Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Statistical Office FSO

Explanatory note

Sustainability indicators of the tourism satellite account (SITSA)

Pilot study

Neuchâtel, 2023

Published by:	Federal Statistical Office (FSO)	**Layout concept:**	Section PUB
Information:	info.vgr-cn@bfs.admin.ch, Tel. +41 58 463 60 87	**Pictures:**	© National Accounts section
Editor:	Dr. Jerry Suk, National Accounts	**Graphics:**	© National Accounts section
Contents:	Dr. Jerry Suk, Fabian L. Schrey, PhD, both National Accounts	**Karten:**	© National Accounts section
		Downloads:	www.statistics.ch
Topic:	10 Tourism	**Copyright:**	FSO, Neuchâtel 2023
Original text:	German		Reproduction with mention of source authorised (except for commercial purposes)
Translation:	National Accounts section		

ESPACE DE L'EUROPE 10 CH-2010 NEUCHÂTEL WWW.STATISTICS.CH

Table of contents

1 Introduction

The National Accounts section of the Federal Statistical Office (FSO) publishes annual indicators of the tourism satellite account (TSA). These measure the direct economic effects of this cross-sectoral activity.
In order to reflect the environmental, economic and social impact of this activity, there are currently international efforts to develop sustainability indicators of the tourism satellite account that aim to measure the sustainable development of tourism. The FSO contributes to this effort by developing and measuring indicators of the environmental and economic aspects of sustainability within this pilot study. These indicators summarise the development of the different dimensions of tourism across time and in coherence with other publications in the national accounts system to allow international comparison.
The FSO publishes this pilot study in collaboration with the State Secretariat for Economic Affairs (SECO).

1.1 Purpose and delimitations

Tourism is of large importance to Switzerland. In 2019, tourism-connected enterprises accounted for4.2% of all jobs and produced 2.9% of gross value added. In cantons that have a high intensity of tourism this share may be up to 13.8% of employment and 10.1% of gross value added.

This economic benefit should be considered alongside the use of natural resources such as clean air, economic resources such as labour, and social resources. The sustainable and efficient use of these resources is a large challenge for politics, economics and science. The purpose of this publication is to touch on the environmental and economic aspects, by reporting the monetary benefit of tourism and the use of resources as well as by comparing them. We report on a set of environmental, economic and cross-dimensional indicators. On the ecology side these are the emissions of greenhouse gases, air pollution and energy use and on the economy side they are the gross value added and tourism employment. Additionally, we publish indicators that capture the relation between them.

Tourism is a cross-sectoral activity. It is vital to embed this statistic into an existing system in order to summarise this activity consistently and to compare it to other statistics. The economic aspects already use the national accounting rules and are published in the TSA and in the annual indicators of the TSA[1]. This pilot study adapts these methods and applies them to other dimensions of sustainability such as energy use. The data source for the environmental aspect are the environmental accounts[2] that also adhere to the national accounting rules. Therefore, published results adhere to the definitions and rules of national accounting so that they are comparable across different dimensions.

This pilot analyses a time-series of indicators for the sustainable development of tourism products. It shows, whether the annual use of resources for a tourism product increases or decreases. There is no evaluation of the absolute level of use of resources, as there is neither a national nor an international benchmark that defines a level of sustainable development.

Tourism is a multifaceted field. Within this system we only measure direct economic use. Importantly, this study only analyses the quantitative and measurable aspects that can be integrated into the TSA. Only these aspects can be directly compared with one another and on the same basis.

This publication differentiates clearly between "sustainable tourism" and "the sustainability of tourism". "Sustainable tourism" is a label used by more and more individual actors to indicate that their offer uses resources sustainably. One hotel may offer" sustainable tourism" (e.g. the sauna is heated by renewable energy carriers), while another hotel does not (and heats their sauna with fossil fuels). This label should incentivise potential tourists to use a sustainable offer. These offers are not systematically measured separately in Switzerland because among other things there is no recognised standard. Thus, the sustainability of tourism products such as accommodation services can be measured but a comparison between sustainable and non-sustainable hotels is not possible, given currently available data.

We publish data from 2014 to 2019. 2020 and 2021 have been severely affected by COVID-19. These years require further analysis that will be conducted as a next step following the publication of this pilot. Because of the particular situation we need to test whether the methods still provide estimates in line with the results of national and environmental accounts for those years. In case of discrepancies, we will revise the methods after this pilot.

In 2024 the UN World Tourism Organisation (UNWTO) will publish the international framework of the statistical system to measure the sustainability of tourism. Switzerland wants to use the experience from this pilot to shape the framework together with its many international partners. Publishing this pilot is also intended to increase public awareness of the UNWTO's work. The methods will be revised according to this framework before regular publication of the sustainability indicators of the TSA (SITSA). The methods will be updated

[1] In particular, we use the definition of a tourism product to classify different tourism activities. Further information on this classification can be found in the accompanying literature to the TSA: *Satellitenkonto Tourismus der Schweiz, TSA 2001 und 2005. Grundlagen, Methodik und Ergebnisse*. Neuchâtel: Federal Statistical Office, 2008. (not available in English)

[2] Environmental accounting | Federal Statistical Office (admin.ch)

alongside TSA and national accounts benchmark revisions, when revisions are necessary to ensure methodology coherence.

