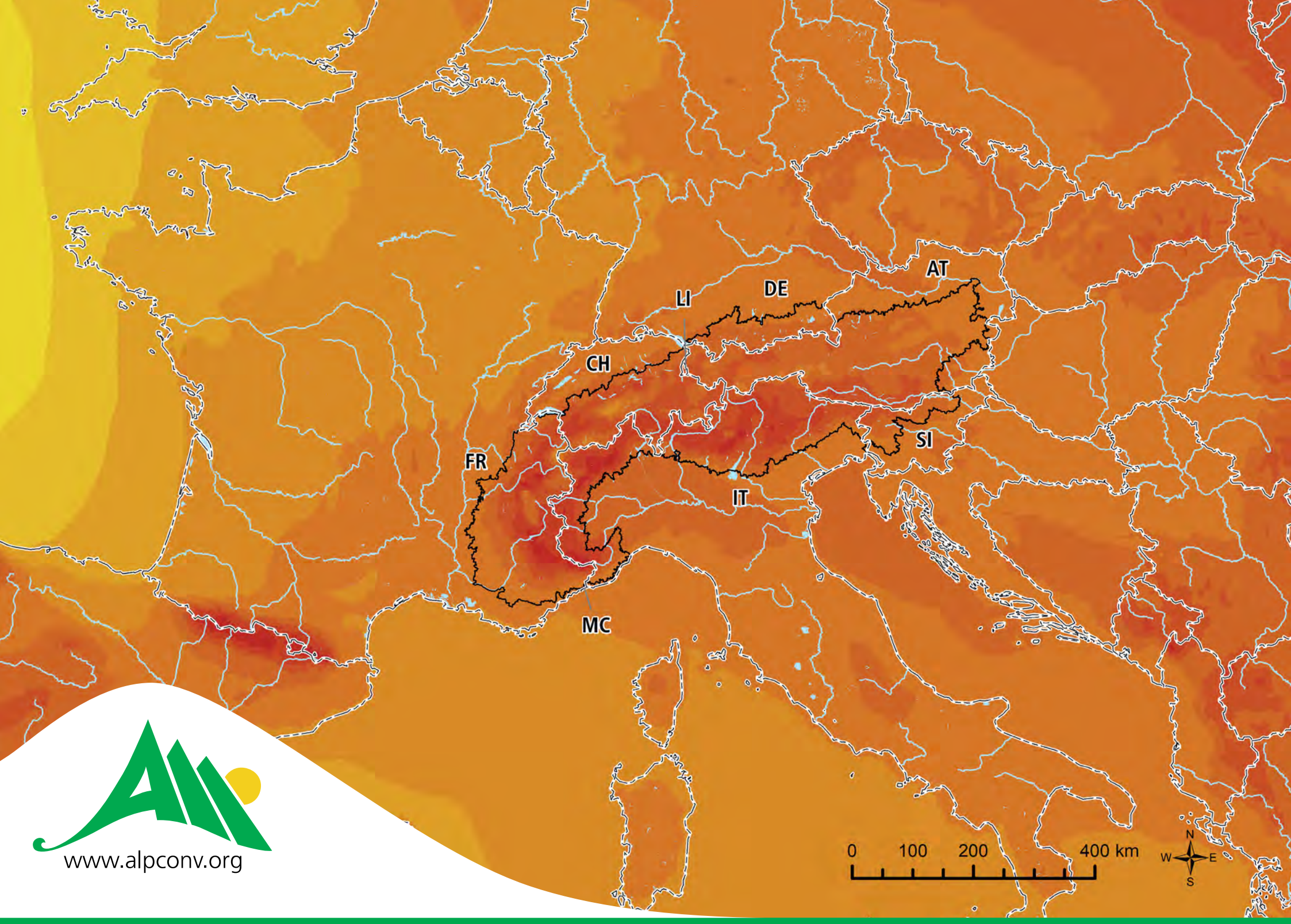

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CLIMATE CHANGE

How it affects the Alps and what we can do

The Alps are vulnerable to climate change

They are home to about 14 million people, 30,000 animal species and 13,000 plant species. Climate change is occurring at a faster pace in the Alps than elsewhere: Since the late 19th century temperatures have risen by almost 2 °C, a rate about twice as large as the northern hemisphere average.

