels, at which business travellers stay during a much larger share of their trips than domestic leisure travellers, but certainly not on all their trips. Table 34 shows the total number of nights spent at Norwegian hotels by business travellers. To get the number of nights spent there by Norwegian resident business travellers, we obviously need to deduct those spent by foreign resident business travellers, which were 1.7 million in 2002 and 1.9 million in 2005 according to Table 36. The Foreign Visitors Survey for 1998 suggest that it was close to 1.9 million in that year. Before that we have no direct data on the number of foreign business visitors staying at hotels. However, we do have approximate figures (from the Air Passenger Surveys of the Institute for Transport Economics) on foreign business arrivals by air, of which there were about 406,000 in 1986, 433,000 in 1992 and 630,000 in 1998. In 1998, the arrivals by air made up some 80 % of foreign business arrivals in Norway. The percentage may have been slightly less earlier in the period but probably not significantly less. Let us assume that 75 % of business arrivals in 1986 and 78% in 1992 were by air. If so, and if neither the number of nights spent in Norway by the average foreign business traveller, nor the percentage of nights spent at hotels has changed, then the number of nights spent in Norwegian hotels by foreign business travellers must have been about 1.3 million in 1986 and 1.4 million in 1992.

On these assumptions the number of nights spent in domestic hotels by Norwegian business travellers works out as shown below.

Table 42 Estimated guest nights (1000) in Norwegian hotels by foreigners and Norwegians travelling on business

Source: Table 34 and own assumptions, see text

	Total nights (cf. Table 34)	Less foreigners' nights	= Norwegians' nights
1986	5538	1300	4238
1992	6002	1400	4602
1998	7857	1900	5957
2002	7469	1700	5769
2005	8403	1900	6503

We have no other real data to tell how many nights Norwegians travelling on business spent outside of hotels in any year between 1985 and 2005, much less how the number of business nights outside of hotels evolved over the period. The National Travel Surveys for 1998, 2001 and 2005 do however give figures for the total number of business trips (>100 km each way) with overnight stays in those years. The evolution that these surveys suggest is rather unlikely to be real (a drop from 2.9 million trips in 1998 to 1.9 million in 2001, followed by an increase to 2.25 million in 2005). We shall return to the overall trend below. However, if the average number of domestic business trips >100 km per year by Norwegian residents during the period was roughly what an average of these figures would suggest – say some 2.2 to 2.5 million – then this in turn suggests that a majority of nights on business trips were spent at hotels. Given the number of business hotel nights by Norwegians from 1998-2005 in Table 41, the average duration of hotel stays on business trips would have to be closer to three than two nights to fit with the NTS figures, even assuming that *no* business travellers stayed outside of hotels, but disregarding stays at hotels less than 100 km from home. The number of nights spent at hotels <100 km from home is admittedly not insignificant, witness the many hotels located within a 70-80 km radius from Oslo and catering mainly to the market for seminars, conferences and team-building activities. But even after compensating for this, the average

overnight business trip would probably have to last for at least two nights for the aggregate to make up as many hotel nights as Table 41 suggests. Our judgement – it cannot be more than that – is that the average duration of business trips with overnight stays is unlikely to have been *very* much longer than two nights. If so, most nights away from home on domestic business trips must have been spent in hotels. We have no data to suggest how the remainder should be divided between other form of accommodation, but stays with friends, relatives or business acquaintances would seem the most likely alternative to hotels.

It would have been desirable for the SDN scenario model to have input on how overnight stays by tourists were distributed between the five tourism regions of Norway. The 19 counties were grouped into regions as follows:

Eastern Norway: Østfold, Akershus, Oslo, Hedmark, Oppland, Buskerud, Vestfold

Southern Norway: Telemark, Aust-Agder, Vest-Agder

Western Norway: Rogaland, Hordaland, Sogn og Fjordane, Møre og Romsdal

Central Norway: Sør-Trøndelag, Nord-Trøndelag

Northern Norway: Nordland, Troms, Finnmark

Unfortunately, no data were available to split tourists both by region and type of accommodation, excepting data on nights at hotels and camping grounds from Statistics Norway's Accommodation Statistics. In fact that source only made it possible to construct time series for hotels, since complete regional data on camping grounds were only available for the very end of our period. The reason for this is that Statistics Norway does not publish figures for counties with three or fewer reporting entities, and until recently several counties had so few camping grounds above the size threshold for statistical coverage.

The table on next page shows the distribution of guest nights at hotels by region at five-year intervals from 1985-2002, and the distribution of nights at camping grounds in 2005.

Table 43 Guest nights (1000) at hotels and camping grounds, by tourism region
 Source: Statistics Norway: Statistics on Tourism

Year	Hotels			Camping grounds		
	Norwegians	Foreigners	Total	Norwegians	Foreigners	Total
Eastern Norway						
1985	3994	2064	6058			
1990	4091	1903	5994			
1995	4731	2753	7484			
2000	5492	2735	8227			
2005	5998	2564	8562	2637	572	3209
Southern Norway						
1985	964	284	1248			
1990	932	279	1211			
1995	1054	379	1433			
2000	1198	366	1564			
2005	1226	292	1518	1037	217	1254
Western Norway						
1985	1734	968	2702			
1990	1934	875	2809			
1995	2224	1186	3410			
2000	2584	1224	3808			
2005	2871	1264	4135	997	770	1767
Central Norway						
1985	670	127	797			
1990	701	160	861			
1995	815	228	1043			
2000	943	218	1161			
2005	1074	207	1281	443	173	616
Northern Norway						
1985	841	271	1112			
1990	827	320	1147			
1995	1037	440	1477			
2000	1181	424	1605			
2005	1260	444	1704	532	382	914

6.5 Energy use and GHG emission factors

The quantity of GHG emissions generated by tourist accommodation can be defined in several ways. One could argue that since tourists would be consuming energy at home if they were not travelling, net emissions from accommodation only arise if those generated where they stay are greater than those avoided at home. In the case of tourists staying with friends or relatives, it is quite likely that net emissions will be negative, especially if the whole family is travelling. Two households will be gathered under one roof and the other house left empty, hopefully consuming little or no energy. If only one person in a family is travelling, so that his or her home remains occupied, and if he or she is staying not with friends but in a hotel or other dedicated tourist facility, then net energy use and emissions are much more likely to be positive. This applies to current energy use and emissions.

If we also consider the indirect emissions arising from the production and maintenance of dedicated accommodation, then the likelihood of positive net emissions increases further.

In practice, it can be difficult enough to estimate gross direct emissions from accommodation, never mind indirect emissions or avoided emissions. In this study we chose to disregard any effect on emissions from stays with friends or relatives, but were interested in finding gross direct emissions from dedicated accommodation, including hotels, camping grounds and cabins as the most important categories. No actual statistics on emissions from any of these exist in Norway. However, a few statistical and other sources are available to throw light on energy use in hotels and in cabins, though no sources were found for camping grounds. Figures for energy use can be converted to emissions if we decide on specific emission factors for the various energy carriers. The latter is a debatable issue in the case of electricity, which is the dominant energy carrier for stationary purposes in Norway. Leaving that debate open, we shall first look at the available data on energy use in hotels and cabins, and then present relevant emission factors, including alternative factors for electricity.

The annual Energy Accounts published by Statistics Norway do not specify accommodation enterprises, but groups them together with the rest of the HORECA industry. However, Statistics Norway did conduct a once-off, detailed survey of energy use in services, including hotels, in 2000⁵¹. The table below shows the results when inflated from the survey sample to represent all hotels in Norway (Total consumption) and the figures per guest night, assuming that there were 16.365 million guest nights in all in 2000, as shown by Table 34.

Table 44 Energy consumption of hotels in Norway, 2000
Source: Statistics Norway

	Elec- tricity	District heat	LFO + Kero- sene	Petrol	Diesel	Bottled gas	Other (wood fuels?)	Total
Total consumption, GWh	782.8	32.3	25.1	2.1	2.9	4.7	1.0	848.7
Cons. per guest night, kWh	47.8	2.0	1.5	0.1	0.2	0.3	0.1	51.9
Percentage of total energy	92.2	3.8	3.0	0.2	0.3	0.6	0.1	100.0

In 2008 Statistics Norway conducted another survey of energy use in services⁵², but with a different design. This survey includes other accommodation enterprises as well as hotels, but the various types are unfortunately lumped together in the published results. Unlike the 2000 survey, the one from 2008 only covers stationary energy use, so there are no figures for petrol or diesel. The only practically useful information from this survey is the mix of energy carriers and the average consumption per square metre of building space, which was 234 kWh.

Table 45 Breakdown of stationary energy consumption in accommodation enterprises, 2008
Source: Statistics Norway

	Elec- tricity	District heat	LFO + kerosene	Bottled or piped gas	Bio- energy	Total
Percentages	84.6	9.8	2.3	0.9	0.8	98.4

The missing 1.6 % are unexplained. A comparison of the 2000 and 2008 results suggests that there was an increase in the use of district heat, and more marginally of biofuels, at the expense of electricity and oil products over the period. This is assuming that the fuel mix for all accommodation enterprises was not much different from that for hotels alone. In fact hotels are much more likely to use district heat than camping grounds are, so the share of district heat for hotels alone may have grown by 7-8 percentage points rather than 6. That the use of district heat should have increased over this period is very plausible – it has done so in the service sector at large. However, these changes only affect the tail end of our period. Some of the increase in use of district heat and biofuels probably occurred between 2005-2008.

Going back beyond 2000, we have statistics only for the HORECA industry as a whole, from the annual Energy Accounts⁵³.

⁵¹ http://www.ssb.no/emner/01/03/10/doc_200308/doc_200308.pdf

⁵² http://www.ssb.no/english/subjects/01/03/10/entjeneste_en/

⁵³ The Energy Accounts since 1994 are available here: http://www.ssb.no/english/subjects/01/03/10/energiregn_en/arkiv/. Accounts for earlier years were published by Statistics Norway in an annual "Energy Statistics".

Table 46 Energy use in the HORECA industry according to Energy Accounts. GWh

Source: Statistics Norway: Energy Accounts

	1985	1989	1994	2000	2005
Total energy, GWh (excluding DH)	1742	2032	1295	1818	1708
Electricity	1408	1757	1187	1639	1583
District heat	Not counted				
Liquid fuels	334	275	108	179	179
Gas	-	-	-	0	46
Bioenergy	-	-	-	-	-

There are obvious minor discrepancies between the Energy Accounts and the survey data for 2000. More importantly, the evolution shown in the Energy Accounts – in particular the big drop in the mid-1990s – is simply not plausible. What *is* plausible is the significant reduction in the share of liquid fuels between 1985 and the mid-90s. A fair guess is that they may have accounted for about 12 % of consumption in hotels alone in 1985, with substitution mainly by electricity over the next decade and later substitution of district heat – and to a much smaller extent gas and bioenergy – for electricity as well as oil.

Besides the statistics we found two other sources of data on energy use in some hotels in Norway. One was the annual reports of the “Eco-Lighthouse” foundation, which runs an environmental certification scheme for small and medium businesses in Norway. Since 2001 its annual reports have included benchmark performance data for those certified enterprises in various trades that have been certified for at least two years and filed full reports. In 2001 this meant only a few accommodation enterprises, but by 2008 there were 51, of which 42 were deemed to have provided sufficiently good figures on energy use.⁵⁴ (The category is called “hotels” in the Eco-Lighthouse report but actually includes a handful of cabin-type accommodations in the mountains and a couple of youth hostels, which probably reduce the average consumption per guest night slightly.) Both because the number of certified enterprises was small at the outset and because the sample has changed – usually grown – each year, no trend can be deduced from the reports so far. However, the average stationary energy consumption per guest night in 2008 was 43.0 kWh and the average per square metre of building space 217.4 kWh. The figure per guest night is less than calculated from Statistics Norway figures for 2000, which concern hotels only. It would seem reasonable that Eco-Lighthouse establishments were more energy efficient than the national average, but in fact the difference could just as well be explained by (1) the effect of youth hostels and cabins on the Eco-Lighthouse figures and (2) energy conservation measures between 2000 and 2008, not least by the Thon Group chain, whose hotels are well represented among the Eco-Lighthouses.

The difference between energy consumption **per square metre** in accommodation enterprises included in the 2008 Statistics Norway survey (234 kWh) and in the 42 Eco-Lighthouses (217 kWh) is much less and not significant.

A final source of data on hotels is the state energy conservation agency Enova, which publishes annual data on energy use in commercial and public buildings whose owners participate in an energy conservation network. The series starts in 1999 and the last statistics available are for 2008⁵⁵. The table below shows the evolution of the number of hotels covered and their average stationary energy consumption per square metre. These data are climate- and location-corrected, i.e. corrected not just to account for temperature variations between years but also to account for over-representation of establishments in colder or warmer regions within Norway.

Table 47 Specific energy use in hotels participating in Enova’s energy conservation network. Climate-corrected data

Source: Enova

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
N	12	12	20	7	80	83	110	120	80	110
kWh/m ² /yr	341	314	311	276	296	261	251	240	249	259

⁵⁴ Stiftelsen Miljøfyrtårn: Resultatundersøkelsen 2008 (in Norwegian only): http://www.miljofyrtarn.no/index.php?option=com_docman&task=doc_download&gid=391&Itemid=51

⁵⁵ Enova, Byggstatistikk 2008 (Building statistics – in Norwegian only): <http://www.enova.no/publikasjonsoversikt/publicationdetails.aspx?publicationID=511>

The figures suggest a declining trend in specific energy consumption – at least until 2006 – but the number of establishments covered before 2003 was definitely too small for this to be significant. Since 2003 many more hotels have been covered and in fact it is quite likely that there has been some reduction in specific energy use during these years, as several hotel chains have mounted energy conservation programmes (partly financed by Enova). However, this would only affect the last couple of years in our 1985-2005 period.

More surprising is the fact that the hotels covered by the Enova data throughout have higher specific energy consumption than the accommodation enterprises covered by the Statistics Norway survey in 2008. One would expect participants in an energy conservation network to have lower consumption than the average. However, the paradox may be due to the inclusion of other accommodation enterprises than hotels in the Statistics Norway data for 2008.

It is not possible to relate the Enova data to guest nights, as they have not gathered data on guest nights in the establishments covered.

In 2005, the breakdown of stationary energy use in the 110 hotels in the Enova network was as shown below.

Table 48 Mix of stationary energy carriers used by hotels in Enova’s energy conservation network in 2005. Percentages
Source: Enova

	Electricity	District heat	Liquid fuels	Gas	Other	Total
Percentage	87.1	8.4	3.7	0.6	0.2	100.0

These figures correspond very well with the Statistics Norway figures for 2008, particularly in view of the fact that some substitution of district heat and biofuels for liquid fuels probably occurred between 2005-2008.

To conclude regarding energy use in hotels, the best-founded figures we have on total energy use per guest night in hotels are those found by combining two Statistics Norway sources for the year 2000. There is no certain indication that it changed over the 1985-2005 period. It probably decreased slightly during the last two or three of these years and has probably decreased further since 2005. It is very likely that there was some substitution of electricity for liquid fuels between 1985 and 1995, and then of district heat – and to a much smaller extent gas and biofuels – for electricity as well as liquid fuels between 1995 and 2005.

For the purposes of this study we have assumed total energy use per guest night to have been constant at the 2000 level from 1985-2000, to have dropped slightly in 2005, and the mix to have changed as indicated by the table below.

Table 49 Estimated energy use per guest night by Norwegian hotels, including own use of energy for transport. KWh
Sources: See text

	Elec- tricity	District heat	LFO + kerosene	Petrol	Diesel	Bottled gas	Bio- energy	Total
1985	45.4	-	6.2	0.1	0.2	-	-	51.9
1990	47.0	-	4.6	0.1	0.2	-	-	51.9
1995	47.5	1.0	3.0	0.1	0.2	0.1	-	51.9
2000	47.8	2.0	1.5	0.1	0.2	0.3	0.1	51.9
2005	41.4	4.0	1.5	0.1	0.2	0.4	0.2	48.0

Regarding cabins or second homes, we have two sources of information on consumption of electricity, though not of other energy carriers. The most important other energy carrier used in cabins is wood, but there is also some use of fossil fuels, e.g. bottled gas for cooking and of kerosene for lighting in cabins with no grid connection, although the latter has increasingly been displaced by solar panels.

Gurigard (2004)⁵⁶ studied electricity consumption in cabins in Norway and found that it had grown from 705 GWh in 1994 to 1,116 GWh in 2001. More recently, Statistics Norway have started publishing separate statistics on

⁵⁶ Gurigard, K. 2004: Energi- og miljøriktig fritids- og turistutbygging (Energy and environmentally wise planning of cabins and tourist facilities, in Norwegian only): <http://www.hyttveilederen.no/docs/prosjektrapport.pdf>

electricity supplied to second homes, which show consumption at 1,518 GWh in 2008⁵⁷. In other words, electricity consumption appears to have more than doubled in 14 years.