1.2 Sustainability of tourism

Tourism is an important source of employment that is closely related to the social, economic and environmental welfare of many countries[3]. The UNWTO defines sustainable tourism as "tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities."

The sustainable development goal 8.9 of the 2030 Agenda strives to "by 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products". The importance of sustainable tourism is also highlighted in sustainable development goal 12.b., that aims to, "develop and implement tools to monitor sustainable development impacts for sustainable tourism which creates jobs, promotes local culture and products".

It is difficult to classify and measure to what extent an activity is “sustainable”. Just as the resources of an economy are diverse, activities can conserve some resources in the long term, while at the same time-consuming other resources in a destructive way. Sustainability is not an absolute concept. It has to be considered in as many nuances and dimensions as there are kinds of resources.

This project isolates some of the concepts that are relevant to measuring the environmental and economic aspects of the sustainable development of Swiss tourism, such as protecting the climate, air quality and energy use. This study develops, where data are available, indicators that objectively measure progress (or regression) within these subareas. This enables national or international (according to the UNWTO) comparisons. Concepts that are not relevant to Switzerland, such as ”coastal protection“ are not pursued. Other concepts, such as social aspects, are relevant to Switzerland but will be developed in the future, as the data require further investigation.

No level will be classified as “sustainable” or “not sustainable”. Instead, we describe the evolution, relative sustainability and tourism production in the various dimensions of sustainability. This pilot does not contain prescriptive guidelines.

The results enable a clear, verifiable description of the state of tourism with regard to its sustainability within the areas covered and to show trends over time. This may provide the actors involved with concrete evidence of where there are positive developments, but also where there are weaknesses.

In particular, within the economic dimension, this publication measures productivity, employment and gross value added. Energy consumption and the emission of greenhouse gas and air pollutants are published within the environmental dimension. Furthermore, the economic benefit per environmental use of resources (e.g. gross value added per unit of energy used) is measured. We show the distribution of the energy used by source.

Tourism in Switzerland is very heterogeneous. Tourism activities vary by winter, summer, active or urban tourism and also by region. Therefore, it is also possible that sustainability varies alongside these dimensions, too. This pilot, however, measures sustainability within Switzerland as a homogenous unit. Another possible delimitation, as mentioned above, is the separate assessment of "sustainable tourism", i.e. tourism offers that are explicitly advertised as sustainable. Chapter 5 assesses the further development of these aspects of sustainability.

1.3 Sustainability indicators of the tourism satellite account in a statistical context

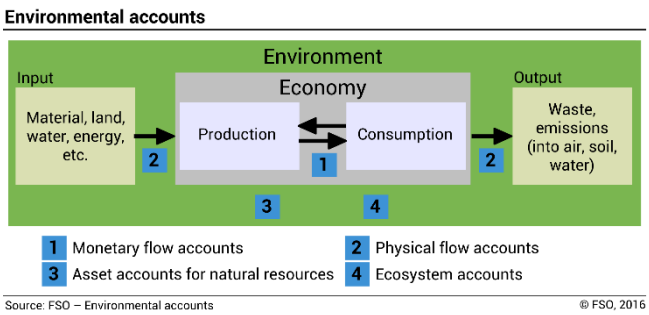
The SITSA are based on the national and environmental accounts. The national accounts are essentially a sequence of accounts that display amongst other things, the gross value added, intermediate consumption and production in different sectors and in NOGA. The environmental accounts measure on the one hand economic information on the environment and on the other environmental information on the economy. They use the same principles as national accounting and supplement the national accounts with an environmental dimension.

Some activities such as tourism, are cross-sectoral activities and require a different grouping that is recorded in a satellite account. The TSA is published every three years; the annual TSA indicators are published to cover the intervening years. As both the SITSA and the regional TSA indicators are based on the results of the annual indicators, the two publications are consistent with one another. However, not all indicators are available at a cantonal level And the the SITSA are therefore published at a national level.

As a consequence, the SITSA developed in this pilot, are a conjunction between the environmental accounts and the TSA. In future, more satellites and data can be added to this. To this end use the physical flow accounts that provide information on the physical flows that pass through the economy (Point 2 in Diagram 1).

[3] International Year of Sustainable Tourism for Development 2017, Resolution A/RES/70/193, New York: UNWTO and UN General Assembly, 2015

Schematic 1 Environmental accounting



Further approaches support measuring sustainable development in general by using indicators systems. These use data from various official statistics sources amongst others national accounting. The MONET 2030[4] indicator system measures the three dimensions (environment, economy, society) of Switzerland's sustainable development at national level using over 100 indicators. It illustrates the progress in implementing the 17 goals for sustainable development of the United Nations 2030 Agenda (SDGs). The indicators were selected using a structured and participatory approach. The indicators enable a differentiated view of firstly, the extent to which societal demands are met, secondly, the level and use of resources, thirdly, distributional and efficiency concerns, and finally, social and political reactions to unwanted consequences. The indicator system *Cercle Indicateurs*[5] measures sustainable development at cantonal and city level. Its structure is similar to that of MONET 2030.

