

Responding to Urban Heat Island Effects

Action Points

- Mainstream adaptation actions towards urban heat island effects across all sector departments
- Maintain and extend the green infrastructure networks
- Create awareness and provide guidance on how to behave during periods of extreme heat
- Learn about best practices from your stakeholders and the most vulnerable
- Use light coloured or white paint for sealed surfaces, buildings and public transport vehicles

Recognising the issue

Built-up areas in cities create unique micro-climates as natural surfaces are replaced by artificial ones, affecting among others local air temperatures. This makes cities particularly vulnerable to the impact of heat waves. The phenomenon is called 'urban heat island effect' and describes the increased temperature of the urban air compared to its rural surroundings.

Analysing the drivers

Rapid urban growth and high population density coupled with sealed surfaces, and a lack of green areas in combination with projected climate-induced changes exacerbates the risk of urban heat islands in cities.

Built surfaces are composed of a high percentage of non-reflective construction materials. As a consequence, they tend to absorb a significant proportion of the incident radiation, which is released as heat. Additional causes of urban heat islands come from residual heat of, for example, air conditioning and refrigeration systems, industrial processes, motorized traffic and the obstruction of airflows.

Climate change essentially increases the number of hot days for both urban and rural situations to a similar extent. However, the number of additional hot nights is larger in cities. Urban areas store more heat during the day than greener rural areas and release this heat during the night.

Understanding the consequences

Climate projections show a substantial increase of periods of extreme heat in the region of South Asia. This, in turn, may reinforce the urban heat island effect in many urban agglomerations. Urban heat island effects go well beyond simple comfort issues for the population. Extreme heat waves endanger human health, and greatly affect everyday life, social activities, economic endeavours and ecological systems

A direct relationship has been established between peaks of urban heat island effects and heat-related illnesses and fatalities. Heatstrokes, heat exhaustion, and heat cramps are some of the main stress incidents, while a large number of diseases may become worse – particularly for the elderly, chronically sick, very young and socially isolated. This is mainly due to the lack of electricity and cooling systems – especially in many informal settlements – and lack of or damage to sanitation and water facilities.

Consequences include increasing stress on water resources from rising water demands and energy shocks as well as disruptions due to increased electricity demands caused by a growing use of air cooling systems.

High temperatures can put infrastructures at risk by, for example, deforming roads and rail tracks, which in turn impede on the supply of goods and the mobility of commuters into and out of the city.

AsianCitiesAdapt

Policy Pointer Series

- No. 1 Tackling Urban Landslides
- No. 2 Responding to Urban Heat Island Effects
- No. 3 Addressing Urban Flooding
- No. 4 Adapting to Sea-Level Rise

The Policy Pointers shall provide local governments with basic insights into selected climate change impacts and present first options of preventing and adapting to them.



Taking action

Local authorities should work towards mainstreaming measures against of urban heat island effects in urban development plans, land use plans, and policies. To this end it is recommended to take a cross-sectoral approach, involving sectors like housing, public health, private sector building industry, transportation, and energy to be able to address the overarching nature of the challenge.

Local authorities can initiate several actions to minimize a city's vulnerability to the effects of urban heat islands. First of all, local authorities should engage all relevant stakeholders in the planning and implementation of activities – also beyond the usual governance and management circles. It is also strongly recommended to engage those who are most vulnerable to heat waves and urban heat island effects in the planning and policy making processes, thereby identifying the most appropriate solutions and at the same time building capacity and increasing public awareness.

Early warning systems and educational campaigns to teach the general public to take precautionary actions during heat peaks are critical.

Green infrastructure including improved vegetation and green building investments for natural cooling can play a crucial role to prepare the city on a long-term basis. This could include increasing the vegetation cover through reforestation as well as the number of parks and implementing vertical gardening to maximize the multiple vegetation benefits to alleviate temperature rises.

Local authorities may consider other measures such as retrofitting public transport with ventilation as well as with white roofs to reduce solar heat gain; retrofitting buildings by adding light-coloured roofs that provide a cooling effect; and increasing surface reflectivity to reduce radiation absorption of urban surfaces by using light-coloured or white paint on the surface of construction materials.



For more information on the project and all other results see:

www.asian-cities-adapt.org

Project Coordinator



ICLEI European Secretariat
Germany
Phone: +49-761/368 920
www.iclei-europe.org
asian-cities-adapt@iclei.org

Project Partners

ICLEI South Asia Secretariat, India
Phone: +91-11/410 672 20, <http://southasia.iclei.org>

ICLEI Southeast Asia Secretariat, Philippines
Phone: +63-2/426 085 1, <http://seas.iclei.org>

PIK - Potsdam Institute for Climate Impact Research,
Germany
Phone: +49-331/288 2664, www.pik-potsdam.de



IIT Delhi - Indian Institute of Technology Delhi, India
Phone: +91-11/265 822 22, www.iitd.ac.in



AsianCitiesAdapt – Impacts of Climate Change in Target Cities in India and the Philippines and Local Adaptation Strategies (2010-2013) brings together science and policy in order to identify the impacts of climate change and develop local adaptation strategies in four cities each in India and the Philippines.

AsianCitiesAdapt is part of the International Climate Initiative. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety supports this initiative on the basis of a decision adopted by the German Bundestag.



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety