

Public Power – Solar Shading Prototype



Increase in the Number of Extreme Heat Days in Cities

The growing heat stress caused by climate change is turning large parts of urban areas into a threat to our health. Urban overheating is a global phenomenon affecting pedestrians in cities worldwide, urgently requiring strategies to adapt to changing climatic conditions. However, the planting of trees to provide natural shade is often not an option. Vulnerable groups, in particular, are at risk from thermal stress, making public spaces difficult for them to access. The NEB Action Public Power aims to reduce temperatures in urban areas through shading measures, thereby preventing social exclusion and restoring the quality of public spaces. These shading elements will also integrate solar panels for energy generation.

NEB Action: Public Power

Key words

thermal heat stress • shading architecture • healthy spaces • climate adaptation • universal accessibility • lightweight structure • bamboo • wood • solar energy • heat islands • environmental quality • outdoor classroom

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Climate-Friendly Designs of Public Spaces in Neuperlach

In Neuperlach, we examine heat islands in public spaces and identify areas where shading measures make sense in terms of social usability, eco-

logical integration, and economic value. Through participatory formats, we work with the community to develop demonstrators that showcase how climate-con-

scious design can lead to social, ecological, and economic enhancement, foster identity, and create an inclusive, liveable, beautiful and sustainable city.



The UTCI temperature map presents a rich, spatially detailed overview of the thermal conditions across Neuperlach during a typical heat wave in summer. It is readily apparent that paved street surfaces heat up to 30–40°C during the day, while at the same time, shaded, unpaved ground maintains a 20°C temperature, making it about 10–20°C cooler. Especially on days with direct sunlight, shading is particularly effective in protecting against extreme heat.

The Potential of Combining Shading and Photovoltaics (PV) in Public Spaces

Many shading projects already exist, especially in cities in hotter climate zones, but their impact on reducing urban heat stress becomes significant only when they are implemented on a certain scale. However, such projects are

expensive to scale up significantly, and cities often lack the necessary funding to support them. Integrating photovoltaic (PV) systems into shading structures offers a practical solution. By generating renewable energy in public spaces, these

installations can help offset costs, making large-scale shading projects more financially viable while simultaneously contributing to sustainable energy transition at a municipal level.



Why is Extreme Heat Dangerous?

As mammals, humans are homeothermic, meaning that we must maintain our core body temperature at around 37°C. A deviation of just a few degrees can pose serious health risks or even be life-threatening. We regulate our energy use through physical processes and behavioural changes. This evolutionary adaptation allows us to survive and function in environments that differ significantly from our ideal body temperature.

Our bodies constantly exchange heat with the surrounding environment, influenced by factors such as weather conditions, the clothes we wear, and how active we are (e.g., whether we are exercising or relaxing in a hammock). The interaction of these processes determines whether the body gains or loses heat and remains in balance. Generally, the higher the ambient temperature, the harder it is for the body to release heat.

NEB-Demonstrator

Solar Power Shading Structure

The prototype for the “NEBourhoods Shading Architecture” was developed in collaboration with the students and teachers of the Campus di Monaco Montessori school. Since the greenspaces of the school are situated above the roof of the underground parking garage of the adjacent shopping centre, no shade trees can be planted there, making the space virtually unusable for the students during the height of summer.

The shading architecture created a comfortable shaded outdoor area for recreation, which also fulfilled the wish students had expressed for an “outdoor classroom”. Lessons held here have access to the electricity generated by the integrated photovoltaic modules which everyone can use.

The shading structure is an element of the school and neighbourhood garden, “Hortus di Monaco”, which is a project of the Growing a Tasty Neuperlach NEB Action Growing a Tasty Neuperlach in

which the school community and the adjoining neighbourhood participated. The development of the roof therefore helps strengthen a sense of belonging and forms a bridge between the school’s identity and that of the surrounding neighbourhood by activating an unused public space and the local populace. While the overall Hortus garden fosters creation and integrates social values, Public Power only acts as an umbrella, creating that necessary space.

All project stages were communicated to the public and neighbourhood through different inclusive formats, and decisions were consolidated by drawing on public feedback throughout all stages. Public Power doesn’t empower and sustain grass-roots initiatives beyond project implementation, as the shading structure itself is owned and operated by a private stakeholder (Campus di Monaco). The “base” of the structure, the benches,

is made of wood, while the NEBourhoods shading architecture construction itself is made of bamboo, which belongs to the grass family. In favourable conditions, bamboo grows between 30 and 80 centimetres a day, so this fast-growing natural product is very sustainable and stores CO2 to boot. Bamboo is both robust and flexible, which makes the curved shape of the shading architecture possible.

“It is wonderful to see the New European Bauhaus here on the local level – and the many, many young people with splendid ideas. Something is growing here from the bottom up that brings with it not only beauty, but also functionality. But also very importantly, sustainability and more social togetherness. It couldn’t be better.”

