EUROPEAN UNION

EU MISSIONS

ADAPTATION TO CLIMATE CHANGE

June 2023

Staying cool during increasingly hot weather

Climate-resilient buildings in Stiefingtal, Austria

New building guidelines in an Austrian valley region are playing a vital role in transforming existing and new construction methods - creating climate-resilient buildings and enhancing their residents' quality of life.

Key Learnings

- **Engagement**: By involving and engaging citizens from the very beginning, acceptance of the project significantly increased. All stakeholders unanimously agreed that such innovative ideas and approaches greatly enhance the quality of living.
- **Collaboration**: Good cooperation amongst stakeholders at all levels, including among the KLAR! Manager, the mayors, heads of departments and architects and master builders, was essential for the development of the guidelines.
- **Funding**: A combination of federal and state (regional) level funding made the creation of the guidelines possible.
- **Financial**: Climate-resilient buildings are not more expensive than conventional buildings.

About the region

With an annual temperature of 13° Celsius, it is one of the hotter regions in Austria but has a lot of sunshine throughout the year. The region is located roughly 450 m above sea level and stretches over around 120 km² providing home to about 11.000 people.

Climate Hazards

Droughts, extreme temperature,

flooding, water scarcity

Sector

Construction

Key system

Infrastructure

Climate Threats

Stiefingtal, a rural valley nestled in the hilly region of Steiermark, Austria, is experiencing the impacts of climate change. The average temperature in this area is steadily rising, leading to increasingly hot summers. Consequently, the region is witnessing a surge in extreme weather events, while also facing the heightened risk of prolonged water shortages.

The main sectors at risk are agriculture, ecosystems and biodiversity, buildings, forestry, and water supply and sanitation.

Building for the Future

The region's exposure to climatic threats has pushed the need to adapt to climate change and to take these risks more seriously up the political agenda:

> *"We are the first generation that can feel climate change first hand, and possibly also the last generation that can really do something about it."*
> *Wolfgang Neubauer, Mayor St. Georgen an der Stiefingtal*

Kindergarten Empersdorf, Austria. Natural materials and architecture with built-in sun protection. Image credit: Daniel Nagler

In 2018, the region of the Stieflingtal became a member of the national **Climate Change Adaptation Model Regions for Austria - KLAR!** programme[1]. This programme, funded by the Austrian Climate and Energy Fund, helps municipalities to raise awareness of the need for climate change adaptation and implement tangible actions at the regional level. As part of this programme, the region has already implemented specific measures in recent years. Those measures include developing climate-smart forests, tree and shrub planting, and the creation of bee meadows.

The region places significant strategic emphasis on climate-friendly construction, with a particular focus on futureproofing both new and existing buildings against the adverse effects of climate change. **The main objective of the region's adaptation measures is to make all public buildings climate-resilient to extreme heat, especially in summer, and to reduce the risks and effects of floods**. Attention is paid to shading, passive cooling, natural hazard-safe construction, high-quality windows, sufficient storage capacity, and energy-saving lighting.

VS Pirching am Traubenberg, Copyright: KLAR! Stiefingtal

[1] https://klarstiefingtal.at/

Local guidelines for buildings

The Region has developed its own "**Guidelines for climate-friendly construction in the Stiefingtal**"[2] to help ensure its building sector is future-proofed. The guidelines address issues like integrated planning, provide recommendations on how to address mitigation and adaptation together and technical recommendations for the construction. This activity was spearheaded by the mayors and heads of departments of the region, who formed a steering group to discuss and develop policies for climate adaptation in the region. The group invited committed citizens and stakeholders from the Stiefingtal to a project workshop, resulting in a "climate-friendly construction project group" under the direction of architect Hans Oster. After several meetings, the company IGEM GmbH was formed and, in cooperation with the Technical University of Graz and with the support of the Steiermark and regional management authority Südweststeiermark, the guidelines were developed. The guidelines support the construction of buildings that are climate resilient, in alignment with European Union directives and address specific regional circumstances and requirements. These guidelines were proactively discussed with potential developers and investors, catering primarily to builders and civil engineers who may not have access to a dedicated team of specialist planners.

Smart building renovation: The climate-resilient elementary school

During the renovation of the elementary school (Volksschule) in Pirching am Traubenberg, the building was refurbished in a climate-resilient manner. The classrooms face south, but thanks to the construction of a balcony and wooden sun protection, they stay pleasantly cool, even on hot days. Each classroom has a direct exit to a covered outdoor area, and there is also an outdoor classroom. The completely green inner courtyard was kept, and new trees were planted. A tree shades the new mini outdoor Amphitheatre. A small sports area and a drinking fountain complete the "cooling school in the countryside". For the building materials, local materials were used almost exclusively to ensure short transportation routes. The total renovation costs were about € 2.5 million and the overall costs did not increase as a result of the climate adaptation measures adopted.

> *"We are very satisfied with the converted elementary school and happy to be able to work in this building. The external shading is a protection against solar radiation, and it stays cooler inside the building. The outdoor class is used very often, especially on hot days."*
>
> - Sabine Weingraber, Director of elementary school Pirching am Rauberberg

The mayors played a crucial role in implementing the guidelines to facilitate the expansion, conversion, and renovation of public buildings within the region, including an elementary school, a kindergarten, and an educational campus. The feedback from the building users has been consistently very positive, highlighting the success of these initiatives. The next project is to build a multi-residential building.

[2] https://klarstiefingtal.at/uploads/Leitfaden.pdf (in german only)

Summary

Stiefingtal's example demonstrates that European regions can adapt their building infrastructure to tackle the increasing impacts of climate change, improving the livelihood of residents and users in a cost-effective way, as climate-resilient buildings have proved to be no more expensive than conventional buildings. Early engagement with citizens and collaboration and cooperation amongst all stakeholders is vital, as is securing a diverse funding source.

Building from scratch: Stiefingtaler Haus (climate-friendly multi-storey residential building)

A prototype multi-store residential complex, with two self-sufficient residential buildings in the centre of St. Georgen an der Stiefing, is planned based on the guidelines for 'climate-friendly construction in the Stiefingtal'. The motto of the residential complex is 'living in the annual cycle of nature'. The complex is deliberately designed with vegetation in the form of trees and hedges. The complex is located in a transition area between farmland and a human settlement and is characterised by existing meadow orchard areas, which will be retained or redesigned. A community garden with raised beds and berry bushes will be located in the transition area to the farmland. On the roof of each house, there is a common open space covered with a solar PV system.

Further information

- Climate proofing of buildings against excessive heat on climate- ADAPT.
  - https://klarstiefingtal.at/projektgruppen/information-in-english
  - https://klarstiefingtal.at/projektgruppen/stiefingtaler-haus

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Funded by the European Union