The rapid growth of electricity consumption – far more rapid than the growth in the number and size of cabins – is very plausible. The traditional Norwegian "hytte" or cabin was a place where people took a break from civilisation and lived the simple life, without such modern conveniences as electricity or running water. During the past 30 years or so the "hytte" culture has changed significantly, with newly built cabins growing steadily bigger (from an average of 60 m² in 1985 to 107 m² in 2009⁵⁸) and generally being connected to the electric grid. Many pre-existing cabins have also been connected to the grid, and use of electricity not just for lighting and radio or TV sets, but also for heating and heavy appliances has become quite common. It is quite safe to assume that the trend first documented by Gurigard (2004) extends back at least to 1985, i.e. that electricity consumption then was less than in 1994.

We have previously estimated the number of nights spent in cabins by Norwegian residents at upwards of 40 million per year in 2001, and maybe over 50 million. The latter figure would mean that electricity consumption per person-night was some 22 kWh in 2001 – probably appreciably more in 2005 and much less around 1985.

However, the denominator, i.e. the number of nights, should also include stays by foreign residents who own or (more frequently) rent cabins in Norway. There is also a grey area concerning cabins built to let, which appear as "holiday dwellings" in the accommodation statistics if one enterprise has at least three of them; it is unclear to what extent these enter into the energy statistics for cabins.

The Foreign Visitors Survey for 2005 showed that foreign visitors spent some 3.9 million nights in rented cabins in Norway and a further 1.2 million in cabins they owned themselves or had borrowed free from connections in Norway. The first figure may be on the high side as some stays in cabin-type accommodation at camping grounds or other enterprises may be included. The National Travel Survey 2001 suggests that Norwegians spent 3.1 million nights in "borrowed or rented" cabins >100 km from their residence. Statistics show that a total of 1.4 million nights (0.3 million by Norwegians and 1.1 million by foreigners) were spent in private cabins let through agents.⁵⁹ However, many owners of cabins either manage the whole letting process themselves or employ agents in other countries, in which case the transactions are not recorded in statistics.

An order-of-magnitude estimate could be that the rental market is responsible for about 10 % of all use of cabins in Norway. A majority of renters come from other countries. However, it is likely that the rental market is responsible for a somewhat larger share of electricity consumption than of nights spent in cabins, and that this was more so at the beginning of our period than at the end. This is because cabins with grid connections and a range of electric appliances are easier to let than those without, and the further back we go in time the smaller the share of such cabins with all modern conveniences in the Norwegian cabin population becomes. However, we have no indications of *how much* higher electricity use per night may be in rented cabins than in others.

For the purposes of the SDN scenarios we have assumed that electricity consumption in cabins was 26 kWh per person-night in 2005 and – probably quite conservatively – that it was only one-third less in 1985, i.e. 17.3 kWh. Because we have no data on direct fossil fuel consumption in cabins, this has been disregarded.

The table below shows GHG emission factors for stationary energy carriers in Norway in 1987, 1997 and 2005. These factors are partly based on Hille et al. (2008), but with important adjustments and additions. That source examined GHG emissions from electricity generation in the OECD countries of Europe in 1987, 1997 and 2005 and from generation of district heat in Norway in 1990 (the closest year to 1987 for which data were available), as well as emissions from production and direct use of various fuels. However, Hille et al. (2008) drew a system boundary which included the production and maintenance of energy infrastructure, and gave no emissions figures for stationary energy other than those for direct emissions on combustion and whole-system emissions. In the present study, we have opted for an intermediate system boundary, so that emissions from extraction, refining, conversion and distribution of energy carriers are included, but not those from production and maintenance of infrastructure. Also - as outlined in relation to energy for transport in section 4.3, we have chosen to present three alternative factors for electricity in each year; not only for the Norwegian electricity system (which was for practical purposes CO₂ free between 1985 and 2005) and for an OECD Europe mix of generation, but also for a Nordic mix.

⁵⁷ http://www.ssb.no/english/subjects/01/03/10/energikomm_en/tab-2010-02-23-02-en.html

⁵⁸ http://www.ssb.no/english/subjects/10/09/byggeareal_tab_en/t-20-en.html

⁵⁹

http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=1&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=hyttefor m

Data on the European (OECD) electricity system including consumption of lignite, hard coal, oil and gas and generation of electricity and heat are given in Hille et al (2008). Data on the electricity system in the four NordPool countries (Norway, Denmark, Finland and Sweden) in 1987, 1997 and 2005 were collated from national statistical agencies and the Danish Energy Agency. The table below shows the Nordic aggregate figures for generation of electricity (net of own consumption in power plants) and consumption of fuels for electricity generation (after deducting the share used to generate heat in cogeneration plants). There are gaps in the data for combusted bioenergi and waste, so these figures are approximate only.

Table 50 Electricity generation and fuel consumption for electricity generation in Norway, Denmark, Finland and Sweden combined. GWh
Sources: National statistics of the four countries

	1987	1997	2005
Total electricity generation	328 944	371 182	392 691
Hydro and wind	190 199	194 002	220 901
Nuclear	87 031	90 028	95 091
Coventional. thermal	51 714	87 151	76 699
Fuel consumption for electricity			
Coal	92 209	91 829	48 582
Oil	8 247	20 563	7 649
Gas	6 846	23 725	34 277
Biomass and waste	22 222	36 111	50 000

Distribution losses were assumed to be 10 % for electricity delivered at low voltage and 5 % for electricity at medium voltage. These figures are close to the average real losses both at the European, the Nordic and the Norwegian level.

Details on Norwegian district heat generation including fuel inputs are provided in Hille et al. (2008).

The next table below shows the emission factors used for individual fuels on combustion, and the add-ons used for emissions along the fuel chain. These factors were assumed constant from 1985-2005, which is probably not strictly true in all cases, but assumed to be nearly so. The emission factors at combustion are those used by the Norwegian Climate and Pollution Agency, except for lignite where the figure is an approximate average of several sources.

Table 51 Estimated emission factors for fuels at combustion and add-ons for fuel chain emissions Norway.

Sources: See text and last column of table

Energy carrier	Combustion emissions gCO ₂ e/kWh	Add-on	Sources for fuel chain emissions
Lignite	353	6 %	Röhrlich et al. (2000) ⁶⁰
Hard coal	310	12 %	Odeh and Cockerill (2008) ⁶¹
Oil, used in power plants*	281	10.5 %	Wang et al. (2004) ⁶²
Light fuel oil	265	15.5 %	
Natural gas, in power plants	202	12 %	Papadopoulo et al (2007) ⁶³
Natural gas, at small consumer	202	17 %	
Biomass, large scale combustion	1.4	-	See text
Biomass in small biolers	26	-	
Nuclear fuel	0	2.55 g CO ₂ e/KWh	SPINE database (2009) ⁶⁴

* Assuming 85 % is heavy fuel oil

It may be argued that we should have included fuel chain emissions for biomass and waste, in particular for transport. However, this is a complex issue, and any figures we might have arrived at were not likely to be very important for our purposes. An EIA of a very large planned CHP plant in Sweden (500 GWh/yr thermal+electric), to be fuelled mainly by forestry residues but also a variety of other biofuels, and which would need to obtain them from a radius of up to 150 km, suggests that fuel deliveries would generate emissions of 600 t CO₂/yr (or about 700 t including upstream emissions). This works out at 1.4 g/kWh, admittedly equal to the combustion emissions for large biomass-fired plants above, but not very important in an absolute sense. Besides, most biomass-fuelled plants are smaller and get their inputs from closer by. Emissions from plants burning municipal waste are considerably larger, perhaps in the range of 50-100 g CO₂e/MJ, if we count the emissions from burning of plastics as net. However, it's open to debate whether these emissions should be ascribed to energy production or to waste disposal. They would arise equally if the waste were incinerated without energy recovery, and even if the waste was landfilled, although in that case it would take centuries (but emissions of methane would give a larger, though delayed, GWP).

The next table below shows the emission factors for energy carriers actually used by service sector enterprises in Norway.

⁶⁰ Röhrlich, M., M. Mistry, P.M. Martens, S. Buntentbach, M. Ruhrberg, M. Dienhart, S. Briem, R. Quinckertz, Z. Alkan and K. Kugeler: A method to calculate the cumulative energy demand of lignite production. *Int. Journal of LCA*, Vol. 5 (6) 369-373.

⁶¹ Odeh, N.A. and T.T. Cockerill (2008): Life cycle analysis of UK coal-fired power plants. *Energy Conversion and Management*, Vol. 49 (2), 212-220.

⁶² Wang, M., H. Lee and J. Molburg 2004: Allocation of Energy Use in Petroleum Refineries to Petroleum Products. Center for Transportation Research, Energy Systems Division, Argonne National Laboratories, Argonne, IL. <http://www.sca.com.co/bajar/GREET/IJLCA-2004.pdf>

⁶³ Papadopoulo, M., S. Kaddouh, E. Dridl-Dastrevigne, A. Cigni and D. Hec 2007: Life Cycle Assessment of the European Natural Gas Chain – A Eurogas-Marcogaz Study, summary published by the Danish Gas Technology Centre, http://www.dgc.dk/nyhedservice/pdf/igu_marcogaz_lca.pdf

⁶⁴ <http://www.cpm.chalmers.se/CPMDatabase/Scripts/sheet.asp?ActId=CPMXFRTOOL2000-01-10324>

Table 52 Estimated emission factors for stationary energy in Norway. g CO2 equivalents per kWh
 Sources: See text and previous table

Energy carrier	1987	1997	2005
Electricity, low voltage			
Norwegian hydropower only	0	0	0
Nordic electricity mix	116,6	126,5	76,3
OECD-Europe electricity mix	488,7	402,0	367,8
District heat			
Norwegian hydropower only	16,1	88,4	42,7
Nordic electricity mix	51,7	97,2	56,8
OECD-Europe electricity mix	165,6	116,5	111,0
Light fuel oil	307	307	307
Natural gas	238	238	238
Wood fuel (small stoves or boilers)	26	26	26

7 Data on other tourist facilities

In addition to data on transport and accommodation, we should ideally – in a study such as SDN – have data on activity and emissions from a range of other facilities that cater mainly or partly to tourists. We were able to find relevant data for four kinds of such facilities: Restaurants (including cafés and bars), museums, amusement parks and winter sports facilities.

7.1 Economic data for restaurants

Tables 49-51 show data and estimates of the aggregate turnover, operating surpluses and investments of restaurants, including cafés and bars. The data for turnover from 1997 onwards are from structural statistics⁶⁵, while those for 1990-96 refer to output according to National Accounts figures as published in Statistics on Tourism. They are thus only roughly comparable. The data on operating surpluses from 1994 onwards are also from structural statistics, while those for earlier years are from National Accounts and refer to the entire HORECA industry. These are the same figures that are shown in the table for accommodation enterprises. As mentioned in the section on accommodation, we guessed that some 55 % of these surpluses might on average be in accommodation enterprises; if so, the other 45 % would be in food service enterprises, but somewhat less in restaurants, cafés and bars, since food service also includes catering and canteens. In the case of investments we found data from National Accounts that referred to food service as a whole from 1988-1996; in this case we guessed that 75 % of these were related to restaurants, bars and cafés. Obviously this percentage as well will have varied from year to year. Turnover and surpluses have been converted to approximate constant 2005 values by inflating current values for earlier years through division by the implicit price index for output of the HORECA industry that appears in the National Accounts⁶⁶. Investments have been converted using the corresponding implicit price index for HORECA investments.

Table 53 Aggregate turnover of restaurants, cafés and bars. Note: Data until 1996 are only roughly comparable with those for later years.

Source: Statistics Norway: Statistics on Tourism and National Accounts

Year	Million current NOK	Million constant NOK (approx.)	Million constant € (approx.)	MEMO: Price index for HORECA output, 2005=1
1990	10980	16601	2073	0,661
1991	11519	16682	2083	0,691
1992	12097	16877	2108	0,717
1993	10690	14536	1815	0,735
1994	11116	14937	1865	0,744
1995	11568	15360	1918	0,753
1996	12605	16376	2045	0,770
1997	13586	17186	2146	0,790
1998	15316	18558	2318	0,825
1999	17727	20834	2602	0,851
2000	18409	20944	2616	0,879
2001	19089	20964	2618	0,911
2002	20586	21696	2710	0,949
2003	20902	21618	2700	0,967
2004	21247	21545	2691	0,986
2005	21775	21775	2719	1,000

⁶⁵ http://www.ssb.no/english/subjects/10/11/sthotell_en/arkiv/

⁶⁶ Annual price changes for output and investments are given in the Annual National Accounts, Tables 8 and 28 respectively: http://www.ssb.no/hr_en/ (the csv files give data going back to 1970).

Table 54 Aggregate operating surplus of restaurants, cafés and bars. Note: Figures until 1993 refer to all HORECA enterprises.

KSource: Statistics Norway: Statistics on Tourism and National Accounts

Year	Million current NOK	Million constant NOK (approx.)	Million constant € (approx.)	MEMO: Price index for HORECA output, 2005=1
<i>Figures for HORECA</i>				
1986	941	1824	227.7	0.516
1987	722	1278	159.6	0.565
1988	340	561	70.0	0.606
1989	386	606	75.7	0.637
1990	662	1001	125.0	0.661
1991	935	1354	169.1	0.691
1992	328	458	57.2	0.717
1993	550	748	93.4	0.735
<i>Figures for restaurants, cafés and bars</i>				
1994	298	401	50.1	0.744
1995	235	305	38.0	0.753
1996	346	437	54.6	0.770
1997	275	334	41.7	0.790
1998	255	300	37.4	0.825
1999	480	564	70.5	0.851
2000	526	599	74.8	0.879
2001	569	624	78.0	0.911
2002	1042	1098	137.1	0.949
2003	1006	1041	130.0	0.967
2004	998	1012	126.4	0.986
2005	984	984	122.9	1.000

Table 55 Aggregate gross investments of restaurants, cafés and bars. Note: Figures until 1996 are derived from National Accounts on the assumption that 75 % of investments in the food service industry were in restaurants, cafés and bars.

Source: Statistics Norway, Statistics on Tourism and National Accounts, and own assumptions

Year	Million current NOK	Million constant NOK (approx.)	Million constant € (approx.)	MEMO: Price index for HORECA investments, 2005=1
1988	592	508	63,5	1,164
1989	594	516	64,5	1,150
1990	486	435	54,3	1,118
1991	437	395	49,3	1,106
1992	464	424	53,0	1,094
1993	557	507	63,3	1,098
1994	571	513	64,0	1,114
1995	690	614	76,6	1,125
1996	797	717	89,5	1,112
1997	691	607	75,8	1,138
1998	1256	1098	137,2	1,144
1999	567	502	62,7	1,130
2000	558	493	61,5	1,133
2001	842	729	91,0	1,155
2002	864	787	98,3	1,097
2003	646	641	80,1	1,007
2004	787	779	97,3	1,010
2005	871	871	108,8	1

Beyond the data on turnover above, we have no direct indicators of activity levels in restaurants. However, Hille et al. (2007) made an admittedly uncertain estimate on the basis of data from a time use survey that Norwegians made 175 million visits to restaurants in their reference year of 2001, although the source data referred to 2000. The figure for visits to restaurants located in Norway ought to be somewhat less, since the time use data should include activity by Norwegian residents abroad, and Norwegians spend more time (and money) abroad than foreign residents do in Norway. However, Hille et al. found it quite likely that activities abroad were underreported in the data and assumed for simplicity that the effects of outbound and inbound tourism on the figure of 175 million cancelled each other out.

Another matter is how many visits *tourists* make to restaurants. If all of those staying at hotels in 2001 made two per day (breakfast at the hotel doesn't count⁶⁷) then that would make some 31 million restaurant visits in 2000. If other foreign visitors visited a restaurant once daily, that would make another 12 million, and if Norwegians staying at camping grounds visited a restaurant every other day this would make another 2.5 million, for a speculative total of around 45 million. It seems quite likely that some 25-30 % of visits to restaurants, bars and cafés are linked to tourism.

7.2 Activity data for museums, amusement parks and winter sports facilities

Since 1995, Statistics Norway has published annual data on the income and operating surpluses of museums, based on direct information from the museums themselves⁶⁸. Similar data were also collected in 1987, but not in

⁶⁷ Hotels serving breakfast only are not counted statistically as having restaurants and any emissions from their serving of breakfast will already have been credited to accommodation. The situation may be different in hotels that serve both breakfast and other meals in the same restaurant, but this is statistically a grey zone. In any case hotel breakfasts are assumed not to have been counted among the 175 million "restaurant visits" mentioned above.

⁶⁸ Figures since 2001 are available at http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=0&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=museer

other years between 1985 and 1994. No similarly precise data are available for amusement parks or winter sports facilities, but the Satellite National Accounts for tourism do give estimates of output for a broader category of “tourism-related products” which includes these as well as museums and several other types of cultural and recreational services. In the latter figures, public grants are not counted (they are not part of output according to National Accounts definitions), which means that museums, some two-thirds of whose income is from public grants, influence the figures less than they would otherwise have done.