1.4 Overview of sustainability dimensions and the calculation approach

At international level, the existing tourism satellite account is expanded by even more dimensions. The economic factors of the existing TSA are supplemented by environmental and social factors that allow a holistic view of tourism. The statistical division of the UN World Tourism Organisation is currently developing these aspects as part of their *Initiative Towards a Statistical Framework for Measuring the Sustainability of Tourism (MST)*.

These aspects of tourism can be divided into economic environmental and social dimensions. Due to data availability this pilot study will only analyse the first two dimensions. The social aspects of tourism are analysed in a later step.

The environmental dimension highlights to what extent tourism uses and/or pollutes natural resources. The indicators in this dimension analyse further if the resources that are used by tourism are substituted over the year – for example if more or less renewable energy is used. The emission of greenhouse gases and air pollution are also measured.

The economic dimension reports the share of tourism in the Swiss national economy. Specifically, the evolution of employment and direct gross value added are examined. Indirect effects on gross value added for example the product of one industry serving as intermediate consumption for another industry, are ignored.

The social dimension examines aspects such as wages and labour, for example income differences between men and women, attitudes towards tourism of both locals and visitors. Additionally, aspects of quality of life such as rental prices in touristic regions or income distribution by socioeconomic factors can be highlighted.

The reference space is Switzerland as destination for domestic and foreign visitors as well as a base for tourism establishments. The economic performance of, and also the use of resources by resident tourism establishments for activities outside of Switzerland are thus excluded from this analysis, as is the case for the TSA.

In a first step, the relevant indicators that enable the broadest possible view of the evolution of tourism and that achieve the best possible international comparability are selected from the satellite accounts. Indicators that can measure the concepts of "productivity", "dependence", "resource use" and "substitutability" are preferred[6]. These concepts are frequently used in various international publications. In this pilot study, indicators that measure the intensity of a resource relative to a reference value belong to the concept of "productivity". The share of tourism and the shares of an energy carrier of a product touch upon the concept of "dependency". "Resource use" corresponds to the results of the environmental accounts. "Substitutability" cannot be measured directly with our data. However, an increasing share of renewable energies, for example, can indicate substitutability of the energy carrier in the past.

In a second step, environmental accounts data (or possibly data from other satellite accounts in the future) are reallocated from the existing sectoral classification to tourism aggregations (the tourism products of the TSA), so that they can be analysed within the TSA. For this, the steps in calculating the TSA[7] are applied analogously to the environmental accounts (reallocation of NOGA to tourism products, calculation of tourism correction factor).

[4] www.monet2030.admin.ch

[5] www.cercleindicateurs.bfs.admin.ch (not available in English)

[6] Measuring the Sustainability in Germany – Development of a Tourism Sustainability Satellite Account. Dessau-Rosslau: DIW, 2021

and

Draft of Framework for Measuring the Sustainability of Tourism, Madrid: UNWTO, 2023

[7] *Begleitnotiz, Regionale Indikatoren zum Satellitenkonto Tourismus, Pilotstudie.* Neuchâtel: Federal Statistical Office, 2023 (not available in English)

Finally, the indicators are contrasted with each other in order to analyse whether a positive development in one area has been merely compensated for by a negative development in another area or whether the data reflect a real, efficient, more sustainable development. For example, we analyse to what extent falling greenhouse gas emissions are accompanied by falling gross value added or whether gross value added per greenhouse gas emissions and thus the efficiency of resource use is increasing. Technical details on the calculations can be found in Chapter 6.

The indicators presented in the following paragraphs were calculated using current figures (2019) from the annual indicators on TSA. However, the time series covers 2014 to 2019.

2 Environmental factors

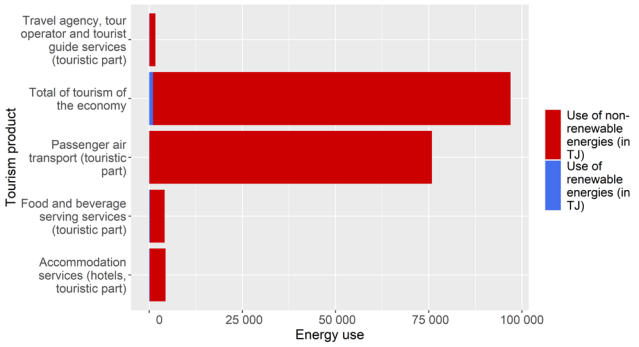
The environmental dimension of the SITSA describes the use of different resources. Within the international framework the environmental resources are classified into land/energy, air and water, where the topic "air" also includes greenhouse gases that are relevant for the climate.

2.1 Land / Energy

The UNWTO drafts for measuring sustainable development in tourism assign great importance to the capital accounts. These measure an economy's resources. Although the stock of resources cannot be measured in this publication due to a lack of available data, changes within these accounts can be estimated. One of these accounts concerns land use. However, this is beyond the scope of this report because a geographical analysis at this level is not compatible with the TSA (see Chapter 5). Tourism land use varies widely geographically. Therefore, a very good coverage of all data at a very disaggregated level is needed, which is currently not available. However, an independent analysis of the development of land use in tourism communities without connection to the TSA seems possible[8]. This would either deviate from the concepts of the national accounts or results would not be comparable with the economic dimension.

