

The Tourism Satellite Account and the environment

– Method development



The Tourism Satellite Account and the environment – Method development

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Tourism satellite accounts and the environment – method development

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Foreword

For several years, the Swedish Agency for Economic and Regional Growth has tasked Statistics Sweden with measuring tourism. Tourism is measured in a national Tourism Satellite Account (TSA) in the National Accounts. The Tourism Satellite Account describes the direct impact on the economy, exports and employment, created in Sweden by tourism and travel. The Tourism Satellite Account measure the value of Swedish and international visitors' direct consumption of Swedish goods and services.

The Environmental Accounts produced at Statistics Sweden also constitute a satellite system to the National Accounts that look at the environmental impact of the economy, such as concerning emissions to air. There is a major international interest in linking the Tourism Satellite Account to Environmental Accounts to measure the environmental impact of tourism.

Against this background, the Swedish Agency for Economic and Regional Growth tasked Statistics Sweden with testing such measurements concerning Sweden and making it possible to share this knowledge with the international community at the annual conference of the United Nations World Tourism Organisation (UNWTO) in December 2018. The results of this assignment are described in this report.

This report has been produced by Anders Wadeskog, Nancy Steinbach, and Susanna Roth at the Environmental Accounts and Environment unit at Statistics Sweden.

Statistics Sweden 2018-10-24

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Summary

This report describes the premises for developing new statistics on the environmental impact of tourism through an input-output model. It is based on the work of the Swedish Agency for Economic and Regional Growth and Statistics Sweden on the Tourism Satellite Account (TSA) and the Environmental Accounts. Both areas of statistics are satellite accounts in the National Accounts.

This type of statistics has developed at an international level over the past ten years. The main focus has been on the calculation of the share of tourism's direct contribution to different types of environmental impact, such as greenhouse gases, water use and waste.

The extant international guidance (Obst 2017) highlights the production of goods and services and the effect of tourism on this production. For instance, a share of the value added of a sector (that is, its contribution to the GDP) is applied to extract the tourism share. A similar approach is used for environmental impact. A brief chapter in the guidance describes input-output analysis in relation to tourism's demand for goods and services.

The TSA measures visitors' impact on the Swedish economy on the demand side. The starting point is visitors' estimated consumption on different products or groups of products. Visitor spending is translated via a number of steps into a share of the corresponding sectors' production volumes. These shares are then translated to estimate tourism's contribution to the economy, such as value added and employment.

The same method used for the TSA could also be used to look at the environmental impact of tourism. Since the Environmental Accounts, like the TSA, are a satellite system to the National Accounts, emissions to air are reported based on economic sectors. The same shares that estimate tourism's contribution of value added and employment can be used to estimate tourism's emissions of greenhouse gases from a production perspective.

Another approach, commonly used in environmental accounts, is the Input-Output Analysis (IOA). Unlike air emission accounts in the environmental accounts, that are based on the production side, the IOA links demand to production in the various parts of the economy.

In short, the IOA is based on the National Accounts' symmetrical input-output tables, which in turn, is based on yearly supply and use tables. These tables describe supply of products that are used either as intermediate goods at enterprises and organisations, or in final use in the form of private or public consumption, investments, changes in inventory and export. IOA is therefore based on a product's final use, but all stages of production prior to consumption are included.

Results can be reported as key figures, although a time series has also been calculated for the period 2008–2015 regarding value added, employment and greenhouse gases from a consumption perspective on the demand side via the input-output analysis.

Table S.1 shows that Swedish household expenses for visitors in Sweden account for seven percent of value added and employment compared with total private consumption. With regard to CO₂e, Swedish households' visitors' share of total private consumption is 13 percent. Add to this nearly 25 percent in direct emissions from households' use of fossil fuels for vehicles.

Among international visitors, corresponding shares amount to five percent of value added, six percent of employment and 12 percent of emissions from consumption. Add to this 19 percent of direct emissions from households' use of fossil fuels for vehicles.