The Alpine Convention is addressing climate change

The impacts of climate change vary across the Alps, but they do not stop at administrative borders. The Contracting Parties to the Alpine Convention adopted in 2006 a Declaration on Climate Change to reinforce their cooperation. This was complemented in 2009 by an Action Plan with specific strategic measures and best practice examples. In 2017, the Alpine Climate Board was established to bundle relevant climate change activities carried out within the framework of the Alpine Convention.

Working with the Alpine environment

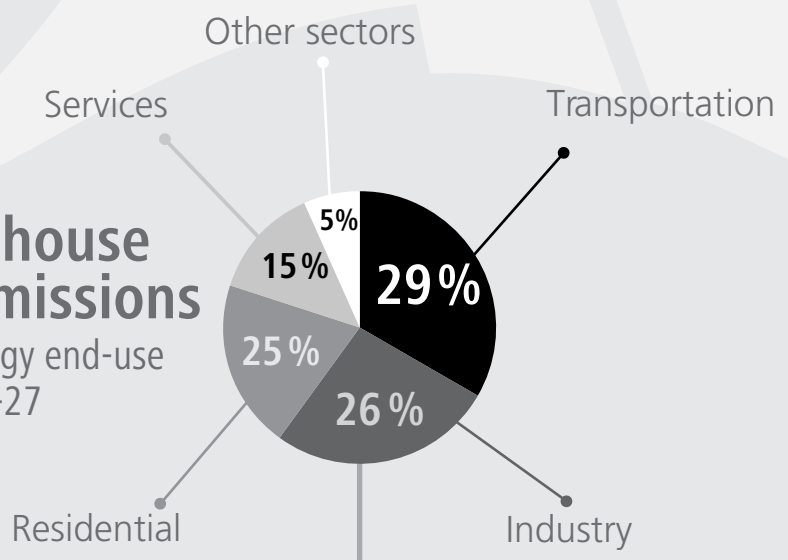
Alpine people have a centuries-long history of living in challenging conditions. Our region is rich in natural resources. When managed carefully, they can help us to find a sustainable balance. Climate change mitigation and adaptation measures also bring many benefits for our health, our environment and our economy. They constitute a smart investment improving our future quality of life.

FACTS AND FIGURES

The **temperature** increased almost **twice** as fast in the Alps as the northern hemisphere average.