Table 56 shows the total income of Norwegian museums and the amounts received as public grants, while Table 57 shows their operating surpluses. The conversion to 2005 NOK and Euros is approximate only, the chosen inflator for previous years in this case being the consumer price index for “cultural and recreational services”. Table 58 shows Satellite Accounts figures for the output of various tourism-related cultural and recreational activities.

Table 56 Total income of museums in Norway and amounts from public grants
Sources: Statistics Norway: Cultural Statistica and Consumer Price Index

Year	Current million NOK		Approximate 2005 MNOK		Approximate 2005 M€		CPI for cultural and recreational services, 2005=1
	Total Income	Public grants	Total Income	Public grants	Total Income	Public grants	
1987	499	378	1126	855	62.3	47.2	0.443
1995	1180	819	1723	1196	147.3	102.2	0.685
1996	1231	812	1751	1155	153.7	101.4	0.703
1997	1267	849	1762	1181	158.2	106.0	0.719
1998	1309	867	1736	1149	163.5	108.3	0.754
1999	1353	914	1734	1171	169.0	114.1	0.781
2000	1655	1076	2042	1328	206.7	134.4	0.811
2001	1842	1207	2168	1420	230.1	150.7	0.850
2002	1994	1352	2289	1553	249.0	168.9	0.871
2003	2143	1426	2374	1580	267.6	178.1	0.903
2004	2323	1525	2472	1623	290.1	190.5	0.940
2005	2558	1700	2558	1700	319.5	212.2	1

. Figures for earlier years are published in annual Cultural Statistics, online here: http://www.ssb.no/emner/07/nos_kultur/ except for the 1987 edition which is available in paper format only.

Table 57 Operating surplus of museums in Norway
 Source: Statistics Norway: Cultural Statistics and Consumer Price Index

Year	Current million NOK	Approximate 2005 MNOK	Approximate 2005 M€	CPI for cultural and recreational services, 2005=1
1987	-2.2	-5.0	-0.6	0.443
1995	10.5	15.3	1.9	0.685
1996	20	28.5	3.6	0.703
1997	45.2	62.9	7.9	0.719
1998	96.9	128.5	16.0	0.754
1999	-6.0	-7.7	-1.0	0.781
2000	4.8	5.9	0.7	0.811
2001	40.6	47.8	6.0	0.850
2002	61.7	70.8	8.8	0.871
2003	78.8	87.3	10.9	0.903
2004	119.1	126.7	15.8	0.940
2005	102.1	102.1	12.8	1

Table 58 Output of “motion pictures, other entertainment, news agencies, cultural activities, sporting and other recreational activities” as estimated in Satellite National Accounts for tourism⁶⁹
 Source: Statistics Norway: Satellite National Accounts for Tourism

Year	Million 2005 NOK	Million 2005 €
1996	3345	417,8
1997	3449	430,7
1998	3337	416,7
1999	3360	419,6
2000	3431	428,5
2001	3564	445,1
2002	3702	462,4
2003	3793	473,8
2004	3951	493,5
2005	4162	519,8

For museums, Statistics Norway’s Cultural Statistics⁷⁰ have also provided data on numbers of visitors in 1983, 1987 and annually since 1994. These are shown below. The figures for 1983 and 1987 are slightly too low as some museums are missing from the data.

⁶⁹ http://www.ssb.no/turismesat_en/arkiv/tab-2009-04-27-13-en.html . The figures have been converted from 2006 to 2005 NOK through division by the GDP deflator.

⁷⁰ Figures since 2001 are available at <http://statbank.ssb.no/statistikkbanken/Default.FR.asp?PXSid=0&nvl=true&PLanguage=0&tilside=selecttable/hovedtabellHjem.asp&KortnavnWeb=museer> . Figures for earlier years are published in annual Cultural Statistics. Editions since 1996 are online here: http://www.ssb.no/emner/07/nos_kulturi/ , while earlier editions are available in paper format only.

Table 59 Yearly numbers of visitors (1000) to Norwegian museums

Source: Statistics Norway: Cultural Statistics

Year	Visitors (1000)		Year	Visitors (1000)
1983	4249		1998	8753
			1999	7896
1987	5661		2000	9254
			2001	8535
1994	8663		2002	8337
1995	8881		2003	8523
1996	8839		2004	8552
1997	9109		2005	9061

Only one source was found that could give any useful indication at all of the share of tourists (as opposed to locals or day trippers) among museum visitors, namely a study of "Norwegian attractions" and their markets in 2000 for what is now Innovation Norway⁷¹. This contains estimates of visitors' origins for a mere ten⁷² (out of over 700) museums, although these ten included three of the most popular museums in the country and between them had about 14 % of the total number of museum visitors. The share of visitors coming from >100 km away, most of whom can be assumed to be tourists in our sense, at these museums varied from 10 % to 90 %, with a weighted average of 34 %. The latter figure is not very meaningful as over 3/4 of the visitors came to only three museums, but for lack of any other data it was assumed for the purposes of the SDN scenarios that tourists made up a constant 34 % of museum visitors. In 6 out of 10 museums surveyed (including all the three big ones) large majorities of the visitors from more than 100 km away were foreigners; in one, foreigners made up about half of the tourists, while the remaining three museums attracted few foreigners.

The study of Norwegian attractions also covered theme parks (including amusement parks), and makes it possible to estimate the total number of visitors to the five major and four smaller theme parks in Norway at some 1.6 million in 2000. We have no earlier or later figures, but it happens that four out of the five major parks were established close to the beginning of our 1985-2005 period, namely Hunderfossen (1984), Bø Sommerland (1985), Kongeparken (1986) and TusenFryd (1988), while the fifth – in Kristiansand - is much older. The number of parks has thus been quite stable since 1988, and the fact that no major players have since either been forced to leave or enticed to enter the market suggests that the number of visitors may not have changed radically either. No data on the share of tourists among visitors to theme parks, but they are likely to be in the majority. Two of the five major parks and all the smaller ones are located far enough for this almost certainly to be the case among their visitors. All of them appeal to a national market. For the purposes of the SDN scenarios the share of tourists was assumed to be 70 %, which is a sheer guess.

Data on visits to alpine (i.e. downhill skiing) winter sports facilities are available from the business association Alpinanleggenes landsforening (ALF), but unfortunately no further back than the 2001/2002 season.⁷³ However, two kinds of proxy data are available, namely the number of ski lifts operating, which is documented from 1955-95 in Stølen (1995)⁷⁴ and for later years by ALF, and the turnover of ski lifts, for which ALF has figures for 1991/92 and annually since 1999/2000.⁷⁵ There is nothing to suggest that the turnover per ski lift in constant NOK has changed radically. We have therefore used the number of ski lifts as a proxy to estimate the number of visits backwards from 2001.

No precise figures are available for the share of tourists vs. day trippers at winter sports facilities. At the major resorts, tourists are definitely the majority, and foreign tourists make up a large proportion of the total – presently

⁷¹ Horwath Consulting 2002: Attraksjoner i Norge - rapport til Statens Nærings- og Distriktsutviklingsfond (In Norwegian only), <http://www.innovasjon Norge.no/upload/Reiseliv/Attraksjoner%20i%20Norge.pdf>

⁷² Including three institutions which are not categorized as museums in the report, but which are in statistics.

⁷³ <http://www.alpinanleggene.no/index.jsp?c=2449&exp=2449>

⁷⁴ Stølen, A. (1995): Fortegnelse over tilsynspliktige kabelbaner, taubaner og skitrekk i Norge per 01.01.95. Rapport 95-TDH-0017, Taubanetilsynet, Det Norske Veritas Industry AS, Trondheim (in Norwegian only)

⁷⁵ <http://www.alpinanleggene.no/index.jsp?a=156302&exp=2432>

some 55 % at the five largest resorts⁷⁶. However, there are over 200 alpine facilities in Norway, most of which are only geared to the local market and frequented mainly by day trippers rather than tourists. A study by the Institute for Transport Economics which refers to 2007 suggests that foreigners on skiing holidays spent some 2.16 million days in Norway.⁷⁷ 66 % of them said that alpine sports were a "very important" reason for coming and 10 % that they were "rather important", which may indicate that the number of days spent at alpine facilities by foreign visitors was in the region of 1.3-1.5 million. The total number of visitors at alpine facilities was 5.3 million in the 2006/7 season and 6.0 million in the 2007/8 season according to ALF statistics, so we may guess that foreign tourists made up about 25 % of the total. For the purposes of the SDN scenarios we have assumed that Norwegian tourists made up an equal share, i.e. that tourists in all made up half of the visitors to alpine facilities and day trippers the other half. 50 % incidentally corresponds to the number of visitors at the 12 largest resorts⁷⁸, excluding Tryvann which is right outside Oslo and mainly caters to the local market. All the other 11 are remote enough from major population centres to attract mainly tourists rather than day trippers.

The table below shows our estimates of the total number of visitors at alpine winter sports facilities.

Table 60 Estimated numbers of visitors to alpine winter sports facilities (2002 and 2005 data are certain; earlier years estimated with numbers of ski lifts as proxy)

Sources: See text

Year	Visitors (millions)
1985	2.4
1990	4.1
1995	4.5
2000	4.8
2002	4.8
2005	5.3

7.3 Energy use and emissions from restaurants, museums, theme parks and winter sports facilities

In section 4.4.6 above we first discussed energy use by accommodation enterprises and then presented GHG emission factors for various energy carriers. The discussion below will be limited to energy use by other facilities. The reader is referred to section 4.4.6 (or section 4.3.7 in the case of motor fuels) for relevant emission factors. Energy use by restaurants was studied in a survey by Statistics Norway in 2000 – which also covered hotels. The results, inflated to represent all restaurants in Norway, are shown in the table below.

Table 61 Energy consumption of restaurants in Norway, 2000

Source: Statistics Norway

	Electricity	District heat	LFO + kerosene	Bottled gas	Other	Total
Total consumption, GWh	752.8	2.5	6.1	20.8	0.6	782.8
Percentage of total energy	96.2	0.3	0.8	2.7	0.1	100.1

If we use the estimate mentioned above of 175 million visits to restaurants in 2000, then the total above works out at 4.34 kWh per visit. Even more than in the case of hotels, energy consumption is overwhelmingly dominated by electricity. The small consumption of fossil fuels is mainly gas for cooking. Cooking by gas in preference to electricity has spread among Norwegian restaurants over the past couple of decades. For the purposes of the SDN scenarios, use of gas was assumed to have been nil in 1985, 2 per cent of total energy use in 1995 and 4.5 per cent in 2005. Because consumption of all other energy carriers than electricity and gas was negligible in 2000

⁷⁶ http://www.arkadia.no/reisemaal_aalfjellvaset_forretningside.htm

⁷⁷ Haukeland, J.V. and A. Rideng 2007: Utenlandske skiturister i Norge 2007 (Foreign skiing tourists in Norway - in Norwegian with English summary): <http://www.toi.no/getfile.php/Publikasjoner/T%D81%20rapporter/2007/918-2007/918-hele%20rapporten%20internett.pdf>

⁷⁸ <http://www.alpinanleggene.no/index.jsp?c=2447&exp=2447>

and we lack any data from other years, it was assumed for the purposes of the scenarios to have been nil in all years. Total energy consumption per restaurant visit was assumed not to have changed between 1985 and 2005. Hille et al. (2007)⁷⁹ estimated the final use of energy by Norwegian museums in 2001 at 194 GWh. This was based on an estimate by the State energy conservation agency, Enova, of average specific energy use in museums (259 kWh/m²/yr) and a less certain estimate of their building space (746.000 m²) which was made on the basis of data for a selection of museums representing about 1/6 of annual museum visits. According to Table 54 the total number of visits to museums in Norway in 2001 was 8.53 million. Using all visitors as the denominator, energy use per visit would have worked out at 22.7 kWh. No breakdown by energy carriers is available, but there can be no doubt that electricity dominates the picture as in the rest of the Norwegian service sector. For the purposes of the SDN scenarios the breakdown was estimated as 85 % electricity, 12 % heating oil and 3 % district heat in 2001. As no data on the evolution of energy use per visit to museums has evolved since 1985 were available, it was simply assumed to have been constant.

Regarding theme parks, Hille et al. (2007), on the basis of direct information from three of the five major ones, estimated the combined end use of energy at all five at 18.6 GWh of stationary energy (all electricity) + 0.8 GWh of motor fuel (2005). The smaller parks mainly feature native wild animals in an open-air setting and were assumed to have negligible direct energy use compared to the major ones. Assuming 1.6 million visits annually the figures above would work out at 11.5 kWh of electricity plus 0.5 kWh of motor fuel per visit.

Finally turning to alpine winter sports facilities, a direct analysis of stationary energy use at the five largest alpine resorts in Norway in 2004 showed that they used 22.5 GWh/year of electricity for lifts, artificial snow production, lighting and ancillary purposes. These five had 34 % of all visitors at alpine facilities in Norway. Hille et al. (2007) inflated the figure to 67 GWh for all alpine facilities in Norway. To this we should add consumption of diesel oil by machines for preparing pistes. Hille et al. (2007) found that there were about 1000 heavy piste machines in Norway in 2005 and from assumptions about their annual operating time, together with specifications for some of the most popular models, estimated that annual end-use of diesel might be some 83 kWh. However, many of these machines are used for preparing cross-country skiing tracks that are mainly used by local residents rather than tourists. It is likely that somewhere between 30-50 % of the machines are used by alpine facilities. Out of the 210-215 such facilities in Norway many have only one machine, quite a few seem to have two and the major resorts have several. For the purposes of the SDN scenarios, consumption of diesel at alpine facilities in 2005 was guessed to be 33 GWh. Total energy consumption per visit at alpine facilities in 2005 then works out at 19 kWh, of which 2/3 is electricity and the rest diesel. We found no data to indicate whether consumption per visit may have been higher or lower earlier in the 1985-2005 period, so the default assumption for the SDN scenarios was no change.

The table below sums up the estimates used for energy consumption per visit to museums, theme parks and alpine winter sports facilities.

Table 62 Energy consumption per visit to museums, theme parks and alpine winter sports facilities. kWh
Sources: See text

	Electricity	District heat	LFO	Diesel	Total
Museums	19.3	0.7	2.7		22.7
Theme parks	11.5			0.5	12.0
Alpine sports facilities	12.7			6.3	19.0

⁷⁹ Hille, J., C. Aall and I.G. Klepp 2007: Miljøbelastninger av norsk fritidsforbruk – en kartlegging (Environmental impacts of Norwegian leisure consumption; in Norwegian with English summary) <http://www.vestforsk.no/filearchive/rappport-1-07-fritidsbruk.pdf>

8 Domestic tourism and transport work generated

In this section we shall first discuss the overall volume of domestic tourism (measured in number of trips with overnight stays) and its distribution by destination region within Norway. We shall then go on to consider the amount of transport work generated and its distribution by mode of transport.

We have already touched on the first question in section 4.4 on accommodation, in which we estimated the number of nights spent away by Norwegian tourists. Several sources of information are available, most importantly the National Travel Surveys (NTS) of 1998, 2001 and 2005, the Holiday Surveys – especially for 1986, 1992 and 1994 - the Air Passenger Surveys from 1992-2005 and accommodation statistics. Detailed background data from the three NTS mentioned were provided by the Institute for Transport Economics. However, it proved impossible to extract useful information on trips with overnight stays from the two earlier NTS (1985 and 1992). The Holiday Surveys since 1994 were less useful for our purposes than the earlier ones because they give no information about trips lasting less than 4 nights. The first Air Passenger Survey (1986) did not cover domestic flights.

- a) The most important sources regarding *leisure* travel are the early Holiday Surveys and the later NTS. The Holiday Surveys from 1986-94 should in principle cover all those involving overnight stays irrespective of distance, while the NTS should cover all those of >100 km – in both cases for the age groups covered by the respective surveys. To extend the results to the whole population we assumed that the excluded age groups (<16 and >80 in the Holiday Surveys, <13 in the NTS) made half as many domestic trips per capita as those included. Finally, we estimated the number of leisure trips shorter than 100 km in 1998, 2001 and 2005 by assuming that (a) the number of leisure trips lasting from 1-3 nights was the same *per capita* in 1998 as in 1986, while the number of trips lasting at least four nights was 2,994,000 in 1998 as in 1986 (and almost the same as in 1999 for which a Holiday Survey was available)
- b) the total number of leisure trips with overnight stays in 1998 thus having been estimated, the number of trips <100 km could be found by deducting the number >100 km according to the 1998 NTS
- c) the number of trips <100 km in 2001 and 2005 was the same per capita as in 1998.

The choice of 1986 rather than 1992 or 1994 as the base for these estimates was due to the fact that the recession which bottomed in 1992 had apparently led to a steep and anomalous decline in holiday travel. Apart from such effects of the economic climate, other indications are that there is no strong long-term upward or downward trend in domestic leisure tourism.