Tabell S.1 Key figures for different visitor groups 2015

	Swedish households	Business travel	International visitors	Reference value, private consumption	Reference value, total	Swedish households/Private consumption	Tourism*/Total
Value added, SEK millions, current prices	73 504	25 461	55 491	1 089 687	3 719 757	7%	4%
Number of employed persons	102 338	45 997	84 638	1 415 722	4 807 300	7%	5%
Tonnes of CO ₂ e from consumption	1 655 972	539 502	1 538 767	13 111 280	52 008 994	13%	7%
Tonnes CO ₂ e, direct emissions ¹	2 209 731	--	1 743 538	8 982 620	8 982 620	25%	44%
<i>...per SEK millions in consumption</i>							
Value added, SEK millions	0,7	0,7	0,8	0,8	0,8		
Number of employed persons	1,0	1,3	1,2	1,0	1,0		
CO ₂ e tonnes	16,6	15,3	21,3	9,7	10,9		

Source: TSA, Swedish Agency for Economic and Regional Growth, National Accounts and Environmental Accounts, Statistics Sweden

* Tourism includes Swedish households, business travel and international visitors.

¹ Direct emissions are from combustion of fossil fuels from transport from private consumption

International visitors' spending is mainly included in private consumption in the National Accounts and in the Environmental Accounts. Table 3.1 suggests that 12 percent of domestic CO₂e emissions through consumption should be reallocated to exports. Nearly 20 percent of Swedish households' direct CO₂ emissions through fossil fuel use should be reallocated to exports. However, it is worth recalling that Swedish tourists abroad lead to the same effects in other countries.

Various key figures per SEK million in consumption are presented in the lower section of Table S.1. Value added accounts for approximately SEK 700 000 per SEK 1 million generated from consumption, both with regard to domestic tourism and business travel. Non-resident tourism generates SEK 800 000 in value added per SEK 1 million from consumption, which is in line with the corresponding key figure on total private consumption and total final use.

CO₂e emissions through spending shows that tourism mostly means that travel leads to emissions. This applies in particular to non-resident tourism, with tonnes of CO₂e per SEK 1 million in consumption, which is twice as much as total private consumption or total final use. Domestic tourism and business travel figures are approximately 50 percent higher than average private consumption and total final use.

Introduction

Background

When the system for National Accounts was published in 2008 in its revised form, it included more than simply revisions of the economic accounts. This version also included various satellite accounts, with the aim of broadening the economic picture of the economy with other aspects, such as the social, environmental, cultural and tourism contributions.

For several years, the Swedish Agency for Economic and Regional Growth has tasked Statistics Sweden with measuring the impact of tourism on the national balance of payments. The Tourism Satellite Account describes the direct impact of tourism and travel on the economy, exports and employment in Sweden. This is measured in a national Tourism Satellite Account (TSA), a satellite account in the National Accounts. The TSA measures the value of Swedish and international visitors' direct consumption of Swedish goods and services.

The Tourism Satellite Account (TSA) is an internationally accepted framework developed by the World Tourism Organisation (UNTWO) in collaboration with the Organisation for Economic Co-operation and Development (OECD) and sector organisations and statistical agencies. Similarly, the Environmental Accounts are also a satellite account to the National Accounts and have been produced as a statistical standard by the United Nations Statistics Division in cooperation with international organisations, statistical agencies and experts. The Environmental Accounts aim to describe the environmental impact on the Swedish economy. Environmental accounts consist of a number of modules, including emissions to air by the Swedish economy.

Now there is international interest in linking the Tourism Satellite Account to the Environmental Accounts to measure the environmental impact of tourism (Obst 2017). A number of countries have developed indicators that measure the environmental impact of tourism via the Environmental Accounts. In Italy (Anzalone 2014) and in Canada (Kotsovos 2016), examples have been produced of how statistics can be calculated and visualised. In 2010, Statistics Sweden also presented indicators on the environmental impact of tourism via the TSA and the Environmental Accounts (Statistics Sweden 2010). In these projects, the approach was to start with supply, that is, the size of the share of industries' economic contributions and environmental impact that can be attributable to tourism. The Swedish Agency for Economic and Regional Growth wishes to contribute to this development of new statistics by developing calculations of the environmental impact of tourism in Sweden and sharing this knowledge with the international community at the UNWTO annual conference in December 2018. This report describes the results of these calculations. The results are only indicative for this report.