Internationally, energy use has even greater importance attributed to it. We present results that show energy use by tourism product. Energy carriers are further classified as "renewable" or "non-renewable" and considered separately.

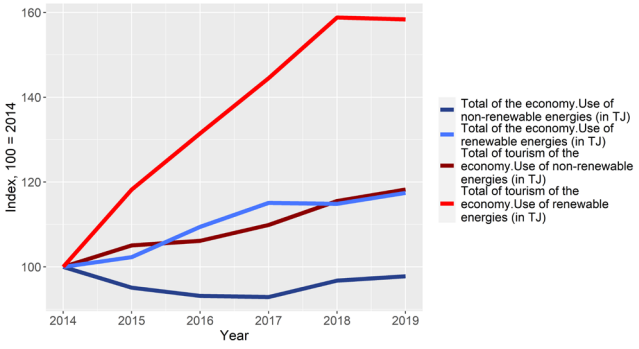
Graphic 1: Distribution of energy use by tourism product and type of energy carrier



Air transport (through its use of jet fuel) dominates the aggregated energy use statistics. Food and beverage serving services as well as accommodation services are other sectors that contribute a large share towards the overall energy use of tourism.

Furthermore, energy carriers can be considered grouped together. Energy carriers can be classified as renewable or non-renewable, with which an analysis of energy use can be carried out. Results for individual energy carriers are dominated by a few tourism products and the energy mix can vary greatly between products. Therefore, there is much statistical value in this aggregation, as it lays out clearly whether tourism uses in general more (and thus more sustainable) or fewer renewable energy carriers.

Graphic 2: Evolution of renewable energy use in tourism compared to the national evolution

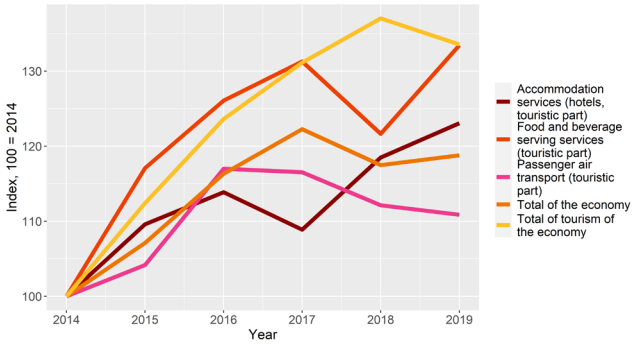


[8] In the ecosystem calculation, 'ecosystem extent accounts' are generated in a first step. These show changes in the extensive margin of individual types of ecosystems and are spatially sufficiently detailed to carry out analyses at the municipality level (the aggregation at the municipality level must, however, be done subsequently). This would be a first, rudimentary estimate of how (tourism) land use influences the prevailing ecosystems (the tourism aspect of the land use changes would have to be clearly defined, however).

This demonstrates that the use of renewable energies in tourism grew more than for the national economy as a whole, yet this is also true for the use of non-renewable energy carriers. This is also a first indication that substitution of energy carriers was possible for a part of tourism activity and may have taken place.

Graphic 3 disaggregates this evolution by product and shows that the development is especially positive for food and beverage serving services.

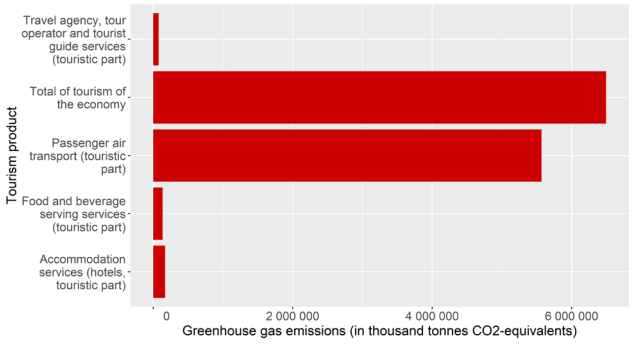
Graphic 3: Evolution in use of renewable energy by tourism product



2.2 Climate / Air

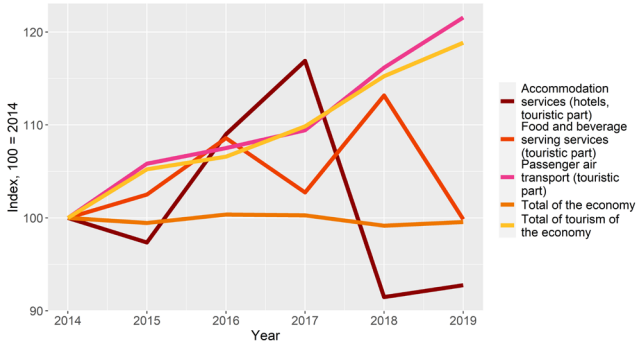
Within the field "climate" the pilot analyses which greenhouse gases (in CO2-equivalent tonnes) are associated with which tourism activities, and within the field "air", which air pollutants. Greenhouse gases are mainly responsible for climate change, whereas particulate matter (PM) or other air pollution causes local phenomena such as respiratory problems or smog.