The Holiday Surveys of course give no information on business trips. The NTS give information only on overnight business trips of >100 km each way. However, the evolution in the NTS data on such business trips – a drop of over one-third in the number of domestic business trips >100 km between 1998 and 2001, and only a partial recovery to 2005 – is frankly impossible to square with other sources. Both the Air Passenger Surveys the accommodation statistics are very relevant to business trips, because business travellers are much more likely both to travel by air and to stay in hotels than domestic leisure travellers. The Air Passenger Surveys for 1998 and 2005 do in fact indicate a moderate decline in the number of domestic business trips by air between those two years, though smaller than the overall drop in the NTS. The likely drop in business air trips with overnight stays from 1998-2005, based on a comparison of the Air Passenger Surveys with the background data from the NTS, is 11-12 %. The most unlikely figure in the NTS series, however, is that for the intervening survey year, 2001, in which no Air Passenger Survey was conducted. Nevertheless, it seems unlikely that such a survey would have shown anything like the dip in business travel that the 2001 NTS suggests. It is all the more unlikely because the accommodation statistics (Table 35 cf. Table 42) suggest only a marginal decline in hotel stays by domestic business travellers between 1998 and 2001, and a clear *increase* from 1998 to 2005 (9 % according to Table 41). After weighing the conflicting evidence, we concluded that the most likely reality was that the 1998 NTS slightly overestimated the number of business trips, that the 2005 survey somewhat underestimated it, and that the number of business trips >100 km was almost unchanged between the two years. The 2001 NTS results were considered so improbable that 2001 was rejected as a data point for business travel.

For the purpose of further calculations the true number of business trips >100 km with overnight stays in 1998 was assumed to have been 5 % less than indicated by the NTS in the same year, and identical in 2005. This makes just over 2.7 million trips in both years.

This still left two questions regarding business trips, namely (1) the number of business trips of *less than* 100 km which nevertheless involved overnight stays and (2) the numbers before 1998. (1) mainly involves trips to

conferences, seminars, team-building events and the like, which often take place at hotels within 100 km of a city from which all or many of the participants come. We guessed that such trips may make up as much as 20 per cent of business trips with overnight stays. If so the total number of business trips in 2005 would have been close to 3.4 million. This is just over half the estimated number of nights spent in hotels by business travellers in the same year. (Of course, this does not mean that the average number of nights away per business trip was two; some business travellers stayed in other accommodation than hotels, so the average number of nights per trip was almost certainly somewhat higher). To estimate the number of business trips with overnight stays in 1986 and 1992, we used the estimates of hotel nights in Table 42 as a proxy and set the number of trips at half the number of nights in hotels by business travellers.

The table below summarises the estimates thus made of leisure trips in 1986, 1992, 1998, 2001 and 2005 and of business trips in the same years except 2005. Figures for leisure trips in 1994 (based on the Holiday Survey in that year) are not shown; they were in fact almost the same as in 1992.

Table 63 Estimated volume of domestic tourism (thousands of trips with overnight stays)
Sources: Statistics Norway (Holiday Surveys), Institute of Transport Economics (National Travel Surveys) and own assumptions, see text

	1986	1992	1998	2001	2005
Leisure trips					
<i>Figures from Holiday Surveys, inflated to total population</i>					
Holiday trips >3 nights	3 479	2 611	(3 479)	3 157	3 396
Shorter trips 1-3 nights	14 628	11 090			
<i>Figures from NTS, inflated to total population</i>					
Leisure (=private) trips >100 km			12 988	11 438	12 874
<i>Estimate of trips <100 km cf. text above</i>			6 098	6 212	6 375
Total leisure trips	18 107	14 119	19 086	17 650	19 248
Business trips					
Estimate with hotel nights/2 as proxy	2 119	2 301	2 979	:	3 252
Estimate for 1998 and 2005, adjusted 1998 NTS figure for trips >100 km+ 20 %			3 397		3 397
Total trips	20 226	17 420	22 065+		22 500+

As mentioned above, the dip in leisure travel in 1992 is not altogether implausible, as this was the bottom year of a long recession (while the preceding boom crested in 1986-87). The dip that NTS figures indicate in 2001, while by no means as dramatic as the dip in business travel according to the same source, is harder to explain and there is no sign of it in transport statistics (domestic air travel was flat from 1998 to 2001 while both rail and road passenger traffic increased). For the purposes of the scenarios 2001 was ignored as a data point, and will be omitted from tables below.

As mentioned in section 4.4 on accommodation, the 2005 NTS included specific questions on visits to cabins, and the results suggest that the total number of leisure trips in that year – and by extension also in previous years – must have been very much higher than the table above would suggest, perhaps twice as high. If so, the great majority of the “extra” trips were probably short, so that their influence on transport work will have been much less. We can safely assume that the effect would be predominantly on transport by car.

8.1 Regional distribution of domestic tourism

The table below shows the distribution of domestic leisure and business tourist trips of >100 km by destination region in 1998 and 2005, according to the National Travel Surveys. No corresponding data were available for previous years.

Table 64 Domestic tourism by destination region (percentage distributions). Trips of over 100 km each way

Source: Institute of Transport Economics: National Travel Surveys

Destination region	Leisure trips		Business trips		MEMO: Regional population shares 2001
	1998	2005	1998	2005	
Eastern Norway	47.3	45.3	41.1	39.0	45.8
Southern Norway	13.7	15.2	3.8	6.2	9.5
Western Norway	17.3	18.9	25.2	29.5	25.8
Central Norway	10.4	9.5	9.7	9.0	8.7
Northern Norway	11.2	11.1	20.1	16.3	10.2
Total	99.9	100.0	99.9	100.0	100.0

The background data from the 1998 and 2005 NTS included matrices showing the breakdown of trips by home vs. destination region, which will not be presented here but are available from the author on request. With few exceptions they showed that the most important destination region for leisure as well as business tourists in both years was their home region. The prominent exceptions concerned business trips by residents of the two smallest regions, Southern Norway and Central Norway. In both cases Eastern Norway was the most important business destination for their residents. For leisure trips, the home region was the most popular destination region, with the sole exception of Southern Norway in 1998, when slightly more residents went to Eastern Norway.

It is also apparent that the distribution of destinations for leisure trips is quite similar to the distribution of population, except that Western Norway is somewhat less popular and Southern Norway somewhat more popular as a destination than this would suggest. – Perhaps surprisingly at first glance, Eastern Norway is slightly underrepresented as a destination for business tourists relative to its population, while Northern Norway is significantly overrepresented. One might have expected the Oslo region, which is in Eastern Norway, to make a stronger showing. The point to remember here is that the table concerns business trips *with overnight stays*. Most of Eastern and Southern Norway are within easy day-tripping distance of Oslo by car or train. Also, “all roads lead to Rome”, in the sense that all major towns in the other regions have rather frequent direct flights to Oslo, whereas getting to other destinations can be more time-consuming. Going from other regions to points in Northern Norway generally costs enough time and money for a stay of at least one night to be either necessary or an attractive option.

The table above concerns trips of >100 km each way. We also made guesstimates of the numbers of leisure trips and even more tentatively of business trips with overnight stays that were shorter than this, and needed to distribute them as well by destination region. The natural default option was to assume that they followed the distribution of population, all the more so as most trips of less than 100 km will start and stop in the same region. However, we found it likely that Eastern Norway would deviate from such a pattern – with opposite signs in the two cases of leisure and business tourism. Eastern Norway includes the capital region (the city of Oslo + neighbouring Akershus county, with 22 % of the whole national population). The capital region contains a disproportionate number of frequent business travellers and within or immediately outside itself has a disproportionately large share of popular conference hotels. As far as short business trips with overnight stays were concerned (most of them are precisely to conference hotels) we assumed that 60 % had destinations in Eastern Norway, and the remaining 40 % were distributed among the other tourism regions in proportion to population. – On the other hand, a very large share of the overnight leisure trips of <100 km will be to cabins or second homes, even on the assumptions reflected in Table 58 (based on the 2005 NTS data regarding visits to cabins, the share would be an overwhelming majority). While most of those outside the capital region who have access to cabins have these within 100 km of their residence, only a small minority of people in the capital region have them so close to home. They are probably also a minority in many of the other cities in the wider Oslofjord region. Therefore, the frequency of private trips with overnight stays at distances <100 km is likely to be lower in Eastern Norway than in the rest of the country. We assumed that the destination for 30 % of such trips was in Eastern Norway, and the remaining 70 % were distributed among regions in proportion to population.

8.2 Transport work generated by domestic tourism

The background data we had from the 1998 and 2005 (and 2001) National Travel Surveys showed how leisure and business trips were distributed by trip length (100-km one-way intervals from 100-199 up to 400-499 km, and a 500 km+ category) and by main mode of travel within each distance category.

We wished to calculate the number of passenger kilometres that were performed by each mode of transport. Since the source data referred to intervals, this first entailed estimating the average trip length for each interval. For travel by car and by ferry or ship the number of trips declined monotonously with increasing trip lengths up to 500 km. In these cases we assumed that the same trend applied within each interval, so that the average trip length within each would be somewhat less than the mid-point of the interval, and set it at 10 km less. In these cases the averages for the four intervals up to 500 km were thus set at 140, 240, 340 and 440 km each way, i.e. 280, 480, 680 and 880 km per round trip. For travel by bus and train there were exceptions or near-exceptions to the trend to declining numbers with distance, which led us to set the round-trip interval averages at 300-480-680-880 for buses and 280-500-700-900 for trains. For all the modes mentioned above, the average trip length in the 500 km+ category was set at 650 km one way or 1300 km round trip.

Air travel presented not only major deviations from the pattern of declining numbers with increasing distance (which was unsurprising) but also other problems of estimation. The NTS distance data are based on the road distance between the central place in the respondent's municipality and the central place in the destination municipality. This is generally valid enough not only for car and bus transport but also for travel by train, as road and rail distances between points >100 km apart in Norway are seldom very different. There are sometimes bigger relative differences between road and sea distances, but ferries and ships have such a small share of trips >100 km that we disregarded this issue. Air travel is much more important and air distances are usually significantly shorter than road distances, at least if the flight is nonstop. To estimate average flight distances per interval we weighed several factors, including the actual relationship between road and air distances between main cities, the likelihood of "dog-leg" flights with transfers, and information from the home region vs. destination region matrices. The result was that we estimated the average round-trip flight distances in the four one-way road distance intervals from 100-499 km at 240-360-520-770 km. The average for the 500 km+ category, however, was estimated at 1400 km return, i.e. slightly longer than the average for other modes in the same interval. The reason for this is that it was evident that a very large share of flights in this category must have been between Northern Norway and other regions, and we estimated the average length of such flights at 1900 km return.

Table 65 Estimated average length of round trips by mode of transport for each one-way distance interval in background data from the National Travel Surveys (km)

Source: Own assumptions, see text

Transport mode	100-199 km	200-299 km	300-399 km	400-499 km	500 km+
Car	280	480	680	880	1 300
Bus	300	480	680	880	1 300
Train	280	500	700	900	1 300
Aircraft	240	360	520	770	1 400
Ferry or ship	280	480	680	880	1 300
Other	280	480	680	880	1 300

Statistics combined with the Air Passenger Surveys in 1998 and 2005 provided a rough check on the validity of the resulting figures for passenger transport performance by air, and contributed to our decision to eliminate 2001 as a data point. According to statistics there was little change in the volume of domestic air travel between 1998, 2001 and 2005, and neither should the volume of air travel on trips with overnight stays have changed much, since these made up 84 % of all domestic air trips in 1998 and 87 % in 2005 according to the Air Passenger Surveys. Yet our initial calculations based on the NTS data indicated a dramatic drop in air travel between 1998 and 2001, followed by a somewhat smaller increase from 2001 to 2005. The raw 1998 data were easiest to square with the statistics, the 2005 data a little less so, while the 2001 data were clearly well off the mark. The adjustments we later introduced to the estimated volume of business travel – when applied pro rata to all modes of transport – resulted in domestic tourist passenger kilometres by air working out at 2.93 billion in 1998 and 3.08 billion in 2005, which is a small enough difference to be almost plausible in the light of the statistics. So is the absolute size of the figures. Total passenger kilometres by air were 4.24 billion in 1998 and 4.14 billion in 2005.

However, this includes travel within Norway by foreign residents (probably between 5-10 % of the totals, and implicitly estimated at 9 % below), day trips by Norwegian residents (which declined somewhat according to the Air Passenger Surveys) and connecting flights to international flights, which are not part of domestic tourism.

The distance estimates for air travel mentioned above concern flight distances only. Trips by air will always involve travel to and from airports at either end. Since the NTS only report the *main* mode of transport on a trip, they contain no information about this. However, we can assume that the distance travelled to and from airports tends to increase with increasing flight distances. There is usually little point in going by air between two nearby places if one has in any case to spend a long time getting to and from the airports. By contrast, air is the preferred mode of travel between Northern Norway and other parts of the country even in cases where trips to and from airports may be as long as 200 km at either end. We guessed that 40, 80, 120, 160 and 200 km of land transport should be added to the round trip flight distances in the five increasing distance intervals in the NTS data. 70 % of the transport work thus generated was assumed to be by car, the remainder a mix of bus and train transport.

In addition to the trips with overnight stays reported in the 1998 and 2005 NTS, Table 67 includes (conservative) estimates of trips excluded from the NTS data because the one-way distance was less than 100 km. We estimated the average length of such trips as 45 km each way. i.e. 90 km return, and ascribed all of them to travel by car.

The table below shows the modal split of all leisure and business trips in the 1998 and 2005 NTS.

Table 66 Domestic tourism by main mode of transport according to the 1998 and 2005 National Travel Surveys (percentages of trips – not of kilometres). Trips of over 100 km each way
 Source: Institute of Transport Economics: National Travel Surveys

Transport mode	Leisure trips		Business trips		All trips*	
	1998	2005	1998	2005	1998	2005
Car	72.2	73.3	34.3	39.5	65.0	66.9
Bus	5.9	6.3	2.4	6.0	5.2	6.2
Train	8.9	6.4	8.0	7.4	8.7	6.6
Aircraft	9.4	11.7	51.9	44.5	17.5	17.9
Ferry or ship	3.0	1.7	2.4	1.9	2.8	1.7
Other	0.7	0.5	1.0	0.7	0.7	0.6
Total	100.1	99.9	100.0	100.0	99.9	99.9

*Weighted result after adjusting the number of business trips downwards by 5 % in 1998 and upwards by 20.8 % in 2005.

Cars are clearly the dominant mode of transport if we simply count trip numbers – and would be even more so if we included the trips with a one-way distance of less than 100 km. However, average distances per trip vary considerably between modes. The next table shows our results for the amount of transport work performed by mode.

Table 67 Estimated transport performance in domestic tourism by mode of transport. Thousand passenger kilometres
Sources: See text

Transport mode	Leisure trips		Business trips		All trips*	
	1998	2005	1998	2005	1998	2005
Car >100 km	5 120 959	5 111 590	487 156	518 412	5 608 116	5 630 003
<i>Car <100 km</i>	<i>548 820</i>	<i>573 750</i>	<i>53 640</i>	<i>58 500</i>	<i>602 460</i>	<i>632 250</i>
Bus	373 010	450 393	30 137	75 639	403 148	526 032
Train	737 595	555 590	124 118	108 336	861 713	663 926
Aircraft	1 363 667	1 774 439	1 563 328	1 311 917	2 926 995	3 086 356
<i>Car/train/bus to/from airports</i>	<i>214 022</i>	<i>273 309</i>	<i>249 622</i>	<i>208 992</i>	<i>463 644</i>	<i>482 301</i>
Ferry or ship	188 028	110 043	46 146	28 724	234 174	138 767
Other	44 212	27 532	13 352	12 370	57 564	39 902
Total	8 590 314	8 876 646	2 567 500	2 322 891	11 157 814	11 199 537

*Weighted result after adjusting the number of business trips downwards by 5 % in 1998 and upwards by 20.8 % in 2005.

Even when we consider transport performance, the car remains clearly the most important mode of transport, but aircraft are more important in terms of passenger kilometres (well over a quarter of the total) than of trips.

The overall volume of transport work generated by domestic tourism changed very little from 1998 to 2005. Note however that although we have assumed the number of business trips >100 km to have been unchanged from 1998 to 2005, the amount of transport work generated fell by some 9 % according to the table above. We have applied our adjustments to the raw NTS data for business trips (a downward correction of 5 % in 1998 and an upward correction of 20.8 % in 2005) equally to all modes of transport and all distance intervals. The share of business trips in the 2005 NTS that were long and went by air was less than in 1998 – therefore an equal number of trips in all makes for fewer passenger kilometres, particularly by air. This is in contrast to the evolution of leisure travel, more of which was by air in 2005 than in 1998. The Air Passenger Surveys from the two years confirm that there was an increase in the share of leisure passengers, though not quite as marked as the table above would suggest. After eliminating day trippers, the share of passengers whose trips were not “work-related” grew from 45 per cent in the 1998 Air Passenger Survey to 53 per cent in that of 2005.

The volume of domestic tourist travel by car changed very little between the two years, while the table suggests a decline in travel by train and by ship or ferry, but an increase in travel by bus. The decline in train travel is not reflected in transport statistics, but neither do we have any other data on the share of train passengers who made overnight stays at their destinations.

9 Inbound tourism and transport work generated

This section presents estimates of the numbers of foreign visitors to Norway from 1985-2005 by mode of transport to and from Norway and the distances they travelled – which together provide a basis for estimating transport work generated – and also estimates of the distances tourists travelled by various modes within the country. Where the sources permit, we shall also present estimates of how inbound tourists were split by purpose of travel.

9.1 Foreign visitor arrivals by mode of transport

Only one data source – the Foreign Visitors Surveys (FVS) of the Institute for Transport Economics – covers foreign tourist arrivals by all modes of transport (the FVS do not actually cover cruise passengers, but do provide some data on this group from other sources). Although the FVS go back to 1995, the design of the surveys has changed several times and also varies between seasons in a given year – usually with more information on tourists in the summer season (May-September) than in the winter and in particular the autumn season. Therefore, we only found it possible to construct a reasonably consistent data series on foreign visitor arrivals by mode from the FVS from 1999-2005.

The tables in the FVS publications split visitors by whether they arrived by air, ferry, rail/scheduled bus or otherwise by road. However, we wished to split those arriving by ferry according to whether they were walking passengers, came in private cars or on touring buses, and also to split arrivals by road between touring buses and cars. Helpfully the FVS also contain information on the numbers of *non-scheduled vehicles* (i.e. cars and touring buses) that brought tourists by road or on ferries, and aggregate numbers of tourists arriving by these modes combined. The other tourists arriving by road or ferry should then be walking passengers on ferries. To split the remainder between touring buses and cars we assumed that there were a constant 40 passengers per touring bus. On that assumption the occupancy of private cars worked out at between 2.23 and 2.47, i.e. quite close in all years to our general assumption of c. 2.4 tourists per car. It should be noted that ferry statistics which were collected from 1997-2002 but then discontinued suggest somewhat higher numbers of walking passengers on ferries than we computed from the FVS. This discrepancy can partly, but probably not fully be explained by the presence of day trippers among those counted in the statistics (but not in the FVS). The table below shows our estimates of the numbers of foreign visitors by mode of transport as estimated from the FVS with the assumptions mentioned above.

Table 68 Estimated numbers of foreign tourists (1000) by mode of transport on arrival, based on data from Foreign Visitors Surveys and own assumptions about occupancy of cars and buses.

Sources: Institute of Transport Economics: Foreign Visitors Surveys and own assumptions

Year	Air	Ferry (walking passengers)	Rail or scheduled bus	Touring bus on road or ferry	Car on road or ferry
1999	1 037	229	81	720	1 156
2000	1 006	223	81	600	1 193
2001	998	226	78	520	1 251
2002	1 011	243	83	560	1 214
2003	1 170	239	79	480	1 301
2004	1 414	231	123	520	1 341
2005	1 560	232	108	560	1 399

The next table below shows the number of vehicles arriving per year with tourists, either by road or on ferries. This series can be extended back to 1997.

Table 69 Numbers of non-scheduled vehicles (1000) arriving with tourists, according to Foreign Visitors Surveys

Source: Institute of Transport Economics: Foreign Visitors Surveys

Year	Ordinary cars only	Cars with caravans	Camping vehicles	Touring buses
1997	447	33	33	18
1998	452	30	36	18
1999	445	27	36	18
2000	438	27	33	15
2001	442	28	36	13
2002	487	24	34	14
2003	492	24	40	12
2004	499	29	45	13
2005	511	27	52	14

For arrivals by air, the Air Passenger Surveys combined with traffic statistics provide a reasonable basis for estimating the numbers of foreign tourists over the whole 1985-2005 period. The method in this case is the same as that used to compute tourist departures by Norwegian residents on scheduled aircraft, i.e. to take the number of international arrivals at Norwegian airports from statistics and the breakdown of passengers by Norwegian vs. foreign residence in the Air Passenger Surveys of 1986, 1992, 1998, 2003 and 2005, and estimate the share of foreign residents by interpolation for years in which no survey was conducted.⁸⁰ This should lead to a slight overestimation of the number of foreign tourists in the true sense who arrived by air, since there are small percentages of day-tripping business travellers and of commuters among the air passengers. This is borne out by the fact that the results of this method – if left unadjusted – are on average some 11-12 % higher than those of the FVS from 1999-2005.

For arrivals by ferry, statistics splitting arriving passengers by nationality (i.e. not strictly by residence) were collected from 1997-2002⁸¹, but not before or since. However, data on overall arrivals by ferry are available for the whole 1985-2005 period. The same applies to arrivals by rail, i.e. by border-crossing trains⁸². If reasonable assumptions can be made about the percentage of foreign residents among the passengers, then we also have estimates of their numbers. Our assumptions were that foreign residents made up a constant 40 per cent of those arriving by rail before 1999, and a constant 30 per cent of those arriving by ferry before 1997. The ferry statistics for the six years from 1997 to 2002 inclusive show that foreign nationals made up between 27 and 34 per cent of passengers on international ferry services in those years.

Cruise passenger numbers from 1995-2005 were taken from a table in the 2005 FVS, whose source was the industry organisation Cruise Norway, except for the 2005 figure which was estimated by the Institute for Transport Economics. For earlier years data were obtained from the harbour authorities in Bergen⁸³ (who supplied a complete time series from 1983 onwards) and Oslo⁸⁴ (data for selected years including 1985 and 1995). The number of passengers who visited these two ports gave a basis for estimating the total number of cruise visitors to Norway, since the great majority of cruises that call at Norwegian ports include either Oslo or Bergen, while only a few visit both. Those calling at Bergen are mainly cruises along the west coast of Norway, while those calling at Oslo are mainly destined for the Baltic. However, some cruises do take in both Oslo and Bergen, and the total number of cruise passengers in 1985 and 1990 was estimated as the sum of passengers in Oslo + Bergen. The number who visited Oslo in 1990 was estimated by interpolation between 1985 and 1995.

⁸⁰ See section 4.3 for more details and sources.

⁸¹ http://www.ssb.no/english/subjects/10/12/40/ferge_en/

⁸² Rideng, A. 2007: Transportytelser i Norge 1946-2006 (Transport performance in Norway – summary only in English), see Table 12 in the appendix for statistics on arriving and departing passengers by ferry as well as rail. Note that the figures in this table refer to arrivals plus departures; they have therefore been halved to give the number of arrivals. <http://www.toi.no/getfile.php/Publikasjoner/T%D81%20rapporter/2007/909-2007/909-hele%20rapporten%20nett.pdf>

⁸³ Helen Hovland, Bergen Harbour Authority (personal communication).

⁸⁴ Margrete Austad, Oslo Harbour Authority (personal communication).

For two major groups of tourists – those who came by touring bus and those who came in their own cars – we found no data whatsoever prior to 1997 that could support estimates of numbers. (Although there are no figures for 1997 or 1998 either in Table 65, the numbers of vehicles in Table 66 could be used to support estimates of passenger numbers.) For the purposes of the scenarios we were obliged simply to guess how many there might have been in 1985, 1990 and 1995. The same applies to the split between walking passengers and passengers who brought cars on ferries. Essentially we guessed that the number of touring bus passengers had not changed much between 1985 and 1997, that the number of tourists coming by car had grown steadily and that the percentage of walking passengers among arrivals by ferry had not changed. – Neither were any data available on arrivals by scheduled bus, as opposed to border crossings by train. However, there were few border-crossing scheduled bus services that were likely to bring significant numbers of tourists at the beginning of our period. The numbers arriving by scheduled bus were guessed at 20,000 in 1985, 25,000 in 1990 and 30,000 in 1995.

The table below summarises our estimates of tourist numbers by mode of transport over the whole 1985-2005 period. Note however that the figures for arrivals by air in this table, which are based on the Air Passenger Surveys combined with statistics, have not been adjusted to eliminate day trippers and commuters.

Table 70 Estimated numbers of foreign tourists (1000) by mode of transport on arrival, based on data from several sources and own assumptions

Sources: See text

Year	Air*	Ferry (walking passengers)	Rail or scheduled bus	Touring bus on road or ferry	Car on road or ferry	Cruise	Total
1985	548	109	184	650	900	59	2 450
1986	580						
1987	616						
1988	648						
1989	668						
1990	697	155	145	700	1 025	74	2 796
1991	670						
1992	739						
1993	756						
1994	820						
1995	868	188	84	700	1 150	110	3 099
1996	977		82	680		133	
1997	1 099		74	720	1 176	131	
1998	1 188		76	720	1 232	173	
1999	1 244	229	81	720	1 156	194	3 624
2000	1 187	223	81	600	1 193	208	3 492
2001	1 164	226	78	520	1 251	197	3 436
2002	1 197	243	83	560	1 214	210	3 507
2003	1 273	239	79	480	1 301	254	3 626
2004	1 500	231	123	520	1 341	302	4 017
2005	1 602	232	108	560	1 399	324	4225

* Figures for air travel are probably some 10 % too high on average as they include day trippers and commuters.

9.2 Inbound tourists by purpose of travel

The Foreign Visitors Surveys provide estimates of the overall numbers of leisure and business tourists from 1998 to 2005. However, we found that only the 2001, 2002 and 2005 FVS provided data that allowed us to split inbound tourists by mode and purpose of travel at once. These data are shown in the next two tables. You will

note that the totals are somewhat smaller than in the table above. This is mainly due to the fact that the FVS data do not include cruise passengers, but also that they do not include day trippers or commuters by air.

Table 71 Leisure and business tourists (1000), according to Foreign Visitors Surveys
Source: Intitute of Transport Economics: Foreign Visitors Surveys

Year	Leisure	Business	Total	Business %	Business % adjusted for cruise (all leisure) tourists*
1998	2 467	788	3 256	24	23
1999	2 426	797	3 215	25	23
2000	2 327	777	3 117	25	23
2001	2 297	776	3 073	25	24
2002	2 373	738	3 111	24	22
2003	2 520	749	3 269	23	21
2004	2 780	848	3 628	23	22
2005	2 946	913	3 859	24	22

* Cruise passenger numbers taken from Table 67

Table 72 Foreign tourists (1000) by purpose of travel and mode of transport on arrival, according to Foreign Visitors Surveys. Note that passengers arriving in cars or buses on ferries are included among ferry passengers in this table.

Source: Institute of Transport Economics: Foreign Visitors Surveys

Year	Air	Ferry	Rail or scheduled bus	Road	Total
Leisure travellers					
2001	474	586	60	1 177	2 297
2002	484	617	67	1 155	2 323*
2005	900	636	87	1 323	2 946
Business travellers					
2001	540	63	14	158	776
2002	516	71	15	181	783*
2005	660	67	22	165	913

* The total for leisure travel in 2002 is slightly lower and that for business travel higher than in Table 68, as the totals for this year were revised in later editions of the FVS, but not the modal splits for leisure and business travellers respectively.

It is evident – and hardly unexpected – that business travellers comprised a large share of tourists arriving by air between 2001-2005, but very small shares – between 10 and 20 per cent – of tourists who arrived by other modes.

For years prior to 1998 we had no data which allowed us to split inbound tourists by purpose of travel across all modes of transport. However, we took it to be a fair assumption that business travellers did not comprise very much more or less than 15 per cent of those arriving by other modes than air (or cruise) between 1985 and 1997. On that assumption, most business tourists would have come by air over the whole period. We have indications of their numbers from the Air Passenger Surveys in 1986, 1992 and 1998. The share of foreign visitors arriving by air who were travelling on business in 1986 was 70 per cent; this figure includes day trippers but excludes commuters. The share whose travel was “work-related” – a term which includes commuters as well as day trippers – was 60 per cent in 1992 and 53 per cent in 1998. This – compared with Table 70 – suggests that after eliminating the groups who were not real business tourists, the number of true business tourists who came by air may have been around 350.000 in 1986, a bit more than 400.000 in 1992 and close to 550.000 in 1998, a year which is also covered by Table 71. If 15 per cent of tourists arriving by other modes than air or cruise in 1986 and 1992 were on business, this would – by extrapolation and interpolation from Table 70 – likely make about 270.000 and 300.000 business tourists in these two years respectively. If so, business travellers would have made up some 24-26 per cent of all inbound tourists in these two years, which is slightly higher than the figures (including

cruise passengers) from 1998-2005 according to Table 68. This suggests that the share of inbound tourists who are travelling on business is slowly declining, as is the case with outbound Norwegian tourists.

9.3 Origins of inbound tourists

To estimate the distances inbound tourists travelled by various modes, we need to know where they came from – for practical purposes which country or region of the world they came from, since neither statistical nor survey data can pinpoint them more precisely than that.

The Foreign Visitors Surveys from 2001 onwards provide data on numbers of visitors split by country of residence (15-17 countries specified, the remainder grouped into “Rest of Europe” and “Rest of world” categories and by four modes of transport – air, ferry, rail or scheduled bus and other road transport. Ideally we would want to split the sum of arrivals by ferry+road from each country into walking passengers on ferries, passengers on touring buses and tourists travelling in private cars, as we did for the aggregate of foreign tourists in Table 70. Available data make this only partly possible. The FVS themselves contain data on (very approximate) numbers of touring buses split by the four most important origin countries plus a “remainder” (effectively “Rest of Europe”) category. These data go back to 1996 and can be used to estimate numbers of passengers on the general assumption that there are 40 per bus, irrespective of country. Further, the FVS also include data on the total numbers of *leisure* tourists who left either by road or by ferry, split by countries of origin. This series also extends back to 1996.

Another source is the statistics on international ferry traffic from 1999-2002 (but not for 1997 or 1998) include data on vehicle as well as passenger numbers split by five nationalities plus “Rest of Europe” and “Rest of world” categories. These can be used very tentatively to estimate the numbers of walking passengers by origin.

For years prior to 2001, or 1996/97 in the case of touring bus and ferry passengers, the only source that combines information about mode of travel and countries of origin for both leisure and business travellers is the Air Passenger Surveys. Since 1986 these have split foreign visitors who came by air by 10 or 11 countries or pairs of countries, plus “Rest of Europe”, Asia and “Rest of world” categories. Therefore, we can make reasonably well-founded estimates of the average distances travelled by visitors who came by air over the whole 1985-2005 period, but are left guessing about those who came by other modes before 1997.

The only other data that could give some indication of tourists’ origins are the accommodation statistics, but since these only cover hotels and camping grounds before 1998 – and even then incompletely – they are not of very much use in estimating the distribution by origin countries of tourists who did not come by air. Besides, there is probably a substantial degree of overlap between tourists who came by air and those who stayed in hotels.

The next table below shows the breakdown of tourists by origin and four modes of transport according to the 2001 and 2005 FVS. The following table shows the corresponding percentage distributions by origin.

Table 73 Foreign tourists (1000) by origin and mode of transport on departure, according to Foreign Visitors Surveys. Note that passengers arriving in cars or buses on ferries are included among ferry passengers in this table.

Source: Institute of Transport Economics: Foreign Visitors Surveys

Year	Air	Ferry	Rail or scheduled bus	Road	Total
2001					
Sweden	121	48	34	571	873
Denmark	104	251	7	177	539
Germany	67	266	6	147	486
UK	210	22	2	3	237
Finland	27	0	0	163	190
USA	147	4	10	0	160
Netherlands	46	32	1	45	124
France	57	5	1	15	78
Cumulative, 8 countries	779	628	61	1 121	2 687
Switzerland	29	2	2	10	42
Italy	21	2	3	13	39
Spain	15	0	1	11	27
Belgium	16	4	0	5	24
Austria	9	2	1	12	23
Rest of Europe	52	12	2	51	116
Rest of world	94	0	8	13	115
Totals	1 014	649	(78)*	(1 236)*	3 073
2005					
Sweden	197	36	61	700	994
Denmark	150	259	9	166	584
Germany	155	271	5	178	609
UK	278	29	2	5	314
Finland	43	0	2	212	258
USA	147	3	6	0	155
Netherlands	73	39	1	55	163
France	90	3	1	19	113
Cumulative, 8 countries	1 133	640	87	1 335	3 190
Switzerland	28	2	2	10	41
Italy	38	2	2	19	60
Spain	48	0	1	6	55
Belgium	30	4	0	7	41
Austria	13	1	0	12	26
Russia	11	0	0	16	27
Japan	39	0	2	0	41
Rest of Europe	110	31	7	84	231
Rest of world	112	24	6	0	142
Totals	1 560	703	108	1 488	3 859

* Note: there are discrepancies between the total numbers of visitors coming by rail/bus and by road as shown at the top of Table 5.6 in the 2001 Foreign Visitors Survey (74.000 and 1.335.000 respectively) and the sums of the numbers for each country or region as shown below in the same table. The letter sums (78.000 and 1.236.000) are the figures shown in parentheses. This also means that the numbers in our table do not all sum up horizontally to the figures in the last column.

Table 74 Foreign tourists, percentage distribution by origin for each mode of transport on departure, according to Foreign Visitors Surveys. Note that passengers arriving in cars or buses on ferries are included among ferry passengers in this table.