Purpose

The purpose of this study focuses on developing a method to link environmental impact to the tourism sector in statistical terms. This has been done using the Tourism Satellite Account of the Swedish Agency for Economic and Regional Growth and Statistics Sweden, Statistics Sweden's input-output tables and Environmental Accounts. The results presented in this report are indicative and the most recently available data has been used. This means that the results may differ somewhat compared to those presented in the report by the Swedish Agency for Economic and Regional Growth on Tourism in Sweden 2017 (only available in Swedish). The results on emissions to air presented in this report may also differ somewhat compared to figures on emissions to air published by Statistics Sweden elsewhere.

National Accounts and Environmental Accounts as a basis

Both the Environmental Accounts and the TSA use the National Accounts as a basis. It is possible to combine these two satellite accounts to calculate the environmental impact of tourism. This section briefly describes the Environmental Accounts and the Tourism Satellite Account, and how these can be combined to calculate the environmental impact of tourism.

The Tourism Satellite Account and the Environmental Accounts

The TSA measures visitors' impact on the Swedish economy on the demand side. The starting point is visitors' estimated spending on different products or groups of products. These expenses as a result of visitor demand are translated via a number of steps to a share of the corresponding sectors' production volumes. These shares are then translated to estimate tourism's contribution to the economy, such as value added and employment.

The same method used for the TSA could also be used for looking at the environmental impact of tourism. Since the Environmental Accounts, like the TSA, are a satellite system to the National Accounts, emissions to air are reported based on economic sectors. The same share that estimate tourism's contribution of value added and employment can be used to estimate tourism's emissions of greenhouse gases from a production perspective.

Another approach, commonly used in environmental accounts, is the Input-Output Analysis (IOA). Unlike air emission accounts in the environmental accounts, which are based on the production side, the IOA links demand to production in various parts of the economy.

In short, the IOA is based on the National Accounts' symmetrical input-output tables, which in turn, is based on yearly supply and use tables. These tables describe supply of products that are used either as intermediate goods at enterprises and organisations, or in final use in the form of private or public consumption, investments, changes in inventory and export. IOA is therefore based on a product's final use, but all stages of production prior to consumption are included.

It is worth noting that, in the final use in IOA, exports are reported as a lump sum, balanced by an equally large negative lump sum in private consumption. However, the sum should contain consumption per product in Sweden with regard to non-resident tourism. This means that non-resident tourism consumption is itemised under domestic private consumption, which leads to an overestimation of Swedish households' consumption. However, correspondingly, Swedish households' consumption abroad outside direct imports. TSA results on non-resident tourism consumption in Sweden and Swedish tourism consumption abroad could be used to adjust these items.

Adding environmental factors, such as carbon dioxide emissions, to the IOA, makes it possible estimate the environmental impact from direct and indirect emissions, linked to various types of final use. This is often described as consumption-based emissions, as they are based on final consumption.

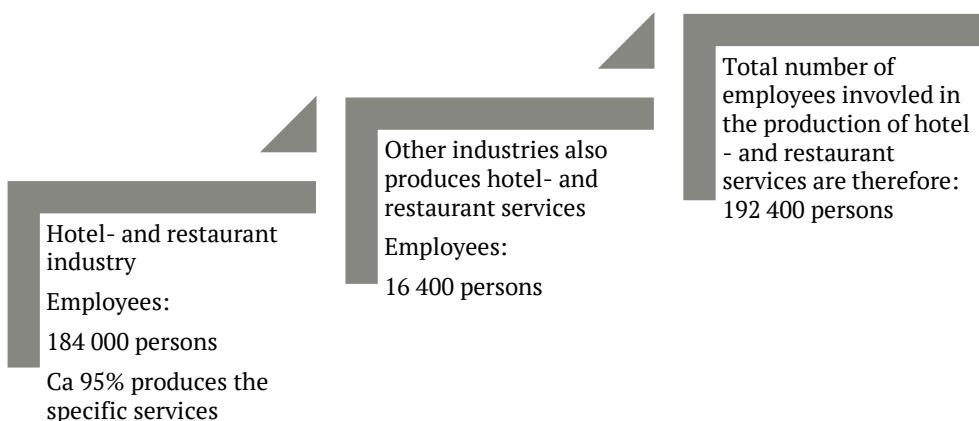
Linking the TSA and the Environmental Accounts via the IOA

