CONNECTIVE CITIES

DOCUMENTATION

Heat in the City

THE CONNECTIVE CITIES DEEP DIVE EVENT HEIDELBERG: 3–6 JUNE 2024

10 experts | from 5 municipalities | from 4 countries

Partners of Connective Cities

Deutscher Städtetag

ENGAGEMENT GLOBAL
Service für Entwicklungsinitiativen

with its SERVICE AGENCY COMMUNITIES IN ONE WORLD

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Commissioned by

Federal Ministry for Economic Cooperation and Development

Introduction

2023 was the warmest year since weather records began. Heat accumulated with great intensity in cities, leading to the formation of "heat islands". In the period from 1986 to 2005 German cities experienced twice as many days with temperatures of 30°C or more than in surrounding areas. Without wide-ranging countermeasures, this number could increase tenfold by 2100. Hot weather particularly affects vulnerable groups such as older people, children, the sick, homeless people and people who work outdoors.

> *"The heat in Heidelberg would be a dream for Aswan."*
>
> *Marva Soliman, Urban Development Fund, Egypt*

The extent to which cities are impacted by hot weather primarily depends on their location. For example, cities such as Aswan in Egypt are currently facing extreme challenges with temperatures of up to 50°. However, the comfort zone varies depending on where people live. In Helsinki, for instance, the comfort zone is 18°, compared to 25° in Athens.

Plenty of greenery provides shade in Heidelberg's Bahnstadt district.

In addition to this, a city's size, layout and the materials used in its buildings are also important factors. Green spaces, air corridors and green façades help reduce temperatures, while trees cast shadows. By contrast, large areas of tarmac, high levels of building density, and concrete buildings all contribute to the formation of heat islands.

There is no time to lose. Cities around the world need to take action now to find ways of reducing heat islands. At the same time, they must also protect the health of their populations and maintain a good quality of life in spite of rising temperatures. Heat islands are not just a question of temperature, but also of urban planning and municipal management, but for many municipalities the issue is too far down the agenda.

> *"Even in cooler regions, heat can be unbearable in urban areas. This can have serious consequences for the quality of life in cities and the health of their citizens. Adapting to climate change is no longer an academic question: it is now a political issue."*
>
> Professor Jürgen P. Kropp, Potsdam Institute for Climate Impact Research

The participants of the Deep Dive on the historic Old Bridge in Heidelberg

Background

From mid-2023 to mid-2025, six municipalities are joining forces for the Connective Cities "Heat in the City" Deep Dive. Together they are analysing the impacts of heatwaves and how heat islands form in their cities, and they are developing solutions tailored to local conditions. The cities involved are Lüdenscheid and Heidelberg (Germany), Aswan (Egypt), Nairobi and Mombasa (Kenya), Lviv (Ukraine), and Ben Guerir (Morocco).

At a meeting in Nairobi in March 2024 the delegates undertook detailed work to identify the challenges their cities face and started developing a strategy to manage them. By the end of 2024 they aim to implement pilot projects which can be scaled up at a later date. At a third in-person workshop in Heidelberg from 3 to 6 June 2024 they expanded on their pilot projects and drafted action plans for implementing the projects. The delegations from Ben Guerir and Mombasa were not able to attend the event.

"Heat in the City" Deep Dive

"Heat in the City" is the first Deep Dive learning project run by Connective Cities. Through the "Deep Dive" model, the Connective Cities platform allows municipalities to assign two or three staff spend two to three years as part of an international group focusing on a global issue which is relevant to cities. The Deep Dive model focuses on sharing expertise and developing a pilot project such as a municipal strategy, draft guidance or a local action plan.

Professor Jürgen P. Kropp at the Potsdam Institute for Climate Impact Research oversees and supports the Deep Dive in an academic context.