Graphic 4: Distribution of greenhouse gases by tourism product

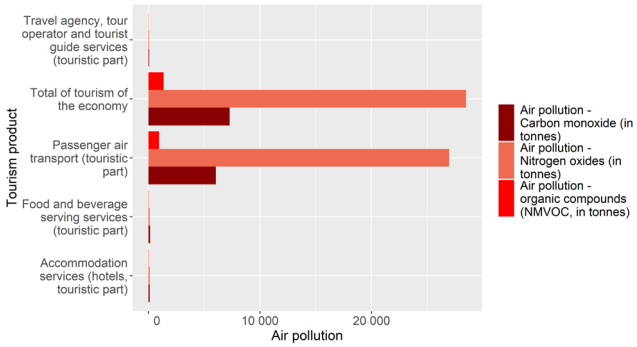


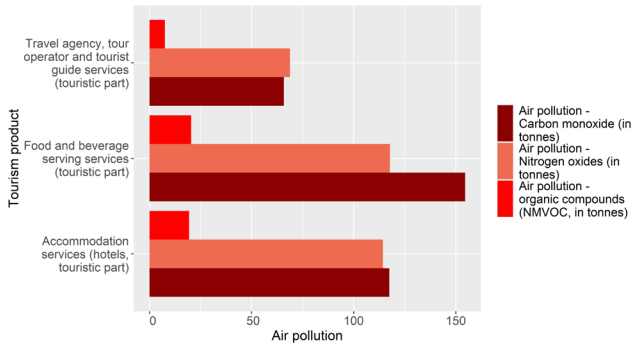
Switzerland's resident tourism aviation services[9] account for about 80% of tourism's greenhouse gas emissions. In relation to a reference year, it is noticeable that accommodation services have been emitting significantly fewer greenhouse gasses since 2018. This is mainly due to a significant reduction in carbon dioxide emissions during that period. The product "travel agency, tour operator and tourist guide services" is not illustrated in the graph as the very small shares result in greater percentage changes year on year.

Graphic 5: Evolution of greenhouse gas emissions of various tourism products



Graphic 6: Distribution of air pollution by tourism product



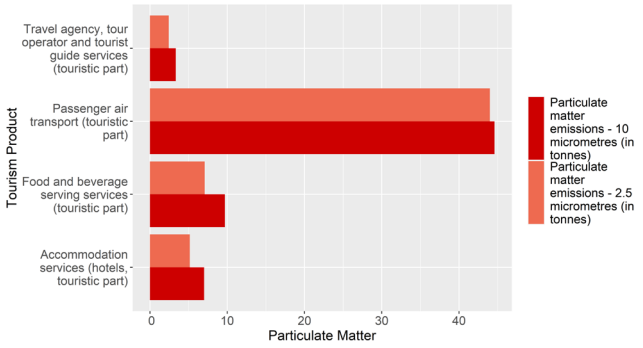


Many health impairments are caused by local air pollution and

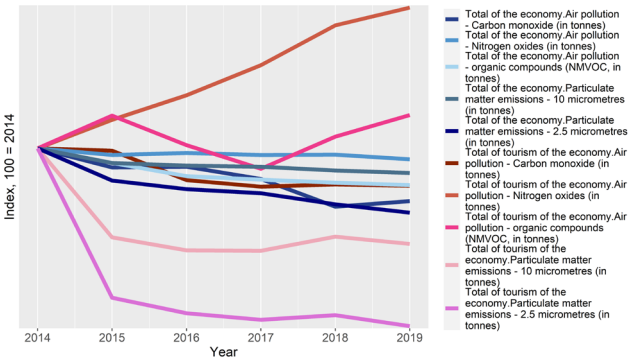
[9] Switzerland's resident tourism air passenger transport services account for about 80% of tourism's greenhouse gas emissions.

not the emission of greenhouse gases. The emission of pollutants with a local effect such as carbon monoxide or nitrogen oxides is ubiquitous within all tourism products. The mix of air pollutants is similar for the published tourism products. Data on the emission of particulate matter are available for different classes of particle size, which both have a similar distribution by tourism product.

Graphic 7: Distribution of particulate matter emission by tourism product



Graphic 8: Evolution of air pollution and emission of particulate matter for various tourism products



At first glance the time series of airpollutants suggests a heterogenous pattern. This is characterised by a significant decrease in toursim emissions of particulate matters in 2015. However, this decrease can, to a large extent, be ascribed to a new calculation method of the Federal Office of Civil Aviation (FOCA). FOCA's calculation method, i.e. the emission coefficients of particulate matter for aviation, were adjusted due to new findings for the data from 2014 onwards; previously they were conservatively overestimated. Other tourism products exhibit more homogeneous trends.