This analysis uses IOA to examine the impact of tourism on the economy, employment and emissions of greenhouse gases. Here, the TSA and Environmental Accounts are linked via the IOA to measure the environmental impact of tourism on final use. Final use refers to the various parts of demand for products produced in Sweden. This report only includes domestic outcome of tourist consumption in Sweden. Domestic production chains included in the Swedish IO model extend, via import and export, to the global economy. However, this is not addressed in the calculations.

Figures on final use show consumption of products produced by domestic producers. Domestic producers also sell their products to other domestic producers as intermediate goods. Total production of domestically produced products should include final and intermediate goods. This is illustrated by hotel and restaurant services.

The hotel and restaurant services sector (SNI I55–I56) employed 184 000 persons in 2015. The main sector activity, hotel and restaurant services, employed 95 percent of the total number of persons employed in this sector. In addition, the hotel and restaurant services sector also produces other services, such as conference services and food for other sectors. These persons were employed to produce various products in this sector, where hotel and restaurant services accounted for 95 percent. Sectors other than SNI I55–I56, in turn, also produce hotel and restaurant services. This means that there were, in fact, 192 400 persons employed to produce hotel and restaurant services, of which 176 000 are employed in the hotel and restaurant services sector (see Figure 2.1).

Figure 2.1 Example of employed persons in hotel and restaurant services with the IOA – on the production side



Among the 192 400 persons employed to produce hotel and restaurant services, 122 000 persons, or 63 percent, are employed to produce products for the final users who consume hotel and restaurant services. However, there are 157 000 persons in total employed with a focus on final use of hotel and restaurant services. Among these, 77 percent are employed in the hotel and restaurant services sector, while the remaining 35 000 are employed in the production of intermediate goods for the hotel and restaurant services sector (see Figure 2.2).

Figure 2.2 Example of employed persons in hotel and restaurant services with the IOA – from the final use side



Examples of results

Tourism demand was calculated based on three variables in the years 2008–2015 in an Excel file:

- Value added
- Employment

Greenhouse gas emissions (CO₂e in tonnes)

The results are illustrated in tables that show values in the entire economy by production chain in the categories of products that form part of the TSA.

In 2015, 233 000 persons in the Swedish economy were employed in activities related to tourism. Table 2.1 shows the distribution of employed persons based on demand in tourism for various products and the links between various producers and the different production chains. Tourism demand for each product is presented in the lines and the production chains are described in the columns

