

COM 22 Heat in the city, definition study

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Context / Social problem

Climate change causes rising temperatures. In cities, the Urban Heat Island Effect contributes to a further increase. The overheated environment reduces the thermal comfort and the functioning of human beings. Especially older and infirm people suffer an increased risk of premature death. The 2003 heat wave has caused between 22.000 – 35.000 additional loss of life in Western Europe of which about 1.000 occurred in The Netherlands. Inhabitants of urban areas tend to compensate for the temperature increase by installing cheap air conditioning units, that enhance global warming. This effect may be strengthened when Dutch building practices continue to focus on low energy or CO₂ neutral buildings and houses. This includes a high degree of insulation and high air tightness of buildings to reduce the heat demand and improve thermal comfort in winter time. If not addressed properly, this will result in further health en thermal comfort problems during warm periods and more high energy cooling devices. A vicious heat spiral develops.

What do we know/not know?

Several factors in spatial design and building design are known to affect outdoor and indoor temperature in urban areas. The urban structure can be used to create breezeways; green areas are useful to diminish the Urban Heat Island Effect. At the level of individual buildings, shading, reflective materials, building mass, orientation, insulation, ventilation and window openings are relevant parameters. And last but not least: people tend to operate their shading and ventilation devices ineffectively. For 6.6 million existing houses and 80.000 new houses annually it has to become clear which measures, both on the spatial planning and building level, are effective to cope with heat waves at the lowest costs. Addressing spatial planning and building measures simultaneously is crucial, as they interact especially in urban areas.

What is being studied?

Important research questions relate to the seriousness of the heat problem in the Netherlands, the level of temperature rise, the level of acceptance of overheating, effectiveness of measures and methods for dissemination of knowledge to the stakeholders.

What are the results, and who are they for?

The first result is a set of preliminary rules of thumb for urban spatial planners and for building designers, indicating how to cope with heat waves cost effectively. The second result is a proposal for a scientific study to increase understanding of the urban heat mechanism and to validate the rules of thumb.