Ursula von der Leyen, President of the European Commission



Infrared images demonstrate the positive effects of shading by illustrating surface temperatures (radiant temperatures) of different materials.





A simple construction lay at the heart of the design process. It makes it possible to produce and assemble the structure through simple means, even without expensive, complicated or heavy tools. This is intended to create a higher level of identification through participation. The structure can be set up on any type of ground at any location, and it can also be readily deconstructed and rebuilt elsewhere.

Stakeholders

District Committees (Politicians)

- Engage at the project start.
- Facilitates smoother planning with broader acceptance.
- Politicians benefit from voter approval and improved public image.
- Requires more effort initially to manage transparency and engagement.
- Opposition risks project failure or poor acceptance.

Property Owners / Administration

- Include during site selection and analysis of feasible locations.
- Supports faster planning with clarity regarding costs, benefits, comfort, and image impact.
- May require iterations to address additional needs, potentially increasing timelines.
- Resistance could hinder project success or public acceptance.

City Utilities

- Involve at the project start or once the location is confirmed.
- Ensure integration of power feed-in systems.
- Potential for revenue and enhanced public image.
- Risks include cost increases or inability to integrate power systems.

Planners/Designers

- Engage during planning when specific expertise is required.
- Provide necessary expertise for high-quality outcomes.
- Concerns regarding costs, revenue, and public image.
- Selecting the wrong professionals or firms risks poor design, quality issues, or project delays.

Residents

- Since they are directly impacted, involve them in the process once concepts and location are determined to ensure greater acceptance and potentially faster planning.
- Proceed with a high degree of transparency, which requires initial effort but may lower resistance in the long term; resistance could lead to project failure or poor post-implementation acceptance

Manufacturers

- Include during planning to ensure expertise is applied early.
- Leads to better quality outcomes.
- Balances costs, revenue, and image considerations.
- Risks include increased costs or errors in execution leading to delays or diminished project quality.

Neighbourhood Management

- Essential for reaching stakeholders.

Why Has it Hardly Been Implemented so far?

The limited implementation of such projects can be attributed to several factors. A key challenge is the lack of existing examples to follow; it is always easier to implement a concept when proven models already exist. In addition, general awareness of the importance of shading and renewable energy integration in urban spaces is lacking.

Building in public spaces presents unique difficulties compared to private settings. Public projects typically involve a greater number of stakeholders, including decision-makers and various

municipal authorities, which complicates the process. Stricter regulations and more stringent requirements, such as ensuring protection against vandalism, further add to the complexity. Ambiguities surrounding ownership and decision-making authority – questions like “Who owns what?” or “Who has the final say?” – also create significant barriers. Lastly, public space projects often face longer implementation timelines, making rapid deployment difficult. Ultimately, it all comes down to the perception of high costs.

What Is Needed to Overcome these Obstacles?

Increasing awareness of the importance of shading and renewable energy integration in public spaces is essential to address these challenges. Decision-makers need to approach such projects as an investment, recognising the long-term (sustainable) social, environmental and economic benefits they offer. Cities must also take greater responsibility for driving these initiatives by providing leadership and resources to ensure their successful implementation. In this context, municipal contributions – such as funding, expertise, or streamlined processes – could play a crucial role in overcoming barriers and accelerating the realisation of such measures.





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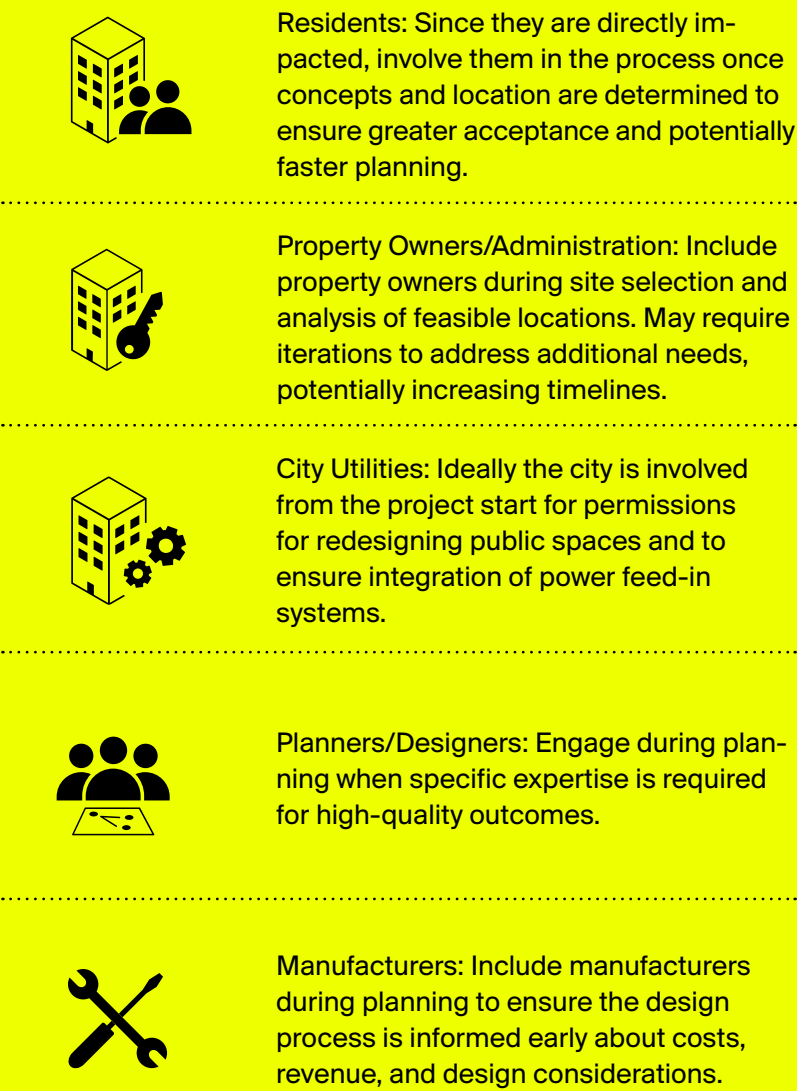
Pointers to Jump-Start Replication