Source: Institute of Transport Economics: Foreign Visitors Surveys

Year	Air	Ferry	Rail or scheduled bus	Road	Total
2001					
Sweden	11.9	7.4	43.6	46.2	28.4
Denmark	10.3	38.6	9.0	14.3	17.5
Germany	6.6	40.9	7.7	11.9	15.8
UK	20.7	3.4	2.6	0.2	7.7
Finland	2.7	0.0	0.0	13.2	6.2
USA	14.5	0.6	12.8	0.0	5.2
Netherlands	4.5	4.9	1.3	3.6	4.0
France	5.6	0.8	1.3	1.2	2.5
Cumulative, 8 countries	76.8	96.6	78.2	90.7	87.4
Switzerland	2.9	0.3	2.6	0.8	1.4
Italy	2.1	0.3	3.8	1.1	1.3
Spain	1.5	0.0	1.3	0.9	0.9
Belgium	1.6	0.6	0.0	0.4	0.8
Austria	0.9	0.3	1.3	1.0	0.7
Rest of Europe	5.1	1.8	2.6	4.1	3.8
Rest of world	9.3	0.0	10.3	1.1	3.7
Totals	100.2	99.9	100.2	100.0	99.9
2005					
Sweden	12.6	5.1	56.5	47.0	25.8
Denmark	9.6	36.8	8.3	11.2	15.1
Germany	9.9	38.5	4.6	12.0	15.8
UK	17.8	4.1	1.9	0.3	8.1
Finland	2.8	0.0	1.9	14.2	6.7
USA	9.4	0.4	5.6	0.0	4.0
Netherlands	4.7	5.5	0.9	3.7	4.2
France	5.8	0.4	0.9	1.3	2.9
Cumulative, 8 countries	72.6	91.0	80.6	89.7	82.7
Switzerland	1.8	0.3	1.9	0.7	1.1
Italy	2.4	0.3	1.9	1.3	1.6
Spain	3.1	0.0	0.9	0.4	1.4
Belgium	1.9	0.6	0.0	0.5	1.1
Austria	0.8	0.1	0.0	0.8	0.7
Russia	0.7	0.0	0.0	1.1	0.7
Japan	2.5	0.0	1.9	0.0	1.1
Rest of Europe	7.1	4.4	6.5	5.6	6.0
Rest of world	7.2	3.4	5.6	0.0	3.7
Totals	100.1	100.1	99.3	100.1	99.9

Unsurprisingly, the overwhelming majority of tourists who came by car, touring bus or ferry were from North-Western Europe. The small number of tourists who came by rail includes a somewhat larger share of visitors from other parts of Europe as well as of visitors from other continents, of whom the latter will almost invariably have

made a trip by air before travelling from some other place in Europe to Norway by train. Even among those who came by air, visitors from North-Western Europe are in a majority, but in this case only of some 60 %. Overall there was a slight drop in the share of tourists who came from North-Western Europe as well as from the USA between 2001 and 2005, while the share of visitors from more distant parts of Europe as well as from other continents (excepting those from the USA) increased (note that Japan was included in "Rest of world" in 2001 but appears separately in 2005).

The next table shows the numbers of *leisure* tourists from different countries who left either by road or by ferry from 1996-2005. For comparison we have included the total number of tourists (i.e. including business visitors) who left by one of these means from 1999-2005 (cf. Table 65).

Table 75 Foreign leisure tourists (1000) who departed either by ferry or by road, by country of residence
 Source: Institute of Transport Economics: Foreign Visitors Surveys

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sweden	600	616	620	593	543	580	568	569	588	622
Denmark	415	401	388	421	404	395	394	390	379	382
Germany	454	453	475	416	407	392	404	438	418	419
UK	30	34	32	23	25	25	29	28	29	31
Finland	162	181	192	184	174	154	172	144	165	196
USA	0	2	3	2	2	3	ROW	ROW	ROW	ROW
Netherlands	73	83	90	85	76	71	71	76	83	89
France	19	22	20	23	25	19	18	18	17	21
Switzerland	13	11	12	14	12	11	10	11	11	11
Italy	15	15	17	19	16	15	12	15	19	20
Spain	9	8	17	18	9	11	6	6	6	6
Belgium	16	10	16	9	17	8	9	10	11	10
Austria	13	13	13	13	17	13	13	11	12	12
Rest of Europe	47	45	55	60	54	57	69	65	123	140
Rest of world	5	1	1	1	13	13				
Totals	1 870	1 896	1 952	1 876	1 793	1 771	1 774	1 781	1 861	1 959
Totals, ALL tourists				2 105	2 016	1 997	2 017	2 020	2 092	2 191

As we can see, leisure travellers made up some 88-89 per cent of tourists leaving by road or ferry from 1999-2005. Tourists from the other Nordic countries, Germany and the Netherlands predominate among this group, and we may reasonably surmise that this is even more true of business travellers who came by car. The number of tourists from these countries was remarkably stable from 1996-2005. The only remarkable change is in the number of tourists in the "Rest of Europe and rest of the world" group, which suddenly doubled in the last two years of the period.

Tourists who came by road or ferry may either have come by touring bus, in their own cars or as walking passengers on ferries (remember that the few who came by scheduled bus are grouped together with rail passengers). The FVS give data on the numbers of such buses from the most important countries of origin (the other Nordics and Germany), but unfortunately only in thousands or half-thousands of buses, which makes the results very approximate. On the assumption that 1,000 buses = 40,000 passengers, the table below shows the numbers of visitors from the countries mentioned and from the rest of the world who came by touring bus. We may fairly assume that all of them were leisure travellers.

Table 76 Approximate numbers of foreign tourists (1000) who departed by touring bus, by country in which the bus was registered

Source: Institute of Transport Economics: Foreign Visitors Surveys and own assumptions

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sweden	200	240	240	240	200	160	160	160	200	220
Denmark	80	80	80	120	80	80	80	80	60	40
Germany	160	160	200	160	120	120	120	120	120	100
Finland	120	120	120	120	120	80	120	80	80	100
Rest of world	80	80	120	120	80	80	80	40	60	100
Totals	680	720	720	720	600	520	560	480	520	560

The figures suggest that over half of the Finnish leisure tourists who came by road (there are no ferry connections from Norway to Finland) were on touring buses in most years, as were about one-third of the Swedes and Germans, but only about one-fifth of the Danes (and even fewer at the end of the period). For the rest of Europe the numbers coming by touring bus make up a bit more or less than 40 % of all leisure visitors by road or ferry in most years.

Most of the other tourists by road or ferry came in their own cars, but some walked on and off the ferry. We have previously estimated the total number of such walking passengers at between 223-243,000 per year from 1999-2005. The ferry statistics that were collected from 1997-2002 also include some data on the nationality of passengers as well as the registration country of vehicles carried. On the imperfect assumption that the passengers in each vehicle were nationals as well as residents of the registration country, and other assumptions about the occupancy of vehicles, we can guesstimate the number of walking passengers for some countries. The table below shows the results of such a procedure based on the statistics for 2002. As always, we have estimated the number of passengers per touring bus as 40, and in this case the number of passengers per car as 2.3 (the procedure we used to calculate total numbers of walking passengers resulted in imputed numbers of between 2.23 and 2.47). Note that the figures in Table 75 concern all visitors, not just tourists in our sense.

Table 77 Foreign visitor arrivals on ferries by nationality, foreign vehicles by registration country and estimated split of passengers (bus, car and walking) in 2002

Source: Statistics Norway: Ferry Statistics and own assumptions

	Passengers (1000)	Buses	Cars	Bus passengers (40/bus) (1000)	Car passengers (2.3/car) (1000)	Walking passengers (residual) (1000)
Sweden	135	448	19 568	17.9	45.0	72.1
Denmark	400	819	65 908	32.8	151.6	215.7
Germany	300	1 495	72 167	59.8	166.0	74.2
UK	50	184	5 496	7.4	12.6	30.0
Netherlands	28	45	12 158	1.8	28.0	-1.8
Rest of Europe	26	206	7 743	8.2	17.8	0.0
Rest of world	8	3	315	0.1	0.7	7.2
Total	950	3021	183534	120.8	422.1	407.0

The total number of walking passengers as estimated above is much higher than that estimated for 2002 in Table 70 (243.000). Much of this discrepancy is likely due to the fact that the figures in Table 70 concern foreign visitors who made at least one overnight stay in Norway, while those in the table above concern all foreign nationals who came by ferry. These will include (1) foreign nationals resident in Norway, (2) day trippers, mainly on the short Strömstad-Sandefjord connection from Sweden and (3) one-day-ashore trippers on other ferries from Sweden or Denmark, whose trip consisted of a night on the ferry, a day in Norway and another night on the return ferry. Most of the category (2) and (3) passengers are of course walking passengers. Category (3) presents a problem

because the people concerned are tourists in the sense of the SDN study since they spent at least one night away from home, even though they spent no night in Norway. We cannot say how large this group was, only that it may represent a significant fraction of the Swedish and Danish walking passengers and that some tens of thousands ought in that case to be added to the number of walking ferry passengers in Table 70, to get the true number of tourists in that category.

Among residents of other countries than the Scandinavian ones, there should be very few day trippers (or one-day-ashore trippers). There are no particular problems with regarding the figures in the table above as estimates of the numbers of *tourist* walking passengers from these countries, except that the negative figure for the Netherlands is clearly absurd. However, it is only slightly so: if we assume that the occupancy of Dutch cars was 2.0 and not 2.3, it becomes positive.

The final table in this section shows how foreign passengers to and from Norwegian airports were split by country or region of residence, according to the Air Passenger Surveys from 1986 onwards. The numbers were calculated by multiplying total foreign arrivals by whole-number percentage figures for individual countries, and are therefore very approximate.

Table 78 Foreign passengers on scheduled flights to and from Norway (1000), by country or region of residence

Source: Institute of Transport Economics: Air Passenger Surveys

	1986	1992	1998	2003	2005
Sweden	133	133	214	204	256
Denmark	168	96	143	153	176
Finland	17	15	36	38	48
Germany	29	67	83	102	144
UK and Eire	81	133	238	242	272
Netherlands	23	30	48	51	80
France	29	37	48	51	64
Switzerland	12	22	48	25	In RoE
Italy	12	22	24	38	48
Spain and Portugal	6	15	12	38	48
Rest of Europe	11	37	83	127	208
USA and Canada	41	89	154	140	144
Asia	12	37	36	38	48
Rest of world	6	15	24	25	48
Total	580	739	1188	1273	1602

In contrast to the number of visitors coming by road or ferry, the number coming by air has grown strongly through the whole 1985-2005 period, and there has also been a very significant shift in the mix of origin countries. In 1986 over half came from Sweden or Denmark, but these countries provided just over one-quarter of the incoming visitors by air in 2005. An increasing share of the air passengers come from some of the most distant countries and regions.

The aggregate figures in the table above include a likely 10 per cent or so of commuters or day trippers, who are not tourists in the sense of this study and who will mainly be found among the visitors from nearby countries near the top of the table.

9.4 Distances travelled from origin countries to Norway

Let us assume that we know which countries visitors who arrived in Norway by each mode of transport came from. (In fact the data presented in the previous section did not answer this question fully, and it was necessary to fill in the gaps with assumptions when modelling the SDN scenrios). If we know this much, there are still questions to be answered before we can say how far these visitors travelled by the mode of transport they were using on

arrival in Norway, and also by other modes they may have used at other stages of their journey. This is what we need to know – or rather to estimate – in order to estimate the emissions their travel generated.

Visitors need not have followed the most direct possible route from their home to their point of entry into Norway, and Norway need not have been the only destination of their journey. In general, however, we assumed that visitors from other European countries had followed reasonably direct routes and that Norway was their only or main destination. Visitors from other continents are more likely to have more than one destination country in Europe and would in almost all cases have come via an airport in another European country, whether or not they had an actual destination in that country, simply because there were very few direct intercontinental services operating out of Norway at any time between 1985-2005. A survey of US visitors to other continents in 2007 showed that they had 1.3 destination countries on average⁸⁵. We guessed that this figure was probably slightly higher for US visitors to Europe, which contains many small countries, and also for visitors from still more distant origins such as East Asia or Australasia. Therefore we assumed an average of 1.5 destination countries for intercontinental visitors, which meant that only 2/3 of their intercontinental flight distance (or more precisely of the emissions generated) should be credited to their visit to Norway.

Further, we assumed that European visitors who arrived in Norway by car had travelled the whole distance from their home to the border crossing into Norway by car, and that those who arrived by car-on-ferry had travelled the whole distance by car except for the ferry crossing. Those who had come by train or scheduled bus were assumed to have travelled virtually the whole distance from home by the same modes. Those who came by touring bus or as walking passengers on ferries were assumed to have made a (usually fairly short) trip by public transport to the starting point of the bus tour or the ferry harbour in their country of origin respectively. Those who came by air were assumed to have travelled by a 50/50 mix of cars and public transport to the departure airport in their home country, and to have travelled further than touring bus or ferry passengers to get there. The same assumptions – with the transport modes in reverse order – naturally applied to their trips home from Norway. Actual estimates of average distances from tourists' homes to airports, harbours or starting points for bus tours in their home countries were not provided as part of the data input from Norway but left to the Dutch team who modelled the SDN scenarios.

For intercontinental visitors, the assumption was that all had travelled from their home country to Europe by air, irrespective of their mode of transport on entry into Norway. Since we had no information to support estimates of the length of ferry, rail or bus trips within Europe for intercontinental visitors who entered Norway by one of these modes, such transport was disregarded and the entire journey counted as one by air with the same flight distance as for residents of the same country who entered Norway by air.

Average flight distances to Norway were estimated for the same individual countries, pairs of countries and wider regions that are specified in the Norwegian Air Passenger Surveys (see Table 76). The first step was to calculate great circle distances between one or more airports in the country or region concerned and one or more airports in Norway, with or without transfers⁸⁶. The choice of airport(s) in the origin country was based on judgement with respect to that country's size, distance from Norway, population distribution and the predominance or otherwise of one airport in that country for international traffic. The larger a country and the closer to Norway, the greater the need to consider more than one origin airport, particularly if that country actually has more than one important international airport. Thus in the case of traffic from the Netherlands or Austria, we saw no need to consider other airports than Amsterdam and Vienna respectively, but in the case of Germany flight distances from Hamburg, Berlin, Frankfurt and Munich were calculated. Similarly, although Japan was the most important source of visitors from the "Asia" region from 1985-2005 and has more than one important international airport, the difference in flight distance from Tokyo and from Osaka to Europe is negligible (but we did also weigh in distances from Shanghai, Singapore and Dubai when estimating averages for Asia). On the other hand, although the USA is quite distant from Norway, the country itself is so large and has so many widely distributed international airports serving major population centres that it was clearly relevant to consider several of them (distances to European airports from Newark, Chicago, Los Angeles and Houston were calculated). The assumptions about flight routes from origin airports to Norway were again based on judgement, but in this case educated by some knowledge of the existence or otherwise of direct services to Norway, and of whether such services existed (for all or much of the 1985-2005 period) to Oslo only, or to other airports in Norway. In most cases Oslo was assumed to be Norwegian the destination, but for four nearby countries (Sweden, Denmark, the UK and the Netherlands) which do have direct services to other Norwegian airports and from which the flight distances to these are markedly

⁸⁵ http://tinet.ita.doc.gov/outreachpages/download_data_table/2007_Outbound_Profile.pdf

⁸⁶ Great circle distances were calculated from this source: <http://www.gcmap.com/>

longer or shorter than to Oslo, more than one Norwegian destination was considered. From European international airports with no direct connections to Norway the most likely transfer point was generally assumed to be Copenhagen, which has direct connections to virtually all of the airports considered. For intercontinental flights the transfer airports were variously (depending on origin) assumed to be Copenhagen, Stockholm, Amsterdam, London, Paris or Madrid.

However, great circle flight distances – even after allowing for transfers – will generally be less than actual flight distances. The flight path may be less than straight for various reasons including weather conditions, and the aircraft may be forced to circle around the destination airport for some time while awaiting permission to land. Even the planned take-off and/or landing direction may be opposite to the main flight direction. The airport-related factors in particular will be relatively more important the shorter the whole flight is. To account for this, we added 10 % to the great circle distances on intra-European flights where these distances were less than 1200 km, 7 % where they were over 1200 km, and 5 % to the great circle distances for intercontinental flights.

The table below shows our final estimates of average flight distances to Norway from individual origin countries or regions.

Table 79 Estimated average real flight distance to Norway, by origin country or region (km)

Sources: See text

	Whole distance	After reduction by 1/3 for intercontinental tourists
Sweden	495	
Denmark	638	
Finland	858	
Germany	1 210	
UK and Eire	1 210	
Netherlands	1 045	
France	1 605	
Switzerland	1 552	
Italy	2 033	
Spain and Portugal	2 782	
Rest of Europe	1 712	
USA and Canada	7 980	5 320
Asia, until 2000	9 975	6 650
Asia, after 2000	9 450	6 300
Rest of world	12 600	8 400

The reason for the slightly lower recent average distance for flights from Asia is that Japan – the most distant of all major origin countries for tourists from Asia – has become somewhat less dominant as a source of such tourists due to rapid economic growth in other parts of Asia. Developments in other countries and regions have probably also had some effect on average flight distances for tourists bound for Norway between 1985 and 2005, but we have assumed that any such changes were negligible for the purposes of the SDN scenarios.