▶ Connective Cities: Deep Dive

CITY OF HEIDELBERG: ACTION TO MITIGATE HEAT

In its heat action plan, the City of Heidelberg aims to protect vulnerable groups from the negative effects of heat in the city, both on a short and long-term basis. The plan includes a wide range of **measures** (in German), from acute responses such as heat warnings to long-term strategies. These include:

- **Climate Compass:** a real-time online public record of temperatures in the city measured at 20 stations, issuing warnings where necessary.
- **Cool map:** a map on the city's website which raises awareness and provides information such as where to find publicly accessible cool spaces and free drinking water.
- **Climate modelling:** providing models of temperature, cool airflows and other parameters so that heating and cooling effects can be factored into planning for building projects.
- **Awareness-raising:** providing advice to the public on how to behave during hot weather.
- **Tree planting:** a plan to plant shady trees within the city and identify suitable sites for tree planting.

Heidelberg's plan is extremely concise, covering only three pages plus a list of planned activities with supporting indicators. Other cities' heat action plans extend to 200 pages or more.

In addition to this, Heidelberg set up a geoinformation tool in 2023 to provide analysis and modelling of the city's climate, with an extremely high resolution of 5 square metres. The tool provides hourly updates on air temperature, cold air production and ground level flow fields, amongst other data. The tool is based on a plugin for the QGIS geoinformation software package and also allows users to simulate the cooling effects of planting trees or a shadows cast by buildings. It is not available to the general public and is integrated into the Land of Baden-Württemberg climate analysis tool.

"The climate data we get from the geoinformation tool makes for persuasive arguments in discussions with investors and policymakers."

Dr Raino Winkler, City of Heidelberg

The Bahnstadt district of Heidelberg comprises 3,700 domestic and office units on a 116-hectare site which was formerly a railway marshalling yard and freight terminal. Areas of shadow and waterways were specified as criteria for the design of public spaces.

The HEAL project at the University of Heidelberg, which is studying heat adaptations for vulnerable groups in society, is complementing municipal work on heat islands. During periods of extreme heat the project helps at-risk groups find support and protection. For example, a route planning app uses near real-time sensor data to suggest the coolest route for pedestrians, displaying the routes on analogue and interactive online maps.

The Deep Dive projects

During the workshop the municipalities involved in the Deep Dive expanded on their projects and developed implementation action plans. The delegates identified a major challenge to their future work on urban heat islands in the fact that the pilot projects affect many different administrative departments, including environment, health, urban planning, built environment and water. As such, the delegates need to take an integrated approach and encourage these departments to participate. On top of this, most administrations are facing financial and time shortages. Other political priorities often get in the way of working on issues around heat, and many areas lack expertise on areas such as greening roofs and façades.

"No-one should hold a monopoly on knowledge."

Grace Ojiayo, Nairobi City County

Principles for Deep Dive action plans

When developing their action plans, delegates sought to make their projects as efficient, impactful and sustainable as possible. In doing so, they were guided by principles such as:

- **Start small and build activities step by step.**
- **Learn from the experiences of other municipalities.**
- **Don't go it alone: bring on board fellow campaigners from politics, administration and civil society.**
- **Gain political backing.**
- **Grab low-hanging fruit for quick wins in areas such as marketing.**

On a public square in Aswan, roofs provide shade over benches.