Table 2.1 Tourist demand, employment 2015

Industries Products	Food	Other products	Fuel	Hotels/ Camping /Rest- aurant services	Second homes	Road/ Rail transport	Water transport	Air transportation	Car rental	Package trips, etc.	Film, Culture,	Trade fairs	Passport / Visa	Photo/ Washing /Hair- dresser	Boating	Other	Trade	Sum
Food	3 126	5	1	1 641	20	19	12	17	7	33	48	3	1	4	1	0	57	4 996
Other products	152	1 943	12	425	183	187	61	79	85	83	134	19	5	19	5	0	574	3 968
Fuel	1	1	99	3	1	11	3	1	0	1	1	0	0	0	0	0	3	124
Hotels/Camping/Restauran t services	101	55	6	75 134	282	204	62	276	71	1 233	332	58	10	78	22	0	424	78 349
Second home	87	47	5	2 475	6 636	224	44	109	64	153	428	38	19	44	27	0	781	11 183
Road/Rail transport	178	87	11	461	156	12 389	50	82	57	432	153	15	7	12	6	0	535	14 631
Maritime traffic	4	2	2	7	2	5	1 131	1	1	8	2	0	0	0	0	0	8	1 175
Air transportation	1	1	0	8	3	3	2	2 306	1	233	5	1	0	0	0	0	7	2 571
Car rental	22	16	1	277	34	151	14	454	1 744	73	102	8	1	10	2	0	192	3 101
Package trips, etc	1	1	0	25	2	4	7	4	1	5 513	8	0	0	1	0	0	7	5 574
Film, Culture	31	20	2	695	107	56	18	37	31	78	13 722	10	4	10	5	0	269	15 095
Trade fairs	176	119	15	2 213	1 628	334	59	267	99	171	664	2 694	19	65	45	0	899	9 465
Passport/Visa	58	28	8	276	93	97	21	32	20	89	180	10	577	8	6	0	133	1 636
Photo/Wash/Hairdresser	56	36	4	555	101	88	30	387	45	82	120	53	4	1 669	10	0	312	3 550
Boating	53	35	8	742	566	158	43	85	28	137	121	21	7	24	638	0	272	2 938
Other	2 472	1 032	183	9 519	4 366	3 357	1 184	2 784	756	1 868	2 207	366	107	318	155	0	6 437	37 112
Trade	333	200	17	2 533	257	1 087	99	465	98	181	336	31	8	32	7	0	31 822	37 507
Sum	6 850	3 629	374	96 988	14 438	18 372	2 842	7 386	3 108	10 368	18 562	3 328	769	2 294	929	0	42 733	232 972

Table 2.1 shows that hotel accommodation, camping, and restaurant services employed 78 000 persons in 2015 to meet tourist demand for these products. Among these, 75 000 persons were employed in the production of hotel accommodation, camping, and restaurant services. This production chain (that is, hotel accommodation, camping, and restaurant services) employs 97 000 persons in total. Other product categories are included in addition to hotel accommodation, camping, and restaurant services, such as trade, good and trade fairs. This production chain accounts for 40 percent of the total number of persons employed as a result of tourist consumption.

Corresponding results can be seen concerning value added and greenhouse gas emissions.

The following section describes the types of indicators that can be produced based on the calculations presented above.

Indicators on tourism in the accounts

Table 3.1 shows the total results in 2015 with a few key figures for comparison. Here, the 233 000 employed persons in the table above are arranged by the various tourist groups – Swedish households, businesses and international visitors. Value added and greenhouse gas emissions are similarly distributed. This is also related to the corresponding results in total private consumption (Reference value, private consumption in the table) and for total final use (Reference value, total in the table). Total final use is identical to the national total of Value added, Employment and CO₂e emissions.

Table 3.1 Key figures for different visitor groups 2015

	Swedish households	Business travel	International visitors	Reference value, private consumption	Reference value, total	Swedish households/Private consumption	Tourism*/Total
Value added, SEK millions	73 504	25 461	55 491	1 089 687	3 719 757	7%	4%
Number of employed persons	102 338	45 997	84 638	1 415 722	4 807 300	7%	5%
Tonnes of CO ₂ e from consumption	1 655 972	539 502	1 538 767	13 111 280	52 008 994	13%	7%
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<i>...per SEK millions in consumption</i>							
Value added, SEK millions	0,7	0,7	0,8	0,8	0,8		
Number of employed persons	1,0	1,3	1,2	1,0	1,0		
CO ₂ e tonnes	16,6	15,3	21,3	9,7	10,9		

Source: TSA, Swedish Agency for Economic and Regional Growth, National Accounts and Environmental Accounts, Statistics Sweden

* Tourism includes Swedish households, business travel and international visitors.

¹ Direct emissions are from combustion of fossil fuels from transport from private consumption

The lower section of the table shows that in domestic tourism, Swedish household expenses account for seven percent of value added compared with total Swedish private consumption, which accounts for eight percent of value added. With regard to employment, domestic tourism consumption is on par with normal consumption, one person employed per SEK 1 million in consumption. With regard to CO₂e, Swedish households' tourist share of total private consumption is 13 percent. Add to this nearly 25 percent in direct emissions from households' use of fossil fuels for vehicles.

Among international visitors, corresponding shares account for five percent of value added, six percent of employment and 12 percent of emissions from consumption. Add to this 19 percent of direct emissions from households' use of fossil fuels for vehicles.

International visitors' spending is essentially included in private consumption in the National Accounts and in the Environmental Accounts. Table 3.1 suggests that 12 percent of domestic CO₂e emissions from consumption should be reallocated to exports. Nearly 20 percent of Swedish households' direct CO₂ emissions through fossil fuel use should be reallocated to exports. However, it is worth recalling that Swedish tourists abroad lead to the same effects in other countries and that this calculation is under development.

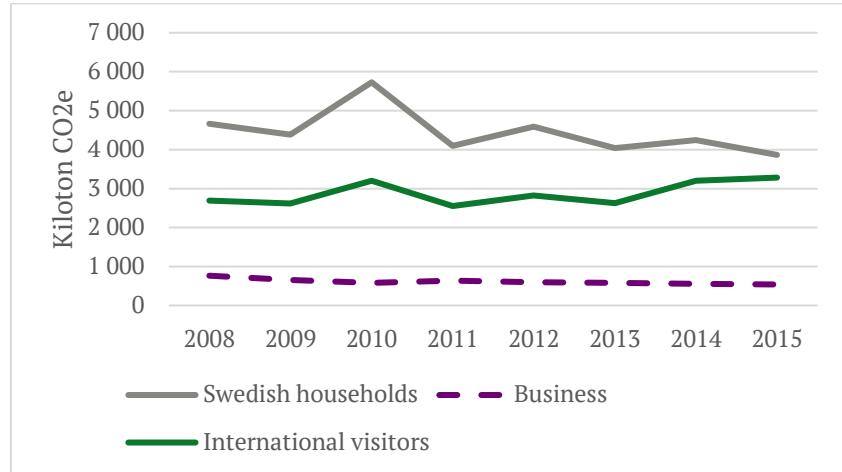
Various key figures per SEK million in expenditure are presented in the lower section of Table 3.1. Value added accounts for approximately SEK 700 000 per SEK 1 million generated in expenditure, both with regard to domestic tourism and business travel. International visitors generate SEK 800 000 in value added per SEK 1 million in expenditure, which is in line with the corresponding key figures for total private consumption and total final use.

The number of employed persons per SEK 1 million differs slightly between the different groups. The figure is low for domestic tourists, one employed person per SEK 1 million in expenditure. This is in line with the value of total private consumption and total final use. Business travel and non-resident tourism figures are 20 to 30 percent higher per SEK 1 million in expenditure.

CO₂e emissions on the consumption side show that tourism generally means that travel leads to emissions. This applies in particular to non-resident tourism, with tonnes of CO₂e per SEK 1 million in consumption, which is twice as much as total private consumption or total final use. Domestic tourism and business travel figures are approximately 50 percent higher than average private consumption and total final use.

Greenhouse gas emissions have decreased over time by 6 percent in the period 2008–2015, driven by a decline in demand. It is mainly the environmental impact of Swedish households and businesses that has decreased; the environmental impact of businesses has decreased by nearly 30 percent. However, emissions by international visitors are increasing over the seven-year period, as reflected in Figure 3.1.

Figure 3.1 Greenhouse gas emissions from tourism consumption, by user, 2008-2015, greenhouse gases in kilotonnes, indirect and direct emissions



Source: National Accounts and Environmental Accounts, Statistics Sweden

Note: Direct emissions are from combustion of fossil fuels from transport from private consumption, indirect emissions are those that the consumption causes in the overall economy

Over time, the environmental impact decreases among all product groups in the period 2008–2015, whereas the distribution between product groups has only shifted little between 2008 and 2015, where the share for travel and transport has increased, as shows in Figure 3.2. Travel is the primary contributor to greenhouse gas emissions. This can be compared with visitors' spending, where the largest share goes to trade, food and accommodation (Swedish Agency for Economic and Regional Growth 2018).