2.3 Water

The data available on water quality and use cannot be used for this indicator system. One main area where there is a lack of data is water pollution. This is due to two reasons. First, there is no raw data on water pollution by industrial sector that could be allocated to tourism products. Secondly, we cannot use local water quality data because regional analysis is not possible for the other indicators and aggregating results is illogical. An extension to water usage is under consideration.

3 Economic factors

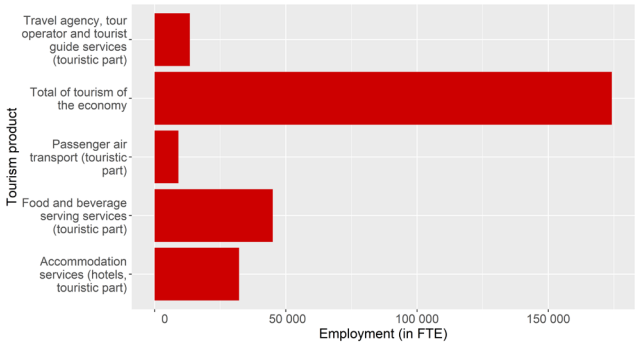
These indicators are already available as part of the TSA. They measure the extent to which a tourism activity affects the economic performance of Switzerland, of an industrial sector or a region.

The indicators included and which form the basis of economic sustainability are:

- Gross value added
- Employment

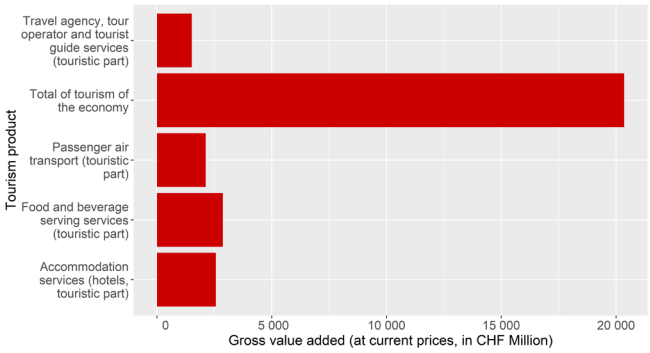
These indicators can provide insight into multiple dimensions of sustainable development. First, the national comparison is a regularly estimated measure that assesses ther percentage of the national economic performance and employment that is associated with national tourism. This statistic uses the direct method of the TSA and tourism products.

Graphic 9: Tourism employment by tourism product



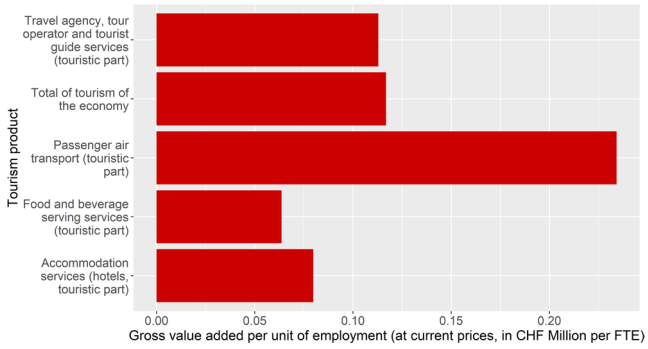
More than 75 000 full-time equivalents are employed in accommodation and food and beverage serving tourism services.

Graphic 10: Gross value added by tourism product



Owner-occupied holiday homes are omitted for technical reasons, as the definitions of employment and value added cannot be applied consistently. Accommodation services, air passenger services, as well as food and beverage serving services account for a large share of the remaining gross value added with approximately equal shares.

Graphic 11: TSA estimation of implied productivity[10] by tourism product



The implicitly calculated productivity in food and beverage serving services and hotels is low. The implicitly calculated tourism productivity is high for air passenger services, yet the difference between these tourism products is not as marked as for other indicators of sustainability.

4 Relative use of resources (intensity)

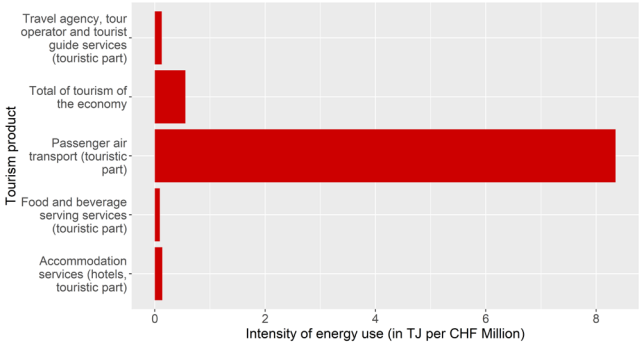
This time series measures the evolution of tourism but it also allows an analysis of the sustainable development of tourism relative to economic production in this cross-sector activity. It highlights areas (tourism products), where measured in relation to employment and gross value added respectively, the greatest use of resources takes place and the most value added is generated. The former is called "resource use intensity".

