Policy Brief: Adaptation of Protected Historic Cities to Heat

Executive Summary

Historic cities like Heidelberg face unique challenges in adapting to climate change due to the Urban Heat Island (UHI) effect and heat waves, which threaten public health, productivity, and cultural heritage.
Legal restrictions on altering heritage street-scapes and buildings limit traditional cooling methods, making adaptation in protected areas particularly challenging.
Targeted, non-invasive strategies offer effective solutions that enhance climate resilience without compromising historic character.
To **adapt historic cities** to climate change, we recommend:

- Implementing **participatory planning** to align climate actions with local needs and heritage constraints
- Applying **urban acupuncture** for small-scale, high-impact cooling interventions
- Using **cool surfaces** to reduce pavement heat without altering architecture
- Deploying **temporary shading** to improve outdoor comfort while preserving visual integrity

Problem and Context

Historic cities are often located in urban centers which makes them more exposed to the UHI effect. Rising temperatures cause material deterioration in historic buildings, which were not designed for current conditions. This leads to damage that can change the city's landscape character and loss of cultural identity. Moreover, many historic cities serve as key economic centers due to their historical value, making UHI mitigation crucial for sustainable urban development to preserve the urban historic landscape for tourism and socio-cultural identity. The particular challenge is that these city centers have unique architectural and spatial constraints that limit the use of conventional cooling solutions. Urban greening for example may not be as viable due to the lack of road space and accessible groundwater. Additionally, urban design guidelines in historic cities may prevent the physical adaptation of buildings to UHI.

Heidelberg Case Study

Heidelberg, situated in the Upper Rhine Valley —Germany's warmest region—is increasingly exposed to the impacts of climate change. Between 2041 and 2070, the number of heat stress days is projected to rise by 50% compared to the 1971–2000 baseline. These impacts will be most severe in the city's core, where the urban heat island (UHI) effect heightens heat exposure—particularly in the Old Town and West Town districts.

Adapting to these risks is particularly challenging, as Heidelberg is home to approximately 2,900 listed historical buildings, with both Old Town and West Town designated in full as heritage districts. Their dense urban fabric and strict preservation rules significantly limit the use of conventional adaptation measures. Any modifications in protected areas to building façades, streetscapes, or land use must be approved by the Municipal Office for Building Law and Heritage Protection.

Given these constraints, climate adaptation in Heidelberg requires a context-sensitive approach that aligns resilience planning with heritage conservation. The following policy recommendations outline strategies to achieve this balance.

Adaptation Strategies

Participatory Planning

Involves both local stakeholders and residents of the city in adaptation decisions.

Pros

- Effective climate policy by cooperation, coordination and a problem-solving approach
- Fosters coordinated climate action

Cons

- Time-consuming
- Risk of unequal participation

Cool Surfaces

Refers to the replacement of pavement with less reflective and emissive material.

Pros

- Can reduce the surface temperature up to 12°C compared to conventional pavements
- Helps lower ambient urban temperatures up to 1.7°C

Cons

- Efficacy dependent on local environment
- Highly reflective surfaces can cause glare

Urban Acupuncture

Targets specific stress points within a community for small-scale cooling interventions.

Pros

- Locally-focused and cost-effective
- Fast implementation
- Minimal disruption of historic environment

Cons

- Limited scope for larger challenges
- Community participation is often uneven and it is difficult to get disparate groups to participate equally

Temporary Shading

Refers to seasonal or removable structures such as awnings or canopies.

Pros

- Enhances thermal comfort
- Easily reversible and adjustable
- Flexibility, such solution can be adapted to different urban settings and needs

Cons

- Limited effectivness on cloudy days
- May conflict with cultural or aesthetic values, especially in areas where visual access to landmarks is prioritized

POLICY RECOMMENDATIONS

1. Establish a municipal task force dedicated to climate adaptation in heritage areas.
2. Launch funding programs for property owners to implement passive cooling solutions.
3. Pilot temporary shading projects in Old Town public spaces.
4. Foster public participation through neighborhood climate forums.

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