For European tourists who came by road, i.e. either by car or bus without any ferry crossing to Norway, we assumed that all residents of countries that do not border directly on Norway – i.e. all countries except Sweden, Finland and Russia – had entered Norway via the border crossing of European highway E6 at Svinesund, at the southern end of the Swedish-Norwegian border. This is the nearest possible – and decidedly most likely – point of entry for residents of any other countries than the three mentioned, if they choose to come all the way by road and not by ferry. The average distance from the origin country to Svinesund was estimated by checking the actual road distance from the capital of the country to Svinesund and applying judgement (a look at the map and the approximate centre of gravity of the country's population in relation to the position of the capital) to adjust the resulting distance slightly upwards or downwards. In the cases of Sweden, Finland and Russia (mentioned in decreasing order by their importance as sources of tourists as well as the length of their borders with Norway) we

had to apply rather more complex judgement. Particularly in the case of Sweden, there are very many possible border crossings and since the distance a Swedish resident needs to drive to get even to the nearest of them can vary from <1 km to >500 km – estimates of the average distance travelled must depend heavily on assumptions about where in Sweden Swedish tourists come from. Essentially two arguments point in opposite directions: (1) Swedes who live close to the Norwegian border are more likely to visit Norway than those who live further away but (2) the majority of Swedes live virtually at the maximum possible distance from Norway, i.e. either along the east coast or in the far south of their country. We settled for an average distance of 270 km from home in Sweden to the Norwegian border. – In the cases of Finland and Russia we have “bipolar” situations, since only Finns from the far north of the country, and only Russians from the Murmansk region, have fairly short road distances to Norway – but this also makes them more likely to visit the country. Finns from Helsinki or Russians from Moscow, or people from the more southerly and more populous parts of these countries in general, are more likely to follow other routes into Norway – most typically a drive through southern Finland, a ferry crossing to Sweden from Helsinki or Turku and a drive through that country, usually along highway E18 to the Norwegian border crossing at Ørje. However, for residents of central Finland, other ferry crossing across the Baltic to Sweden and other, more northerly, border crossings into Norway are also quite likely. So for Finns and Russians who entered Norway by car-on-road or bus-on-road, the estimated average road distance also includes an estimated average ferry distance. This is not the case with tourists from any other countries, although UK residents who came by car are also likely to have made a short ferry crossing.

The table below shows our estimates of average road distances for tourists from Europe.

Table 80 Estimated average distance covered from home to Norwegian border by tourists who entered Norway by road (in cars or touring buses)
Sources: See text

Origin country	
Sweden	270
Denmark	580
Germany	1 200
UK	1 850
Finland	580+200 by ferry
Netherlands	1 250
France	1 850
Switzerland	1 700
Italy	2 250
Spain	3 200
Belgium	1 450
Austria	1 900
Russia	1 500+150 by ferry
Rest of Europe	2 300

For tourists who came to Norway by ferry, we estimated average ferry distances in the cases of the five countries whose residents made up 90 % of foreign tourists by this mode in 2005 and even more in 2001 according to Table 74. These are Sweden, Denmark, Germany, the UK and the Netherlands. Distances for the most important ferry services that had operated for all or much of the 1985-2005 period between these countries and Norway were found with the help of a sailing distance calculator⁸⁷. Then average distances by ferry were estimated for residents of each of these countries. For residents of Sweden, Denmark and the UK, these estimates were based on judgement guided only by a comparison of sailing distances from the same countries, since residents of Sweden, Denmark and the UK are not very likely to choose ferry connections from other countries than their own to Norway. Dutch and German tourists, however, may well choose to drive to a Danish port and cross by ferry to Norway from there, in preference to a longer drive through Sweden (and then through Eastern Norway, for their

⁸⁷ <http://e-ships.net/dist.htm>

destination is Southern or Western Norway). The ferry crossing from Denmark will be shorter than the alternative direct ferry routes from the Netherlands (Amsterdam-Kristiansand) or Germany (Kiel-Oslo). Therefore the average ferry distance for residents of these countries was estimated to be shorter than the distances on those routes. Residents of other European countries who arrived in Norway by ferry were assumed predominantly to have come via Denmark.

In addition to actual ferry distances, we guessed what likely average distances by road to the ferry harbours might have been for those visitors from Sweden, Denmark, Germany, the Netherlands and the UK who came by car-on-ferry or touring bus-on-ferry. (As mentioned above, walking passengers on ferries were assumed to have travelled by public transport to the harbour, and we did not estimate the length of these trips). The estimates of road distances from home to ferry harbour were based solely on judgement, as no real data were available. Essentially we assumed that Swedes were unlikely to bring their cars to Norway by ferry unless they lived quite close to the port, since it would otherwise make more sense to drive the whole distance. Denmark is not only a small country in area but also has several ferry connections to Norway from Jutland as well as direct from Copenhagen, so the average driving distance must be quite short also for Danes. Germans, on the other hand, may have to drive much further to get to Kiel and further still to reach a Danish port. For most Dutch residents the road distance within their own country will be quite short if they choose to leave from Amsterdam, but the assumption that some came via Denmark added to the estimated road distance. In the case of the UK we assumed that people from the North of England or Scotland would be somewhat more likely to choose a direct ferry crossing to Norway (the only possible departure port being Newcastle) than others. In general we chose rather to err on the side of conservatism when guessing average road distances.

The table below shows our estimates of average distances by ferry and by road-to-ferry-harbour.

Table 81 Estimated average distances by ferry (for all tourists arriving by ferry) and by road from home to ferry harbour (for tourists arriving by car-on-ferry or bus-on-ferry). Km

Sources: See text

Origin country	Ferry distance	Road distance
Sweden	250	60
Denmark	300	100
Germany	500	400
UK	720	200
Netherlands	600	200
Rest of Europe	300	Not estimated

In the case of cruise passengers we did not estimate actual distances travelled. The emission factor we have for cruise traffic has passenger days rather than passenger kilometres as its denominator. Therefore, we were satisfied to estimate the average length in days of cruises to Norway. Based on data from the 2005 FVS and from the Oslo Harbour Authority, we found that some 128,000 of an estimated 324,000 cruise visitors to Norway (39.5 per cent) made a single-day call in Oslo only, usually on a cruise whose other destinations were in Baltic ports. Few cruises with destinations in several countries call in other Norwegian ports than Oslo. Therefore, the remaining 196,000 cruise passengers were assumed to have Norway as their sole cruise destination. Again according to the 2005 FVS, cruise passengers spent a total of 1,296,000 days in Norway in 2005, or 1,168,000 after deducting the single-day visitors to Oslo, i.e. 5.95 days on average for the 196,000 other cruise tourists. This would likely mean some 8 days on average including the voyage from the origin of the cruise (usually Southampton, Le Havre, Rotterdam, Hamburg or Copenhagen) to the first Norwegian destination and back again from the final Norwegian destination. Perhaps somewhat conservatively, we estimated the average number of cruise days that should be credited to tourism in Norway as 1 day for visitors to Oslo only and 7 days for all others, leading to an overall average of 4.63 days. The same figure was assumed valid for all years between 1985 and 2005.

9.5 Travel within Norway by foreign tourists

Very little direct information is available on how far tourists in Norway travel within the country or by what modes. The most useful source we did find was the Foreign Visitors Surveys. They include direct information on where and by what mode of transport tourists departed from the country (those who depart by other modes than car are also questioned about mode of transport on arrival, which is usually the same as on departure, and classified by

entry rather than departure point, again usually – but not always – the same). The FVS also include some questions about what places in Norway departing tourists had visited. By combing entry or departure points and information about places visited it is possible in theory to deduce some information about how far tourists must at least have travelled, and if we know the mode of transport on arrival and/or departure we can make some assumptions about likely modes of transport within the country. In particular, it is very probable that most of those who left the country in their own car had travelled the entire distance within Norway in the same vehicle.

In the course of this project the Institute for Transport Economics were asked for background data from the 2000 and 2006 FVS, showing which tourism regions the tourists who left or entered by border-crossing points in each region and by each mode of transport had visited. It proved impossible to extract such data from the 2000 FVS, and only partly possible from the 2006 FVS. Reasonably full information of the kind requested was actually only available for the summer (May to September inclusive) season of 2006, as the questionnaires used in the autumn and winter seasons are more limited. The summer season is certainly the most important in this context, not only because some 60 per cent of tourists come in that season but also because we can be sure that they travel more within the country than those who come in autumn (October-December) or winter (January-April).

However, the data also had another important limitation. For each region and mode of entry to or departure from the country we got figures showing the number of visitors to each tourism region, but not how many had visited various combinations of tourism regions. For instance, 781 respondents had arrived by car-on-ferry to ports in Eastern Norway. Out of these, 422 had “visited” (i.e. by their own account done more than pass through) Oslo, 192 other points in Eastern Norway, 270 Southern Norway, 431 Western Norway, 138 Central Norway and 93 Northern Norway. (Note that tourists did not necessarily “visit” the region where they arrived: if they did not stop there but simply drove through to another region, they had not visited the region of arrival.) But we had no direct information on how many of the 781 respondents above had visited, say, Southern+Western Norway, or Western+Central+Northern Norway. The fact that Oslo was split from the rest of Eastern Norway in the FVS material further complicated the issue, since we did not know how many had visited Oslo *and* other points in Eastern Norway.

We therefore had to make a series of assumptions to arrive at estimates of how many tourists had visited various combinations of regions. To simplify matters, we started by reducing this to a question of dividing the tourists who had arrived in any given region by any given mode into three groups: (a) those who had visited their arrival or departure region only, (b) those who had visited other adjacent regions, but not distant regions and (c) those who had visited regions distant from that of arrival or departure. Eastern and Western Norway are adjacent to each other as well as to Southern and Central Norway. Central Norway lies between Eastern and Western Norway to the south, and Northern Norway to the North. Thus all regions except Central Norway are distant from Northern Norway and vice-versa, but no other pair of regions are distant from each other, except for Central and Southern Norway. However, the latter pair hardly affected the issue since the sum of visitors who arrived/departed by Central Norway and had visited Southern Norway, and those who entered/left via Southern Norway and had visited Central Norway without probably also having visited Northern Norway was less than 0.5 per cent of the whole sample. Therefore, the distant-region group (c) was for practical purposes almost equal to those who had either entered/left by one of the three southernmost regions and had visited Northern Norway, or had entered/left by Northern Norway and also visited one of the three southernmost regions. These two groups could be identified unambiguously from the FVS data.

To separate group (a), who had visited their arrival/departure region only, from group (b), who had visited adjacent regions, was a more complex problem. In the example above of tourists entering Eastern Norway by car-on-ferry, there might theoretically be as few as 422 of 781 who had visited other regions. That would be the case if all those who visited Southern, Central and/or Northern Norway had also visited Western Norway. But the total number of visits to other regions was $422+270+138+93 = 923$, i.e. an average of 1.18 visits to other regions per respondent, so in theory everyone might have visited at least one other region. Neither extreme is probable. More specifically, it is highly likely that many (but not all) of those who visited Western Norway both went via and “visited” Southern Norway, and that most of those who visited Northern Norway were also part of the group who “visited” Central Norway (assuming that they drove, they would have had to spend at least two half-days driving through that region anyway). Very likely there was also of scattering of people who made a round trip taking in all four regions except Northern Norway. In other words, the average number of regions visited *by those who did leave Eastern Norway* was probably substantially higher than 1.18, meaning that there was also a substantial group who never left Eastern Norway. The higher the average number of regions visited by those who did leave Eastern Norway, the larger must be the percentage who never left that region.

In fact the sum of visited regions other than that of arrival or departure varied from lows of 0.32 times the number of respondents in the case of those leaving Northern Norway by car and 0.35 times in the case of those who arrived in Eastern Norway by train or scheduled bus, to extreme highs of 1.63 for those who arrived in Southern Norway by air and 1.73 for those who arrived in Northern Norway by train or bus. (To arrive at such figures for those groups who entered or left by other regions than Eastern Norway, we had also to make an assumption about the degree of overlap between visitors to Oslo and to other points in Eastern Norway. We assumed that 75 per cent of visitors to other points in Eastern Norway also visited Oslo.) – Starting from figures like those mentioned we estimated the proportion of visitors who had left their arrival/departure region at all by applying judgement on a case-by-case basis for each combination of arrival/departure region and mode of transport. The result in almost all cases was that we estimated the average number of other regions (including distant ones) that these people had visited at between 1.5 and 2.0. Again returning to our example of people who arrived by car-on-ferry to Eastern Norway, we estimated the average at 1.7, which in turn implied that close to 30 per cent of the group had visited Eastern Norway only. There were three outliers from the range of 1.5-2.0 other regions visited by those who did leave their arrival/departure region. The first was a low 1.38 for people who left Central Norway by car. Since Central Norway lies between Northern Norway and the rest of the country, tourists may go either north or south from there but were judged unlikely to have done both on the same visit. In other words we assumed that those who left Central Norway by car and had been to Northern Norway had visited that one other region only. The other outliers were on the high side. Those who arrived in Southern Norway by air and had been to other regions were estimated to have visited 2.5 other regions on average, and those who left Northern Norway by car and had been to other regions were estimated to have visited 2.4. The latter may seem paradoxical since the average number of other regions visited by the whole group of tourists who left Northern Norway by car was a mere 0.32. However, the distribution of other regions in the responses suggested that most of those who did leave Northern Norway during their visit to the country had visited more than one other region. Had they visited only one other region by car, this would most likely have been Central Norway, and one would have expected the number of visitors to that region to stand out; but in fact there were roughly as many visitors to Eastern and to Western as to Central Norway, suggesting that many had visited at least all three.

The table below shows the breakdown of respondents to the 2006 summer season FVS by arrival or departure region and mode of transport, and our estimates of the numbers who stayed within that region and who visited other adjacent or distant regions.

Table 82 Respondents to the Foreign Visitors Survey in the summer season of 2006 by region and mode of transport on arrival/departure, and estimates of percentages who visited other adjacent and distant regions

Source: Institute of Transport Economics: Foreign Visitors Survey 2006 and own assumptions, see text

Departure region (if by car) or arrival region and mode of transport	N	Visits to all other regions per respondent	Visits to distant regions per respondent	Estimated percentage who visited other regions	No. of regions visited by those who went to other regions
By car on road from Eastern Norway	589	0.66	0.11	44.2	1.5
By car on road from Central Norway	78	0.71	negligible	50	1.38
By car on road from Northern Norway	258	0.32	0.24	13.3 (of whom 10.3 to distant regions)	2.4
By car on ferry from Eastern Norway	781	1.19	0.12	70.2	1.7
By car on ferry from Southern Norway	809	0.88	0.09	58.5	1.5
By car on ferry from Western Norway	656	0.61	0.13	40.9	1.5
By bus or train from Eastern Norway	77	0.35	0.10	17.6	2.0
By bus or train from Central Norway	2	1.00	negligible	disregarded	
By bus or train from Northern Norway	12	1.73	1.56	69.2 (all to distant regions)	2.0
By ferry from Eastern Norway (no car)	77	0.39	0.07	19.5	2.0
By ferry from Southern Norway (no car)*	0	:	:	:	
By ferry from Western Norway (no car)	3	0.67	0.00	disregarded	
By air from Eastern Norway	910	0.71	0.22	35.7	2.0
By air from Southern Norway	9	1.61	0.21	64.4	2.5
By air from Western Norway	93	1.16	0.16	57.8	2.0
By air from other regions*	0	:	:	:	

* These are possible combinations of mode and region which are not represented in the FVS material

The next table gives a simpler overview,

Table 83 Estimated percentages of foreign tourists who stayed in their entry/departure region, visited adjacent regions only and visited distant regions.

Source: Table 82

Departure region (if by car) or arrival region and mode of transport	Stayed in entry/departure region	Visited adjacent regions only	Visited distant regions
By car on road from Eastern Norway	55.8	32.8	11.4
By car on road from Central Norway	50.0	50.0	negligible
By car on road from Northern Norway	86.7	3.0	10.3
By car on ferry from Eastern Norway	29.8	58.3	11.9
By car on ferry from Southern Norway	41.5	49.4	9.1
By car on ferry from Western Norway	59.1	28.1	12.8
By bus or train from Eastern Norway	82.4	7.2	10.4
By bus or train from Central Norway	disregarded		
By bus or train from Northern Norway	30.8	0.0	69.2
By ferry from Eastern Norway (no car)	80.5	13.0	6.5
By ferry from Western Norway (no car)	disregarded		
By air from Eastern Norway	64.3	19.8	21.9
By air from Southern Norway	35.6	43.2	21.2
By air from Western Norway	42.2	40.9	16.9

Having thus estimated the proportions of tourists by each mode and region of entry or departure who stayed in that region, who went only to other adjacent regions and to distant regions, the next problem was to estimate the number of kilometres they had travelled.