Intensity of resource use:

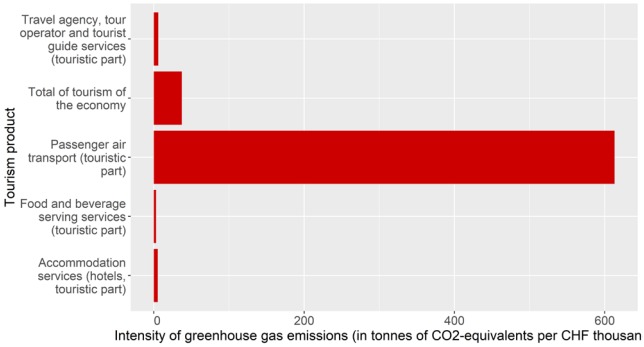
- Greenhouse gas emissions per gross value added
- Air pollution per gross value added
- Energy use per gross value added
- Greenhouse gas emissions per full-time equivalent job
- Air pollution per full-time equivalent job
- Energy use per full-time equivalent job

An increasing value indicates that the amount of resource use increases more than the economic performance. This intensity can be measured relative to gross value added or full-time equivalents. When this statistic is relative to full-time equivalents it displays the resource use per job.
Even though this measurement is used often internationally, its pertinence when used in relation to employment is limited. Tourism products that use more labour for the same level of e.g. greenhouse gas emissions with the same economic performance would be considered "more effiecient" by that metric, yet this is true only in a strictly monetary sense.

Graphic 12: Intensity of energy use by tourism product relative to units of gross value added



Graphic 13: Intensity of greenhouse gas emissions by tourism product per unit of gross value added



[10] The statistics on GVA per full-time job are also known as "productivity" and are calculated by the FSO using another method. A comparison of the two concepts is not possible. See: Methodenbericht Messung des Arbeitsinputs und der Ar-beitsproduktivität in der Schweiz, Neuchatel. Federal Statistical Office, 2007

These graphs show the resource use intensity of tourism products. Although e.g. air passenger transport is the most productive and also exhibits a very high level of gross value added, it still uses the most greenhouse gases per unit of gross value added of all tourism products. Therefore the intensity is highest for air pessenger transportand hence per gross value added most natural resrouces are needed.

The energy efficiency of most products is constant across time.

5 Challenges and looking ahead

This is a pilot study. After receiving feedback from users of these statistics as well as from experts in the field, we will revise the methods and, if available, improve it using new data. Especially the social dimension of tourism is not yet covered by this publication. In addition, COVID-19 pandemic years (2020-2021) will be published after the method has been tested further.

One level at which the development of tourism sustainability could be evaluated would be a geographical one. Data on the environmental dimension use the environmental accounts. However, the data on emissions of greenhouse gases and air pollutants as well as on energy use are not available at a regional level. According to our assessment, these data do not allow a regional breakdown at this time. Thus, regional statistics on the environmental dimension or intensity indicators of the economic dimension would merely be a statistic on the regional distribution of industrial sectors. These statistics would neither take into account cantonal differences in pollutant emissions within a NOGA group nor cantonal differences in the tourism share of different NOGAs. Thus, a cantonal distribution would be very misleading.

With different geographical levels, the different dimensions of the SITSA would no longer be consistent with each another.

The "TSA regional indicators " already provide a regional breakdown of the economic results. In order to estimate a cantonal breakdown for tourism gross value added and employment by canton these indicators use, among other things, the number of stays as well as the tourism correction factor[11].

The social dimension is not considered within this pilot study due to a lack of data. The inclusion of this dimension will require further clarifications with various stakeholders. The statistical quality and representativeness of potential data sources are the most important aspects. The ambitious goal is to obtain coherent information on wages, the gender wage gap, visitors' attitudes towards tourism of visitors, as well as those of the resident population, and guest satisfaction using register data as well as data from the structural business statistics and the wage structure survey. These data should allow for an extension of the SITSA. The geographical breakdown of the social dimension will depend on the data. An analysis of the communes that are classified as predominantly touristic could also be a possible regional level of analysis.

6 Calculation methodology

The TSA published by the FSO contains 21 tourism products (e.g. accommodation services, petrol stations, passenger transit by ship). For the environmental dimension and the intensity indicators of the economic dimension, both the pollutant emissions and energy use are aggregated by these tourism products. However, the published pollutant emissions and energy use data are broken down by NOGA division. Furthermore, much of the data is only available through the TSA, which is published every 3 years. Therefore, the economic results are extrapolated[12] and the environmental dimension uses the same distribution as the TSA calculations do.

The environmental accounts' data are available at the NOGA division level. The more homogeneous the activities in these divisions are in terms of pollutants, greenhouse gas emissions and energy use, the better the implicit assumption that pollutants or greenhouse gases or consumption of certain energy sources are proportional to production and employment and that e.g. the energy mix within a NOGA division is the same. If two enterprises are both assigned to the same NOGA, but one enterprise is solely providing tourism activities and another enterprise is only providing non-tourism activities, the results of these enterprises are aggregated and then redistributed according to this methodology. If tourism enterprises systematically behave differently than non-tourism enterprises, this is not recorded in these statistics. These statistics only show the sustainability in different dimensions of tourism activities, not companies.

The results at the NOGA division level are adjusted in three steps to be at a tourism product level:

Firstly, for each NOGA type and each TSA product, the share of the type that is relevant for the TSA product is calculated. This is done using exactly the same methods as for the annual indicators.