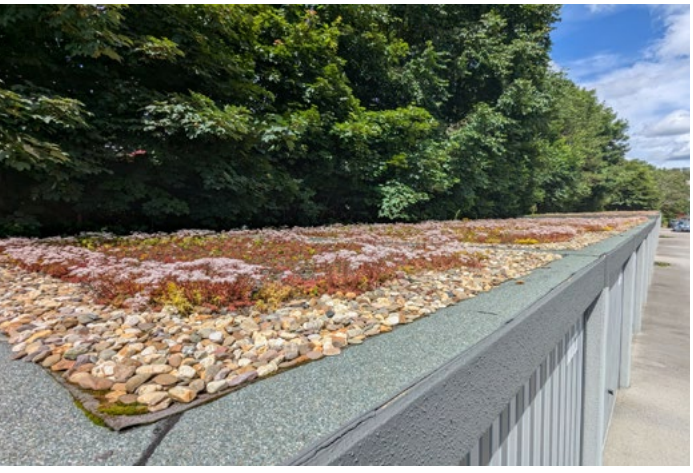
1. ASWAN

The City of Aswan is planning to develop a draft municipal heat action plan and prepare a list of measures to implement the plan. The city has set up a task force to this end. Initially, the plan is to be developed in detail for an urban zone and supported by priority activities. As a basis for this, the city is developing a heat map using sources such as publicly-available weather data. Following this, experience from limited local pilots is to be carried over into the development of a plan for the whole urban area.
A major priority for the city administration is ensuring that the final heat action plan integrates coherently into the city's development plan, which has already been approved. Raising awareness and public involvement are also of great importance.

Mobile benches in Heidelberg offer a good opportunity for a short break in the heat.

2. HEIDELBERG

The City of Heidelberg is planning to create a climatological database for all public spaces and outdoor areas. The city is also planning to develop up to three examples of best practice for reducing heat in public spaces. These are to be presented to the city council as a basis for future urban planning activity. The examples might include small parks known as "pocket parks".
The examples of best practice are intended to demonstrate easily visible outcomes, as these are vital to convincing policymakers, administrators and the public of the importance of measures to reduce heat. In addition to this, the examples are intended to provide city administrators, private households and businesses with a model for designing gardens and green spaces. In the longer term, the experiences from the project will inform city guidelines for planning green spaces.



In Lüdenscheid, green garage roofs help combat heat islands

3. LÜDENSCHEID

Lüdenscheid is also planning to develop a heat action plan for the city, taking a lead from other municipalities with more experience in the area, such as Heidelberg and the Jordanian capital Amman. The plan is to include specific delivery mechanisms and information on the relevant responsibilities, timeframes and costs for implementation. The city intends to set up a small working group for the pilot project, bringing together the administrative departments most relevant to the project. Resources are limited for all city stakeholders in terms of implementing the project, so the focus is developing the heat action plan in a highly efficient way, such as by drawing on the experiences of other cities. Once complete, the measures included in the plan are to be implemented, initially with a focus on activities which are easily achieved.

At the annual Maisternia Mista, the people of Lviv get involved in creating a more sustainable city.

4. LVIV

Despite the prevailing war conditions, which are tying up financial and human resources to a huge extent, the city plans to push forward its efforts to adapt to climate change. These include developing a city dashboard and climate map, meteorological maps and a climate model for a small district as part of the Deep Dive. This data is intended to provide a basis for policy decisions and to raise awareness among the public.
The city's plans also include drawing up recommendations on how to integrate the topic of heat into urban planning and the region's climate adaptation strategy. The pilot project includes at least one DIY pocket park to help adapt to increasing heat in the city. The park is to be designed and created on city-owned land through a bottom-up approach in collaboration with civil society.
In addition to this, the city plans to consider using timber for building a new rehab centre, as wooden buildings are not only more environmentally friendly to build but also store heat more effectively in summer.

Air quality measurement devices are being installed at Kenyatta University Primary School in Nairobi.

5. NAIROBI

Nairobi City County is measuring temperatures at several public schools. This data is to be used to identify schools and outdoor spaces where shady fruit trees can be planted to help lower temperatures. In addition to this, the climate data is expected to indicate broad trends in how heat develops in the city.
With teachers and pupils closely involved in the pilot project, children and young people are to take responsibility for tending the plants, in turn raising awareness about climate change and adaptation. Schools are ideal locations for the project as they have the capacity to carry it out; furthermore, the saplings are protected by fences. The pilot planting is expected to provide an example and encouragement to create more green spaces in schools and other public places.