2×

Greenhouse gas emissions
from energy end-use in the EU-27



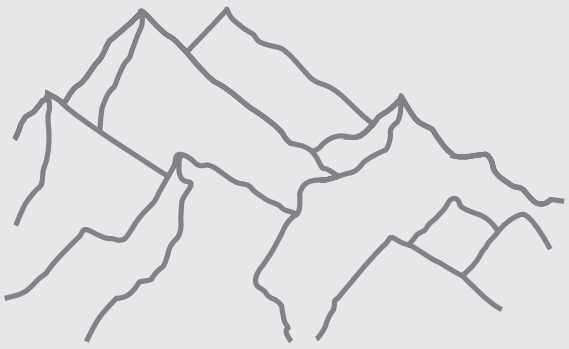
1850 — today — 2100

+2 °C

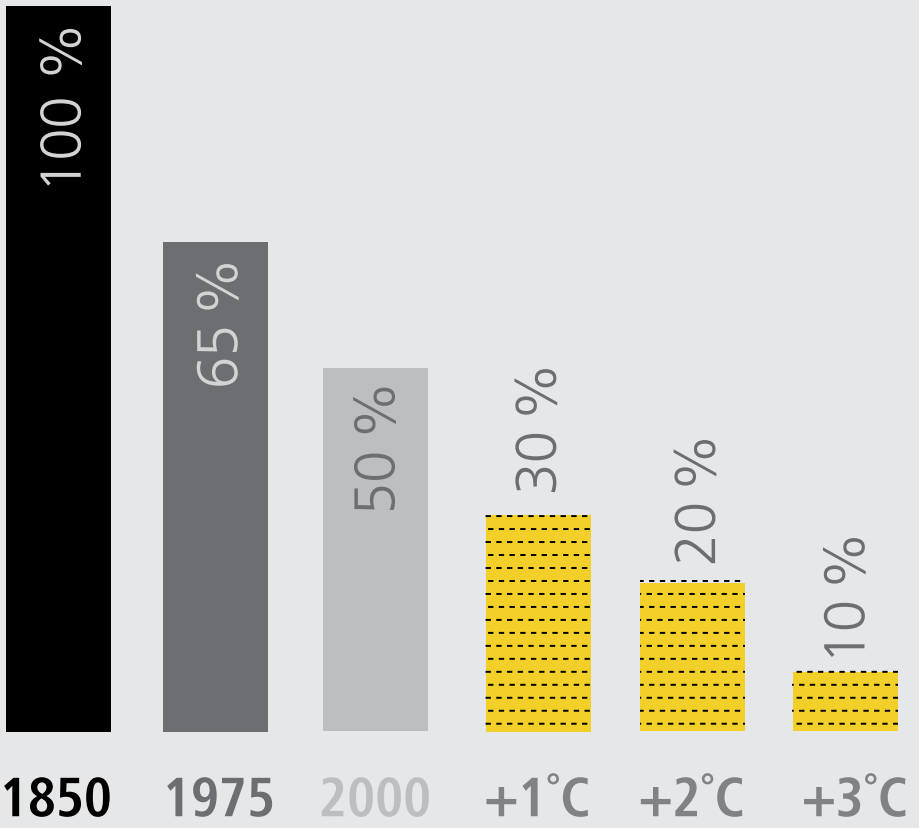
-80%

31%-51% of
Alpine plant species
are projected to loose more than 80 % of their suitable habitat.

Remaining
glacier surface
in the Alps



PROJECTIONS



CLIMATE CHANGE IN THE ALPS

FINDING THE BALANCE

WATER

The Alps are known as the main freshwater supplier for Europe, but climate change leads to changes in precipitation. There tends to be less snow but more rain in winter and less water in the summer, with drought episodes becoming more frequent, especially in the southern and south-eastern Alps. The decrease of snow and the melting of glaciers also reduce the amount of stored water. The use of water for agriculture, households, hydropower generation and tourism (including artificial snow production) needs to be managed carefully to prevent conflicts of usage and to keep the water ecosystems functional.

NATURAL HAZARDS

Natural hazards have always been present in the Alpine region: avalanches, landslides, floods, forest fires etc. However, climate change alters their patterns. Extreme weather events tend to occur more frequently, and risks are becoming less predictable. Permafrost degradation increases the risk of ice and rock fall and damage to high-altitude infrastructure. Consequently, potential natural hazards have to be taken into account even more strongly in spatial planning. Natural and artificial measures are required to protect settlements and infrastructure, and we have to give up developing the most exposed areas.

BIODIVERSITY

Many Alpine plants and animals are specialists for cold areas. As the climate gets warmer, they have to move to higher altitudes. This leads to a loss of habitat surface. Some species may eventually be displaced by more competitive ones from lower regions. To help maintain healthy populations of the Alpine fauna and flora it is important to create ecological networks which allow species to wander and migrate.

FORESTS

Due to climate change, mountain forests are at increased risk from dry periods and extreme events such as wind gusts and forest fires. Weakened trees also become more vulnerable to pest diseases. On the other hand, the forest cover is growing in the Alps due to the abandonment of cultivated areas and the rise in temperature. Sustainable forest management is key to the Alpine climate change strategy, because forests provide a carbon sink, they supply wood as construction material and renewable energy source and they offer natural protection from avalanches, floods and other disasters – at a cost up to ten times lower than artificial protection structures.

TOURISM

Tourism in the Alps is highly dependent on the natural attractions (landscape, snow, wild water) which are potentially affected by climate change. Infrastructure and even hiking and mountaineering routes are now subject to a higher risk of natural hazards. Tourism itself contributes to climate change, especially through the prevalent use of motor cars for recreation in the Alps. Keywords for a sustainable and resilient Alpine tourism are diversification in activities and season (making the most of the relative coolness of summers), soft mobility and a focus on natural and cultural heritage and healthy activities.

AGRICULTURE

Climate change is already affecting mountain agriculture through droughts and extreme weather events, the expansion of forests and, most significantly, the reduced weather predictability. On the other hand, new climatic conditions may allow the cultivation of alternative crops in the Alps, such as vine. Extensive Alpine agriculture with a careful use of natural fertilizers can have a lower carbon footprint and help mitigate climate change: biomass from agriculture is an increasingly relevant source of renewable energy and the development of local and regional value chains can reduce emissions from food transport.

ENERGY PRODUCTION

Renewable energies are key to climate change mitigation. The Alps have traditionally been a major producer of hydropower. They also benefit from strong solar radiation, and their forests are a source of wood biomass. However, available land in the Alps is scarce and energy production can have negative impacts on nature and landscape and on other human activities such as mountain agriculture. Only well-balanced energy projects in carefully selected locations should be developed. Renewable energy production has to go hand in hand with the improvement of energy efficiency, especially in transport and buildings.

TRANSPORT

Transport is the largest single source of greenhouse gas emissions in Europe. The transit of goods across the Alps creates concentrated impacts along the main road axes. However, the majority of the overall traffic volume is actually made up by inner-Alpine transport. In order to mitigate climate change, sustainable mobility needs to be strengthened. In particular the modal shift of goods and passengers from road to rail needs to be enforced. Unnecessary transport should be avoided – for instance through the use of local products, smart spatial planning or distance working.

BUILDINGS

There is a high potential to reduce the greenhouse gas emissions generated from heating and also increasingly from air conditioning. The Alps have a rich tradition of efficiently integrating architecture in the surrounding environment. The region is now an active pilot area for the development of sustainable, near-zero-energy (or even positive energy) construction, making the most of local natural materials such as wood and clay and the availability of renewable, CO_2-neutral energy sources such as solar energy. The whole life cycle of buildings and materials has to be taken into account. Therefore, the refurbishment of existing structures is a priority.

WHAT I CAN DO

- Take the train, bus or bike
- Enjoy local products
- Check my home and office's energy balance
- Plant a tree
- Choose a "green" energy provider
- Reduce, reuse, repair and recycle
- Define my own climate targets

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The Alpine Convention was signed in 1991 by the eight Alpine countries of Austria, France, Germany, Italy, Liechtenstein, Monaco, Slovenia, Switzerland and the European Union. It is the first international treaty aimed at the cross-border sustainable development and protection of an entire mountain range. It consists of a Framework Convention complemented by eight implementation Protocols on: mountain farming, tourism, spatial planning and sustainable development, transport, nature protection and landscape conservation, mountain forests, soil conservation and energy. Common declarations have been adopted on population and culture, climate change and sustainable economy.

The Alpine Convention works through the biannual Alpine Conference, the current Presidency, the Permanent Committee, the Compliance Committee, numerous working groups and platforms, and the Permanent Secretariat. Also, the single Contracting Parties and many Observer organisations contribute to the implementation of the Alpine Convention.

www.alpconv.org

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Cover image: PROJECTED TEMPERATURE CHANGE

Projected changes in annual near surface temperature in Europe 2021-2050

Sources: Data: EURO-CORDEX project: http://www.euro-cordex.net/
Terrain: ESRI USGS 2014. Country boundary: Countries, 2014 - European Commission, Eurostat/GISCO.
Perimeter Alpine Convention: EURAC 2008. Water and Administrative boundary: EuroGeographics 2009.

eurac research,Institute for Earth Observation, Institute for Regional Development
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