

# **Meeting the Challenges of Climate Change to Tourism in Austria**

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## **Abstract**

This article provides some basic facts about Austria and the relevance of tourism for the Austrian economy; the impacts of climate change in the past decades as identified in Austria; the ongoing efforts of Austria to prepare an adaptation strategy; the vulnerability of tourism in general and winter tourism in particular; and adaptation actions that have been already taken or are being considered. The lessons learned from adaptation activities in the winter-tourism sector conclude this article.

## **Some Facts About Austria**

Austria is a land-locked country of 83,858 km<sup>2</sup> located in central Europe. About 40% of the total area lies at more than 1,000 meters above sea level (m asl). Austria has 8.32 million inhabitants (2007) who live in a Federation with nine federal provinces (Länder), each of which has its own government and parliament. It is also a member state of the European Union since 1995.

Tourism is a very significant economic activity in Austria. 124.9 million overnight stays from 33.4 million guests – about one third from abroad – are served in about 60,000 businesses with an overall capacity of one million beds. Winter tourism has become increasingly important for business despite climate change impacts already in Austria. The importance of tourism in Austria can be seen in the fact that it provides about 10% of the jobs in Austria and it contributes about 4% to the gross domestic product (GDP) (with indirect effects about 9%) and delivers a surplus of the balance of payments in the range of €5 billion per year.

## **Climate Change in Austria**

The temperature has increased in the last 50 years between 1-2°C and the precipitation has increased by 10-15% in the last 40 years, with the exception of southeast Austria that became drier. The retreat of glaciers and permafrost is significant. The loss of glacier area between 1969 and 2006 is in the range of 30%. This means consequences for the infrastructure, i.e. skiing on glaciers. In the lowlands, snow cover has been reduced by three to four weeks per year within the last 20 years and this trend is getting even stronger. The fraction of snowfall has decreased even at an altitude of 3,100m since 1970 by 10%. This is a clear indication of global warming. Looking at the future, based on the A2 emission scenario, the snow duration in the Alps in altitudes of 2,000m is likely to be reduced by 50% and by 95% at levels below 1,000m (IPCC AR4). This will impact winter tourism in Austria, as most of the skiing regions are located in altitudes between 1,000 and 2,000m asl.

### **Adaptation Framework in Austria**

The development for the framework was triggered in 2007 by request of the federal provinces. This trigger was informed by the development of the Green (June 2007) and White Paper on Adaptation to Climate Change (April 2009) prepared by the European Commission. The milestones of the development of the Austrian framework on adaptation were so far:

- Kick off 2007
- Assessment of already ongoing activities
- Five workshops (09/2007; 03 and 11/2008; 06/2010; 11/2010)
- Preliminary recommendations (agriculture, forest management, water management, tourism, electricity sector, biodiversity, transport infrastructure, health, settlements and natural hazards)

*For more information see: <http://www.klimawandelanpassung.at/newsletter-registrierung/newsletterarchiv/>*

In addition, the Umweltbundesamt has started a participatory process. Within the government, the lead for developing a National Adaptation Strategy (NAS) in 2007 was taken by the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, which is supported by a group of experts representing other ministries and the provinces, called Kyoto-Forum. The NAS is planned to be finalized by 2012. The government decided to have a sound process within five years to come forward with this strategy. This iterative process will result in a final strategy in 2012. Some of the future activities will include workshops addressing health, ecosystems/biodiversity, transport infrastructure, buildings and natural disasters, with the goal being to elaborate further recommendations. The participatory process, engaging 84 organizations, should lead to a common understanding on how to address adaptation in Austria as well as to the identification of synergies and conflicts of interest and of needs for further research.

### **Vulnerability of Tourism**

In studying the vulnerability of tourism, a differentiation has been made with respect to four tourism categories (winter tourism in the alpine region, summer tourism in the alpine region, summer tourism at lakes and urban tourism). The vulnerability of tourism was considered in general and a strong dependence on climate change was found in winter tourism in the alpine region but also with respect to the summer tourism at lakes. This has high importance for the economy in general and in particular for those regions for which winter tourism is the main economic activity and which are very sensitive to the impacts of climate change. The regional variability of vulnerability has been assessed and is significant.

An additional point, with a linkage to Africa, is tourism at lakes, in particular Lake Neusiedel. This lake has shallow water that is a home to many bird species that come in spring from east Africa to Austria and go back later in autumn. This lake might disappear due to evaporation and lower precipitation, triggered by climate change.

Winter tourism is however the most vulnerable tourism category in Austria. Autonomous adaptation started already many years ago by introducing artificial-snow production. This technology has a large demand on water and energy resources and therefore artificial-snow production is quite expensive. A basic snow cover of 30cm depth requires about 2500m<sup>3</sup> artificial snow for 1 hectare of ski slope. The water consumption is about 600 to 1500 m<sup>3</sup> per hectare and the energy demand 5,000 to 27,000 kWh per hectare. The costs amount to about €10.000 per hectare (data from 2005). Yearly investments in Austria in artificial-snow production is higher than €100 million. A lack of sufficient snow cover raises the risks for skiing accidents.

Whereas, currently 85% of the skiing regions would have a fair snow cover without artificial-snow production, this number is expected to decline to about 70% by 2025, 50% by 2050 and only 20% by 2100 (see table).

Number of skiing regions	Fair snow cover (without snow making equipment)	+ 1°C (about 2025)	+ 2°C (about 2050)	+ 4°C (about 2100)
228	199	153	115	47

Area of slopes	with snow making equipment	%
25,400 ha	16,760 ha	66

#### **Possible Adaptation Measures for Skiing Regions**

- Regional co-ordination of investments
- Broadening of the basis for financing beyond cable-car businesses (e.g. co-operation with communities) – not very successful until now
- Shift to slopes in less climate-sensitive regions (e.g. higher elevations)
- Close, inefficient slopes
- Improvements in artificial-snow production – has been significant in the past
- Diversification into other tourism activities than skiing that are independent from the availability of snow
- Diversification into other economic activities than tourism

#### **Conclusions**

It is evident that climate change is a significant challenge for winter tourism in the alpine region in Austria; however, the vulnerability depends very much on the specific local circumstances. Therefore, every region has to identify its appropriate adaptation strategy.

The private sector is quite responsive to the need to meet the challenge and has sought to compensate climate change mainly by technical solutions. More holistic approaches that are imbedded in sustainable development strategies of a region/a community are lacking; therefore, the development of the NAS is very important to prepare the ground for a more holistic perspective. Currently the approach is mainly driven by the economic considerations from the perspective of the cable-car business, based on the need to achieve a return of investment within four years.