

The Karlsruhe urban planning framework for climate adaptation

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Abstract

In the year 2008 the German Adaptation Strategy for Adaptation to Climate Change (DAS, 2008) was adopted by the German federal cabinet. One consequence of this DAS was the change of the planning law (BauGB, 2011/13). So since 2011 it is a demand by law to take into account climate adaptation in all planning processes. In a project supported by the federal state Baden-Württemberg (KLIMOPASS) the concept of the urban climatic framework plan "heat" for Karlsruhe was developed in cooperation of the city administration, urban planners and urban climatologists.

Initial situation

An exposed location in the upper Rhine rift valley makes the city of Karlsruhe one of the municipalities with the highest average temperatures in Germany. In urban climate terms, the increased frequency of hot days or periods makes Karlsruhe particularly prone to heat stress and the associated negative impacts on human health and performance (urban heat issue).

The case for action

The city council adopted the "Climate adaptation – survey and strategy for the City of Karlsruhe" policy in May 2013, endorsing the findings of a working group set up in 2011 and chaired by the city office for the environment. Measures targeting urban climate and urban planning included developing an "urban climatic framework plan (heat)". The council administration was thus lent political authority to further pursue this issue.

Project objectives

The framework plan is an informal planning tool which highlights spatial measures to reduce heat stress caused by climate change. It is aimed both at municipal and at private sector decision makers. The framework plan also aims to meet successive climate change related amendments to the building code and to provide politicians and administrators with the necessary reference framework for evaluating steps towards climate adapted urban planning and regeneration.

Concept and approach

The framework plan was developed with a focus on viewing the city as a whole. This included identifying areas requiring specific responses and packaging tailored measures to implement in particularly affected locations. The aim was to depict structural and typological medium-term heat loads experienced throughout the city and to locate particularly vulnerable hot spots. The first step was to identify a range of urban structure types, each comprising similarly functioning neighbourhoods. The next step was to identify the most vulnerable neighbourhood (or hot spot) within each structure type.

This approach was based not only on data relating to urban climate change, but by cross-referencing this data with relevant non-climate factors, such as urban grain, building energy performance standards, climate sensitive uses, population density, age profile and demographic change, accessibility, and the capacity and quality of place in green spaces. The integrated multi-attribute analysis distinguishes this approach from a purely climate data based process and delivered significant added value.

The next step was to tailor packages of local and overarching measures for urban structure types facing short and medium term stress. Local measures include demolishing and unsealing surfaces, creating shade, greening courtyards, facades and roofs, creating pocket parks, water features in public spaces, and using light and highly reflective materials to improve albedo. Overarching measures include raising the proportion of inner-city green space, improving neighbourhood air exchange or safeguarding night-time fresh air supply through continuous open space and cool air channels.

The overall plan sets out a coherent relief system including statements with regard to areas generating relief and supply networks, as well as areas suitable for the climate adapted development of buildings or open spaces. The plan also provides advice on key climate functions and the use of water as a coolant in the public realm. Finally, it also identifies areas suitable for urban regeneration in line with section 136 of the building code, based on environmental and climate factors.

Stakeholders

The project was initiated and organised by the city planning department, based on the findings of the federal ExWoSt demonstration project on densification versus climate comfort in the Karlsruhe region. The city's political leadership commissioned the administration to make preparations for developing the framework plan in April 2012 during the drafting of the Karlsruhe climate adaptation strategy, initiated by an application to Baden-Württemberg's KLIMOPASS programme.

The research funding was used to commission GEO-NET (Hanover) and the urban planners berchtold - krass space & options (Karlsruhe). Professor Dr Jürgen Baumüller (Stuttgart) and Professor Dr Günter Groß (Hannover) acted as scientific advisors. Close collaboration between climate experts and urban planners from the outset has undoubtedly made a major contribution to project success. Further stakeholders involved in the process of developing the plan included members of Karlsruhe's existing working group as well as elected members and external professionals such as the university (KIT), the chamber of trade and industry (IHK), the urban housing corporation, architects and resident association representatives.

Legal framework

The legislature has declared protecting the climate and adapting to climate change as guiding principles in its most recent changes to the building code (BauGB, 2011/13). The new paragraph 5 in section 1a of the building code places climate issues at the heart of the environmental assessment. This obliges local authorities to address these issues in land use planning and to formulate planning policy to contribute to their resolution where possible. Local authorities implement the directive in the course of statutory scrutiny of land use plans during the drafting process, both in terms of the plans' impact on the climate and the impact of climate change on planned development.

The new requirement can be met by adopting an urban planning framework such as the urban climatic framework plan as an informal planning tool. This differs from preparatory and binding land use planning in that can be drafted without complying with formal procedures or specific forms of documentation. As an urban planning framework the framework plan is not legally binding in its own right. By decree of the city council, the framework plan is viewed as supplementary planning guidance as per section 1 para. 6 no.11 of the building code and thus becomes a key consideration in planning scrutiny. In current jurisdiction, urban framework plans can be viewed as up-front expert reports for the adoption of development plans. This eases implementation of binding land use planning and frees resources dedicated to obtaining further expert reports.

Embedding in planning and processes

The status of the urban climatic framework plan in other planning and processes is directly derived from the city council resolution of March 2015:

The urban climatic framework plan is adopted as supplementary planning guidance as per section 1 para. 6 no.11 of the building code and taken into consideration within statutory planning scrutiny.

The urban climatic framework plan informs the selection of designated urban regeneration and urban development areas.

The urban climatic framework plan is further taken into account in urban design competitions, framework plans and transport plans, in evaluating proposals as per section 34 of the building code, in evaluating exceptions granted as per section 31 of the building code, in land sale and acquisition, and in exercising municipal pre-emptive right-to-buy (public interest, section 21 para. 3 of the building code).

Transferability

The project's research-driven approach and KLIMOPASS funding envisaged transferable methods and measures from the outset. This applies to the methods used in drafting and mapping the framework plan, as well as the way in which adaptation measures are allocated to specific urban structure types.

Summary

As in many other German cities, the existing urban fabric will far outweigh the small number of new or amended development plans adopted. As a result, the inclusion of climate related objectives in planning law will be important, but not inherently sufficient to deliver broad-based climate adaptation in urban planning. Given that climate deficiencies occur mainly in existing urban areas, regeneration, redevelopment and densification tools must gain significance in adapting to climate change.

Further information

<http://www.karlsruhe.de/b3/bauen/projekte/klimaanpassung>