Topic in focus: weather and climate data

When working on heat islands, it is very helpful to know which areas in a city are particularly susceptible and which mechanisms can cause cooling. Robust data also provides a good basis when presenting arguments to investors and urban planners. Visualising specific sites and activities is also a compelling way of making a case.

While most German municipalities have access to high-resolution weather and climate data, it is common for municipalities in the global south to lack data of this kind. Either the data is not available or it is very expensive, and while freely available data is available in the Global South, the resolution is usually limited. Nevertheless, this data is often adequate to provide a basis for developing measures to counteract heat islands. Municipalities can draw upon crowdsourced data. One example of this is "Weather with Netatmo", one of the world's largest networks of weather stations, meteorologists and weather institutions. It provides data and allows municipalities to benefit from the Netatmo Community which is spread across a very large geographic area.

That said, having access to data is one thing; being able to interpret it is another. Municipalities should always bear this in mind.

Interim conclusions and next steps

The Deep Dive workshop in Heidelberg showed how municipalities can learn from one another, even where they come from widely differing contexts. According to one delegate, just having the opportunity to engage with the challenges facing other municipal stakeholders cast new light on her own work.

For those involved, the value of the workshop was not limited to the technical work. Many delegates said they would make greater use of the tightly structured methods and design thinking approach behind Deep Dive in their own day-to-day work.

> *"It is not only about the topic, it is also about the process"*
>
> Marva Soliman, Urban Development Fund, Egypt

Dr Raino Winkler from the City of Heidelberg guided the participants through the 'Bahnstadt' neighbourhood

The City of Heidelberg announced it would share the findings of its climate model with other Deep Dive municipalities. It also offered to put them in touch with the business which developed the model and the University of Heidelberg with a view to advice on publicly available weather data.

The next in-person Deep Dive workshop will take place in Aswan from 28 to 30 January 2025. The Deep Dive municipalities aim to have implemented their pilot projects by then so they can report on and discuss them in Aswan.

Key takeaways

1. **Given that universities often have access to more detailed climate and weather data, it is worth involving them more fully in municipal work and initiating academic collaborations in this area. This could involve students working on heat strategies and climate models for municipalities as part of their dissertations and theses.**
2. **That said, a good heat action plan does not necessarily need complex climate models or large volumes of climate data. Much is already known, even if assumptions cannot be supported with data.**
3. **The need to do something about heat islands must be communicated to policymakers, administrators and the public through a strong narrative that is appropriate to each group, as adapting to climate change is closely linked to the well-being of the population.**
4. **Reducing heat islands requires an integrated approach, convincing other political and administrative departments of the need to take action against heat.**
5. **Urban planning should always take heat islands into account, even if other objectives are the priority.**
6. **Civil society and the public should always be involved in action against heat islands, such as by participating in citizen science. Decision-makers should seek to ensure that many shoulders bear the workload by bringing on board other departments and civil society.**

IMPRINT

Published by
Connective Cities
International Community of Practice for
Sustainable Urban Development
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Connective Cities is a joint venture between
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Engagement Global gGmbH and its
Service Agency Communities in One World
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Picture credits
Page 1: Heidelberg Marketing GmbH, page 2 und 3: Philipp Rothe,
Seite 5: UDF / Aswan Governorate, Philipp Rothe, Lisa Flender,
page 6: City Institut Lviv, Nairobi City County, page 7: Philipp Rothe

Design
blickpunkt x – Büro für Kommunikation und Design

Layout
Rendel Freude

July 2024

Commissioned by
German Federal Ministry for Economic Cooperation
and Development (BMZ)

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Connective Cities

Connective Cities promotes global sharing of expertise, and supports mutual learning and collegial support between German and international urban practitioners and the development of joint projects. Connective Cities is a collaborative project run jointly by the Association of German Cities, GIZ and Engagement Global and its Service Agency Communities in One World, with funding from the Federal Ministry for Economic Cooperation and Development (BMZ).

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