The Action was created to examine Neuperlach for heat islands in public spaces and identify areas that make sense for shading measures in terms of their social usability, ecological integration, and sustainable value. This includes not only shading but also the secondary potential analysis of combination solutions with photovoltaic systems to expand renewable energy production and infrastructure beyond the adaptation of the building stock to the public realm as a mediator for the energy transformation.

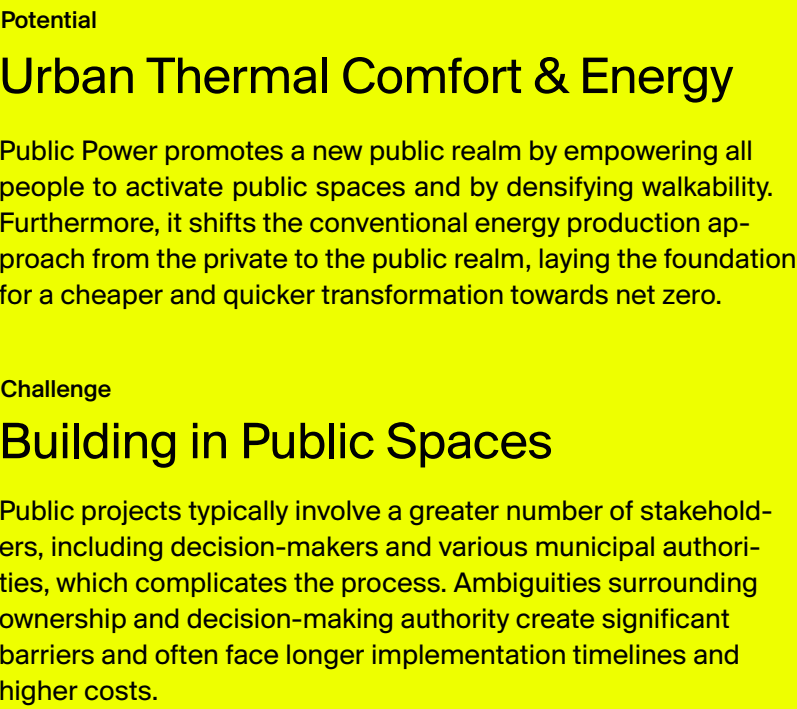
Key Project Steps



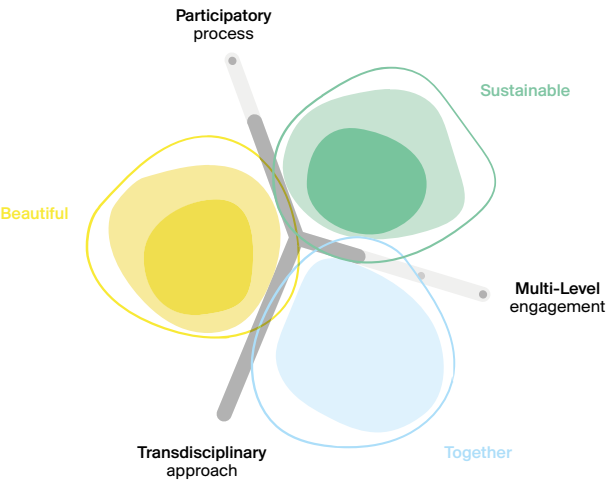
Key Stakeholders



Evaluation of Replicability



NEB Evaluation Public Power



“Vast areas of the public realm are becoming a danger to our thermal health, as the urban fabric we designed decades ago cannot mitigate the increase in heat exposure brought on by climate change. This poses a health risk particularly to vulnerable groups (young children, senior citizens and people with pre-existing conditions). Public Power implements socially, ecologically and sustainably valuable shading to reduce temperatures in urban spaces in order to restore quality of life and prevent social exclusion.”
Sebastian Clark Koth

Related Links



Shade and Energy in Public Space

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