

How climate efficient is tourism? - The case of Switzerland

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Introduction and Background

The tourism sector is not only affected by climate change but also has an impact on the Earth's climate by emitting greenhouse gases (GHG). Consequently, the sector is under increasing pressure to make its contribution to the mitigation of GHG. In this context, there is a growing interest in identifying those measures that are the economically most efficient. In order to assist the determination of such measures, we calculated the climate efficiency of the tourism sector for the case of Switzerland.

Climate Efficiency

Climate efficiency = $\frac{\text{CO}_2 \text{ emissions [kg]}}{\text{added value [CHF]}}$

This concept, inspired by Gössling et al (2005), allows to identify subsectors that generate high emissions and relatively low added value (i.e. unfavourable climate efficiency) and should thus be focused on for mitigation purposes.

Definition of Tourism

According to the Swiss Tourism Satellite Account (BFS, 2003), tourism is the total of consumption activities outside the habitual environment. This includes travel for leisure, business, and other purposes, lasting maximum one year

System Boundary

To calculate tourism's climate efficiency, tourism industries were considered, if they contribute added value to the Swiss economy. These tourism industries belong to the internal tourism that consists of domestic and inbound tourism.

Method

Figures for added value were taken from the Tourism Satellite Account (BFS, 2003) whereas CO₂ emissions were assessed with data from various energy surveys and databases (BFE, 2006; BFS, 2005; BFS, 2007; Ecoinvent, 2006).

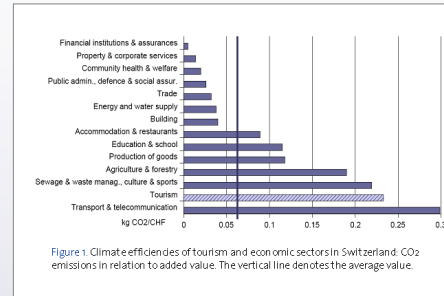


Figure 1. Climate efficiencies of tourism and economic sectors in Switzerland. CO₂ emissions in relation to added value. The vertical line denotes the average value.

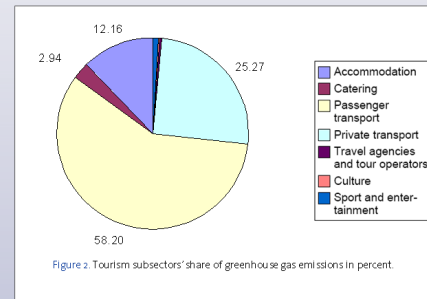


Figure 2. Tourism subsectors' share of greenhouse gas emissions in percent.

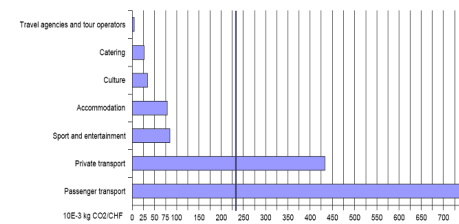


Figure 3. Climate efficiency ranking of tourism subsectors. The vertical line denotes the average value.

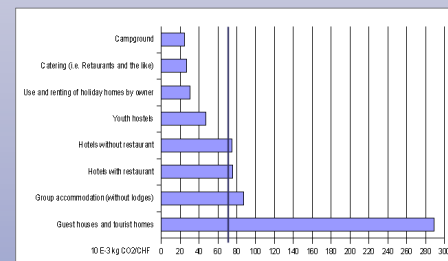


Figure 4. Climate efficiency of accommodation. The vertical line denotes the average value.

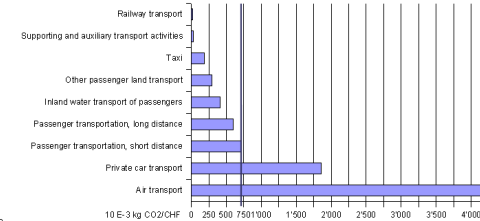


Figure 5. Climate efficiency of transport. The vertical line denotes the average value.

Results

The calculations for Switzerland show that transport contributes 84% to tourism's GHG emissions, accommodation 12% and activities including catering 4%.

Air transport has with 4.26 kg CO₂/CHF the least favourable climate efficiency in the transport sector. In the accommodation sector, guest houses and tourist homes are least climate efficient with 0.29 kg CO₂/CHF. The same value is shown by fairgrounds and amusement parks, the least efficient facilities among the activity sector.

Conclusions

Tourism is responsible for a sizeable amount of CO₂ and GHG emissions (8.4% of Swiss economy's CO₂ emissions). Compared to emissions per added value of the Swiss economic sectors, tourism's climate efficiency (0.23 kg CO₂/CHF) is much less favourable than the average (0.06 kg CO₂/a).

It is reasonable to take mitigation measures in sectors, where high emissions are connected with relatively low added value. In the transport sector, decision makers could improve the climate efficiency by supporting efficient transport modes, such as railways, rather than inefficient transport modes, such as air transport. Accommodation and catering services have medium climate efficiencies and could be improved by upgrading their heating systems. Tourism activities have a favourable climate efficiency in average.

Decision makers must integrate tourism in national and international climate policies. The tourism sector has a high potential for significant GHG mitigation measures, which as of yet remains untapped.

Literature cited

- BFE. 2006. *Energieverbrauch in der Industrie und im Dienstleistungssektor 2002-2004*. Bundesamt für Energie. Bern.
- BFS. 2003. *Satellitenkonto Tourismus in der Schweiz*. Bundesamt für Statistik. Neuchâtel.
- BFS. 2005. *Arbeitsstätten und Beschäftigte nach ausgewählter NOGA 5*. (unpublished work). Bundesamt für Statistik. Neuchâtel.
- BFS. 2007. *Mobilität in der Schweiz - Ergebnisse des Mikrozensus 2005 zum Verkehrsverhalten*. Bundesamt für Statistik. Neuchâtel.
- Ecoinvent. 2006. *ecoinvent lifecycle inventory data v1.3*. Dübendorf.
- Gössling et al. 2005. The eco-efficiency of tourism. *Journal of Ecological Economics*. 49: 417-434.

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