[11] The German version uses the term "*Touristischer Anteil*". This term is no longer in use and replaced in this context with "*Tourismus Korrekturfaktor*". The English language version uses the equivalent of the newer expression.

[12] (sic to the intervening years)

Secondly, for each TSA product, the share of the NOGA division that is relevant to that product is calculated. This is the share of relevant NOGA types in the parent NOGA divisions, calculated on the basis of full-time equivalent employment.

Finally, each TSA product has a tourism share that is published in the TSA. The TSA tourism correction factor is multiplied by the relevant share of NOGA division for the product. This key is then used to calculate the greenhouse gas and pollutant emissions and energy use relevant for tourism.

Due to the heterogeneity of TSA products, the calculation method varies slightly for different TSA products, NOGA divisions and NOGA types. Because the tourism share of TSA products is also calculated according to different methods, the calculation must be adjusted accordingly.

Unless otherwise stated, it is assumed that the share of NOGA types relevant to the associated TSA product is 100%.

For NOGA types 551001 and 561002, the share for the TSA product "accommodation services" is equal to the share of turnover taxed at the reduced tax rate on total turnover. The share for the product "Food and beverage serving services" is equal to the ratio of turnover at the normal tax rate to total turnover.

The share of type 552002 (group accommodation) in total accommodation services is 0% by assumption and 100% of the activity is allocated to supplementary accommodation. This allocation was improved because in 2017 some (14) establishments that were previously wrongly allocated to this type are now classified within the “hotel” type. The share is still calculated as 100% to the supplementary accommodation sector even though the composition of the establishments has changed.

NOGA type 561003 covers the management of restaurants and would be, in principle, relevant to the corresponding TSA product. However, the employment registered in the Structural Business Survey (STATENT) within this NOGA type has been allocated to the remaining NOGA since 2016. Therefore, the economic performance of this type (561003) is accounted for by the increased employment within the other relevant types. The direct share of type 561003 has been 0% since 2016; it was 100% before.

NOGA type 562100 covers contractual catering services on specific occasions at a location specified by the customer. In the TSA calculations, it is assumed that tourists do not use event catering services. Thus, the share is 0%.

NOGA type 562900 covers large-scale catering, i.e. contractually agreed catering services for specific occasions at a location specified by the client. Included in this are licensee catering services at sports and similar facilities. The food is usually prepared at a production site. In the TSA calculations it is assumed that tourists do not make use of this service. Thus, the share is 0%.

To calculate the share of NOGA types of the NOGA divisions by TSA product, the full-time equivalent employment with the relevant NOGA types of the TSA product is multiplied by the share determined above and added grouped by NOGA division. This sum is divided by the full-time equivalent employment of the entire NOGA division. This quotient is the share of the NOGA division assigned to this TSA product.

Industrial sectors associated with the TSA product “Owner-occupied holiday home” would have an effective share of 0% because there is no employment associated with them. No share is reported in the TSA. We have calculated this share experimentally using information on this sector from STATENT.

The tourism share per TSA product is taken from the 2014 and 2017 TSAs and, if no further information is available, a linear trend is assumed for the intervening years. This extrapolation produces good results locally. This can be replaced in the long run by using a limited function, such as the logistic function or an extremum function.

The tourism part is multiplied by the share of the NOGA division. This results in the distribution key that allocates the greenhouse gas emissions, energy use and air pollutant emissions published by environmental accounting to the TSA products. The possible use of auxiliary data to refine the account for certain NOGA divisions is being examined.

7 Abbreviations

FOCA	Federal Office of Civil Aviation
FSO	Federal Statistical Office
MONET	*Monitoring der nachhaltigen Entwicklung* – Monitoring of sustainable development
MST	Measuring the sustainability of tourism
NOGA	*Nomenclature générale des activités économiques* – Allgemeine Systematik der Wirtschaftszweige
PM	Particulate Matter
SECO	Staatssekretariat für Wirtschaft
SITSA	Sustainability indicators of the TSA
STATENT	Statistik der Unternehmensstruktur
TSA	Tourism Satellite Account
UNWTO	United Nations World Tourism Organisation

8 Bibliography

Methodenbericht Messung des Arbeitsinputs und der Arbeitsproduktivität in der Schweiz, Neuchâtel: Federal Statistical Office, 2007

Satellitenkonto Tourismus der Schweiz, TSA 2001 und 2005. Grundlagen, Methodik und Ergebnisse. Neuchâtel: Federal Statistical Office, 2008

International Year of Sustainable Tourism for Development 2017, Resolution A/RES/70/193, New York: UNWTO und UN General Assembly, 2015

Measuring the Sustainability in Germany – Development of a Tourism Sustainability Satellite Account. Dessau-Rosslau: DIW, 2021

Begleitnotiz, Regionale Indikatoren zum Satellitenkonto Tourismus, Pilotstudie. Neuchâtel: Federal Statistical Office, 2023

Draft of Framework for Measuring the Sustainability of Tourism, Madrid: UNWTO, 2023