First of all, this was likely to vary by departure region. The regions vary substantially in size and extent, Southern Norway being the smallest and Northern Norway the largest and above all the most outstretched. So people who visited Northern Norway only were likely to have travelled considerably further on average than those who visited Southern Norway only, with other regions falling in between. This would also depend to some degree on the distance between the main entry/departure points in each region and the main cities or main attractions in the same regions. Furthermore, it would depend on the mode of transport on entry. The assumption was that people who come by car, and in particular those who come by car-on-ferry, intend to drive around, whereas a higher proportion of those who come by bus, train or air are going to one place only (the latter was evident in the case of arrivals by bus or train to Eastern Norway, of whom a clear majority visited Oslo only.) It was reasonable to assume that quite a few air passengers, in particular business travellers, also visited Oslo alone. The distance travelled by those visiting nearby regions, in particular those who visited only one nearby region, would also vary by entry/departure region since the distances between major entry/departure points and the most likely (or any possible) crossing points into other regions vary. For those travelling to the most distant regions, the *relative* differences in distance travelled would vary less between departure points, until we started considering modes of travel. There might be some difference between those departing from Northern Norway by car after visiting the southernmost regions and those doing the reverse. That would be likely the former group included a large share of Swedes or Finns who chose a Northern Norwegian border crossing simply as the closest to home, while the latter group predominantly consisted of tourists from more distant parts of Europe, who are more likely to drive almost the *whole length* of Northern Norway, often with the North Cape as their goal.

We assumed that all tourists who came and left by car did all of their travel within Norway by car. This is certain to be close to the truth. Car tourists may make ferry crossings while driving in Norway, but these were disregarded. In the case of people departing by train, bus or ferry, we assumed that they travelled by train or bus within Norway, except for some of those travelling to the most distant regions who might have gone by air. This assumption affects distance travelled as well, since the air distance between two points is less than the overland distance.

The visitors who came and left by air raised the most question marks. Almost all would at least have travelled to the city the airport serves, in the great majority of cases meaning Oslo – but they may have done this either by public transport or by car (taxi or hire car). Those travelling further within the departure region might likewise have done so by car, bus or train, but not by air as long if they came to Oslo Airport (there are very few scheduled flights *within* Eastern Norway). Those who travelled further afield might well have done so by air, including those going just to “nearby” regions. However, since a majority of visitors coming by air in summer are holidaymakers, many of whom want to see the country rather than just get to a single destination and back, we assumed that many – close to 50 per cent - either hired cars or went by train or bus. The distances travelled would again be somewhat longer for those going by land than by air between given points.

The case of travel to distant regions – which in the case of people coming by air meant Northern Norway, since all arrivals by air in the FVS material were to the three southernmost regions – included the possibility of a fourth mode of travel, namely the coastal express from Bergen to Kirkenes in the far north. Especially in the summer season, this caters mainly to tourists making the voyage as a cruise, and the majority of foreign tourists who do so make either the full one-way voyage (going the other way by domestic aircraft) or the full round trip. A report published in 2007 estimated the number of international flights generated by this traffic at 50,000 per year, i.e. 25,000 return trips⁸⁸. Out of these we assumed that at least 20,000 would be during the summer months. As the number of visitors arriving by air in the summer months of 2006 was 970,000 (based on the Foreign Visitors Survey), this means that about 2 per cent were bound for a trip by the coastal express, and thus in the great majority of cases visited three regions (Western, Central and Northern Norway). Many of them presumably flew directly into Bergen, but since Oslo has more international connections than Bergen, some were bound to go via Oslo. To simplify matters we assumed that all air passengers who arrived at airports in Western Norway and had been to Northern Norway had taken the coastal express. This group made up 1.5 per cent of people arriving by air in the whole survey sample, so we assumed that the other 0.5 per cent were among those who arrived at Oslo by air. Further, we assumed that 50 per cent of those taking the coastal express made the full one-way voyage and the other half the round trip. Since the round trip is 4,200 km, this made the average distance by sea 3,150 km. The flight distance between the end points of the voyage is some 1,600 km (via Tromsø), so the 50 per cent going one way by air made for an average domestic air distance of 800 km. – There are of course some passengers on the coastal express who come to Norway by other means than aircraft, but these have been disregarded, as have those who made only part of the voyage.

The table below shows our estimates of distances travelled by mode, for each combination of entry or departure region, mode of transport at entry or departure and regions visited.

⁸⁸ Landsdelsutvalget for Nord-Norge: Hurtigruten mot år 2020 (The Coastal Express towards 2020 – in Norwegian only) <http://www.ffk.no/docs/7a66665e-401b-4516-ab3a-76e86513e0d9.pdf>

Table 84 Estimated distances travelled within Norway by various groups of foreign tourists (km)

Source: Own assumptions, see text

Departure region (if by car) or arrival region and mode of transport	Stayed in entry/departure region	Visited adjacent regions only	Visited distant regions
By car on road from Eastern Norway	500 by car	1300 by car	4200 by car
By car on road from Central Norway	400 by car	1800 by car	not applicable
By car on road from Northern Norway	800 by car	1800 by car	3800 by car
By car on ferry from Eastern Norway	500 by car	1600 by car	4200 by car
By car on ferry from Southern Norway	300 by car	1200 by car	4500 by car
By car on ferry from Western Norway	500 by car	1300 by car	4200 by car
By bus or train from Eastern Norway	350 by bus or train	1600 by bus or train	2500 by bus or train, 500 by air
By bus or train from Central Norway	disregarded	disregarded	disregarded
By bus or train from Northern Norway	800 by bus or train	none	2500 by bus or train, 500 by air
By ferry from Eastern Norway (no car)	100 by bus or train	1600 by bus or train	2500 by bus or train, 1000 by air
By ferry from Western Norway (no car)	disregarded	disregarded	disregarded
By air from Eastern Norway	150 by bus or train, 150 by car	400 by car, 400 by bus or train, 600 by air	600 by car, 600 by bus or train, 2000 by air, 80 by coastal express
By air from Southern Norway	50 by bus or train, 100 by car	400 by car, 400 by bus or train, 500 by air	600 by car, 600 by bus or train, 2200 by air
By air from Western Norway	100 by bus or train, 200 by car	400 by car, 400 by bus or train, 600 by air	200 by bus or train, 800 by air, 3150 by coastal express

The next table shows the resulting estimated average distances by each mode of transport within Norway for all tourists who arrived by each mode. This means that the figures in each row of Table 85 were first weighted by the proportions of visitors staying in entry/departure regions, visiting adjacent regions and visiting distant regions according to Table 84, and the various entry/departure regions for each mode of international transport then weighted according the number of respondents per region (see the N column of Table 83).

Table 85 Preliminary estimated distances travelled within Norway by foreign tourists (km). Weighted averages for each mode of transport on arrival. Summer season 2006

Source: Previous 3 tables, see text

	Domestic travel by:			
	Car	Bus/train	Air	Coastal express
Visitors departing by car on road	1 167	0	0	0
Visitors departing by car on ferry	1 323	0	0	0
Visitors arriving by ferry (no car)	0	841	92	0
Visitors arriving by train or bus	0	451	65	0
Visitors arriving by air	(278)	(277)	(503)	62

Not accounted for in Table 83 are those who came by touring bus, since the FVS gives no information on the regions they visited. Since we can assume that these tourists travelled by bus only within Norway, the question is how far the average touring bus drove in Norway. We found no data on this, but guessed a distance of 1,000 km.

The figures for domestic travel for tourists who arrived by air – as estimated from the FVS and the assumptions in Table 85 – are in parentheses because other data, to which we shall shortly return, suggested that they were somewhat too high. This does not apply to travel by the Coastal Express.

Having dealt with the summer season, we had also to estimate the distances travelled by tourists who came in the autumn or winter, without the kind of data on regions visited that we had for the summer.

We do however know that tourists at other seasons differ in some respects from those who come in summer. Firstly, the share of business travellers is higher (33 per cent in autumn/winter vs. 18 per cent in summer, not counting passengers by touring bus in the total).

Table 86 Foreign tourists (excluding those on touring buses), by mode of transport on arrival and purpose of travel. Data from Foreign Visitors Survey 2006, percentages by purpose

Source: Institute of Transport Economics: Foreign Visitors Survey 2006

	Summer		Rest of year		Year-round	
	Leisure	Business	Leisure	Business	Leisure	Business
Car	92	8	83	17	89	11
Ferry (with or without car)	93	7	87	13	90	10
Bus/train	80	20	71	29	77	23
Air	69	31	46	54	60	40
All modes	82	18	67	33	76	24

For other modes than air travel, we see that the business share on a year-round basis is just 3 percentage points higher on a year-round basis than in summer, which will only marginally affect the average distances travelled within Norway, most likely downwards by 1-2 per cent.

There is a more significant difference in the case of air travel, which is the dominant mode for visitors on business at all seasons. This alone suggests that the average distances travelled within Norway by visitors arriving by air should be lower on a year-round basis than the summer season figures in Table 86. There is also something to suggest that sampling strategy in the FVS has led to some overrepresentation of passengers who came via Oslo vs. other airports. In 2006 Oslo Airport handled 68 per cent of international traffic to and from Norway. Among foreign tourists in the summer 2006 FVS sample who came by air the share was 89 per cent. Now the percentage of *foreigners* who entered via Oslo was probably in fact higher than 68 per cent, since some of the services operating out of other airports cater overwhelmingly to Norwegian tourists. Considering that Kristiansand, Stavanger, Bergen and Trondheim all have multiple direct daily services to several European capitals, one would nevertheless expect a fair share of business visitors to use those services if their destination was in or around any of those cities. That would reduce the amount of domestic air travel, since the great majority of likely destinations for business travellers are within a 100 km radius of one of those cities or within a 150 km radius of Oslo. Well over half of business visitors are destined for Oslo itself or other places in Eastern Norway in any case. On these

counts alone we judged that the amount of air as well as land travel within Norway by tourists who arrived by air should be reduced by some 10 per cent from those in Table 83 to give an estimate of the year-round average. A closer look at Northern Norway suggested that the FVS figures of travel to that region by tourists who arrived by air were probably too high even for the summer season, and if so much too high as averages for the whole year. Business travellers are less likely than holidaymakers to have destinations in Northern Norway. The share of *leisure* travellers who want to go to Northern Norway, unless they have friends or relatives there, is doubtless also much less in autumn or winter than in summer. Also, a comparison with data from the Air Passenger Surveys suggested that the FVS probably found too many visitors to Northern Norway among their airport samples, even for the summer season. In the four most recent Air Passenger Surveys (1998, 2003, 2005, 2007), an average of just over 8 per cent of foreigners interviewed said their destination was in Northern Norway. Since 56 per cent of visitors by air arrive in the summer season, the year-round figure of 8 per cent would mean that only 15 per cent were destined for Northern Norway in the summer season, even if *no-one* went to Northern Norway in autumn or winter. Yet the 2006 FVS found that almost 22 per cent of those who came via Oslo airport in summer, and 16 per cent of those who came to Bergen or Stavanger airports, had been to Northern Norway (cf. Table 84). It is unclear where the somewhat more than 1 per cent of year-round air passengers whose "destination" was the coastal express fit into the Air Passenger Survey data. Still, it was difficult to reconcile the two data sources on this point. The Air Passenger Survey data should be the most reliable for air passengers. We therefore chose to adjust the figures to fit the latter source, by assuming that 8 per cent of visitors by air were bound for Northern Norway, excluding those bound for the coastal express. This virtually halved the amount of domestic air travel per visitor arriving by air from 503 km to 253 km, on the simplified assumption that the excess of visits to Northern Norway in the FVS data could be reallocated to the category "Visited arrival region only". The reallocation also affected figures for overland travel by visitors who came by air, but to a smaller extent.

Further reducing the figure of 253 km by 10 per cent gives an estimate of 228 km of domestic air travel per visitor arriving by air. That would make the total amount of domestic air travel by foreigners (1.72 million arrivals by air in 2006) equal 390 million pkm or about 9 % of all domestic air travel. This is a plausible figure, while a figure of some 20 per cent hardly is.

As regards travel by the coastal express, we assumed that at least 80 per cent of this was in the summer season compared with 56 per cent of arrivals by air, so the year-round average distance travelled by the coastal express would be only about two-thirds of that in the summer season.

Regarding visitors who came by car (including car-on-ferry), there are more reasons than the slightly different leisure/business split to believe that those who visited in autumn or winter travelled less within Norway than those who came in summer. For one thing, road and weather conditions in Norway in winter are simply not inviting to long-distance touring by car. For another, the main Norwegian attractions for leisure travellers during the winter (but not autumn) season are ski resorts, and the main resorts are almost all located in Eastern Norway. This is highly significant because the overwhelming majority of visitors who drive into Norway enter via Eastern Norway, which is closest by road to the main centres of population in Sweden and to everywhere else in Europe, except for the sparsely populated northern regions of Sweden, Finland and Russia. Also, most arrivals by car-on-ferry in winter are to Eastern Norway. So in contrast to the situation in summer, when the fjord country (i.e. Western Norway) is Norway's No. 1 attraction, the important attractions in winter are in the same region that foreigners coming by car find closest at hand. The limited background data that we had on winter season visitors in 2006 show that 80 per cent of those who came by car had their destination in Eastern Norway. Furthermore, one resort stood out: Trysil, which was the goal of 27 per cent of all sampled visitors. Trysil borders directly on Sweden and a very large share of its visitors are Swedes, who would only need to drive a very short distance on Norwegian territory to reach their destination. Admittedly, the sampling strategy in the 2006 winter season survey appeared to be somewhat slanted, so that the predominance of Eastern Norway in general and Trysil in particular may be a bit overstated. Nevertheless, there is little doubt that most tourists who arrive by car in winter have destinations in Eastern Norway, that those destinations are usually within about 350 km of the point of entry to the country, and that winter tourists are much less likely than summer tourists to go on long sightseeing tours beyond their main destination.

For visitors in the autumn season, the FVS gives no information on destinations. This is not only the shortest of the three seasons but also the least attractive to leisure visitors.

Of the visitors who brought cars with them through all of 2006, some 38 per cent came during the autumn or winter. A reasonable guess could be that those arriving by car-on-road in autumn or winter drove 500 km on average in Norway and that those arriving by car-on-ferry drove 600 km. (Those coming by car-on-road include a large share of Swedes, destined if not for Trysil then presumably by preference for other destinations relatively

close at hand). Combined with the figures in Table 86, this would make the year-round averages for domestic travel by tourists arriving by car-on-road 913 km and for those arriving by car-on-ferry 1048 km.

For visitors arriving by bus or train or as walking passengers on ferries, the likelihood of their travelling far around the country will also be less in autumn and winter than in summer. We guessed that these groups travelled half as much in autumn/winter as in the summer season, which made the year-round averages some 20 per cent less than the figures in Table 86.

The table below shows our final estimates of the distances travelled within Norway by foreign tourists on a year-round average basis.

Table 87 Estimated distances travelled within Norway by foreign tourists in 2006 (km). All year averages
 Source: Institute of Transport Economics: Foreign Visitors Survey 2006 and own assumptions, see text

	Domestic travel by:			
	Car	Bus/train	Air	Coastal express
Visitors departing by car on road	903	0	0	0
Visitors departing by car on ferry	1 048	0	0	0
Visitors arriving by ferry (no car)	0	673	74	0
Visitors arriving by train or bus	0	359	52	0
Visitors arriving by air	180	199	228	41
Visitors in touring buses		1 000		

It needs to be emphasised again that the figures above depend on a series of uncertain assumptions, some of which are simply guesswork. They do not include any intra-urban use of taxis or public transport, and they do not allow for very much “pure sightseeing”, but are rather based on the assumption that people followed reasonably direct routes to and between one or a couple of places in each of the regions they visited.

We were unable to construct any kind of time series for domestic travel by foreign tourists, but found no particular reason to suppose that the average distances travelled by car, bus or train *for each arrival/departure mode* had changed significantly over the 1985-2005 period. That the mix of modes at arrival has changed is another matter, as shown in previous sections. One might think that visitors arriving by air had become somewhat more likely also to travel domestically by air rather than by slower means, but this too is uncertain. The reason is that there were significantly more direct international flights from airports other than Oslo in 2005 than in 1985, so fewer visitors should need to transfer to domestic flights at Oslo. The only case where there has quite certainly been a significant change is the coastal express, whose orientation towards an international cruise market only began in the 1980s, so the amount of travel foreign tourists did by that mode would have been considerably less at the beginning of the period.

Works cited in this report

Note:

1) The list below does not include references to regular series of official statistics, nor to ordinary web pages (as opposed to downloadable documents, which are included).

2) Reports based on the intermittent National Travel Surveys and Air Passenger Surveys and the annual Foreign Visitors Surveys of the Institute for Transport Economics are not listed individually by author name, but grouped under the (English) names of the respective surveys. See these for references.

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Rideng, A. and J.V. Haukeland (2005): Gjesteundersøkelsen 2005

<http://www.toi.no/getfile.php/Publikasjoner/T%D8I%20rapporter/2005/813-2005/813-hele%>

The annual publications provide some time series showing results of previous surveys. Data for years between 1996-2000 in this report were taken from the 2002 and 2005 publications. Figures based on the 2006 survey that are provided in Chapter 9 of this report are not based on published data but on detailed background tables provided by Petter Dybedal at the Institute for Transport Economics.

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