Figure 3.2 Share of greenhouse gas emissions from tourism consumption, by product group, 2008 and 2015, indirect and direct emissions



Source: National Accounts and Environmental Accounts, Statistics Sweden

Note: Direct emissions are from combustion of fossil fuels from transport from private consumption, indirect emissions are those that the consumption causes in the overall economy

Briefly about the statistics

The statistics presented in this report is the result of development work.

The purpose of the statistics and content

The development of this statistics has been done on commission from the Swedish Agency for Economic and Regional Growth. The same agency also commission the statistics on the tourism accounts from the national accounts at Statistics Sweden.

The statistics in this report is therefore a combination of the three sources, the national and environmental accounts and the tourism accounts on employment, value added and greenhouse gas emissions.

This data enables the development of a method to connect the two satellite accounts to the input-output analysis.

Information about the statistical production

A brief explanation of the statistical production of the data was provided for in the chapter about national accounts and environmental accounts as the basis.

Statistics Sweden's and the Swedish Agency for the Economic and Regional Growth data on the tourism satellite accounts was used in combination with existing data from the national accounts and their input-output tables and the data from the environmental accounts.

Information about the statistical quality

The statistics presented in this report is the result of a new method to calculate the data. This means that the method still has room for improvements which can lead to future changes in tables and figures.

The underlying data, the tourism satellite accounts, the national accounts and the environmental accounts are official statistics. Thus they have their own quality assurance processes to go through. For example, the statistics is regularly recurring and has gone through several stages of data validation.

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Appendix 1: Consumption products

A. Consumption products

A.1 Tourism consumption products

I551	Hotels
I55A	Holiday villages, camping, etc.
L68201B	Second homes
I56A	Meals out
H491A	Rail transport
H493A	Public transport, bus
H4932	Taxi travel
H50A	Water transport
H511	Air transportation
N7711	Passenger car rental
N7912	Package trips
	Other travel arrangements + tourist assistance
N79A	
R90	Cultural services and entertainment
J591	Film
R91	Museums, libraries, etc.
R931	Sports
	Other recreational and entertainment services
R932	Boating

A.2 Tourism products

	Goods purchase
C10 and C11	Food
	Other goods purchase
C192000B+E	Fuel
	Cars
	MC
	Boats
N82A	Trade fairs, congresses, conferences
O84B	Passport, visa

A.3 Non-tourism-related services

M742	Photo services
S9601	Washing
S9602	Hairdresser, beauty care

B.1 Valuables

Appendix 2 Industry codes - Swedish Standard Industrial Classification

Industry, by NACE 2007		Tourism as share of total value added 2015
I55	Hotels	62%
I56	Restaurant services	31%
H49A	Rail transport, passenger	19%
H49B	Public and other passenger transport	8%
H49C	Taxi	29%
H50	Water transport	10%
H51	Air transportation	86%
N79	Travel agencies, tourist assistance	100%
L68A	Second homes	10%
O84	Public administration	0.2%
R90–93+S96	Culture, sports, entertainment, beauty care	16%
G45–47	Trade in goods	5%
N77	N77 Rental	11%
N82A	Other business services	9%
M74	Design, photo, interpreter	1%

The tourism share of total value added changes from year to year.

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- Figure 3.2 Share of greenhouse gas emissions from tourism consumption, by product group, 2008 and 2015

SCB beskriver Sverige

Statistikmyndigheten SCB förser samhället med statistik för beslutsfattande, debatt och forskning. Vi gör det på uppdrag av regeringen, myndigheter, forskare och näringsliv. Vår statistik bidrar till en faktabaserad samhällsdebatt och väl underbyggda beslut.