

sa_partners

Rules for a good urban climate



Report, graphics, illustrations | 2020 ©

sa_partners

Dufourstrasse 95
8008 Zürich
www.sapartners.ch

«The elements of modern urban design are the sun, public space, trees, steel and concrete, in that order and hierarchy.»

Le Corbusier, International Congress
of Modern Architecture, Athens, 1933

sa_partners



Table of contents

5 reasons why it is worthwhile	6
Urban climate is a cross-sectional task	8
12 rules for a good urban climate	10
34 tips for effective implementation	14
What does it mean for planning?	38

5 reasons why it is worthwhile.

There are many reasons to promote a good urban climate. We have summarised the five most important ones for you:

- 1 Economic benefits**
Green technologies and smart solutions will provide important impulses for a competitive economy. Investing in a good climate means investing in a healthy economy.

2

Robustness and resilience

The Covid pandemic made us aware of the vulnerability of cities and the great need of people to meet and be together. A robust city is characterised by short distances, lively neighbourhoods and attractive public spaces.

3

Fitness and adaptability

Cities are increasingly exposed to extreme events such as heat, dryness, air pollution and heavy rainfall. Measures to promote a good urban climate compensate the consequences of these phenomena and lead to a significantly higher level of well-being for the population.

4

Neo-ecology and changing values

Climate change has established itself in the consciousness of the society and is leading to a reorientation of the values, everyday culture, politics and economy. Environmental awareness is becoming a social movement, and the "green city" a decisive factor for success.

5

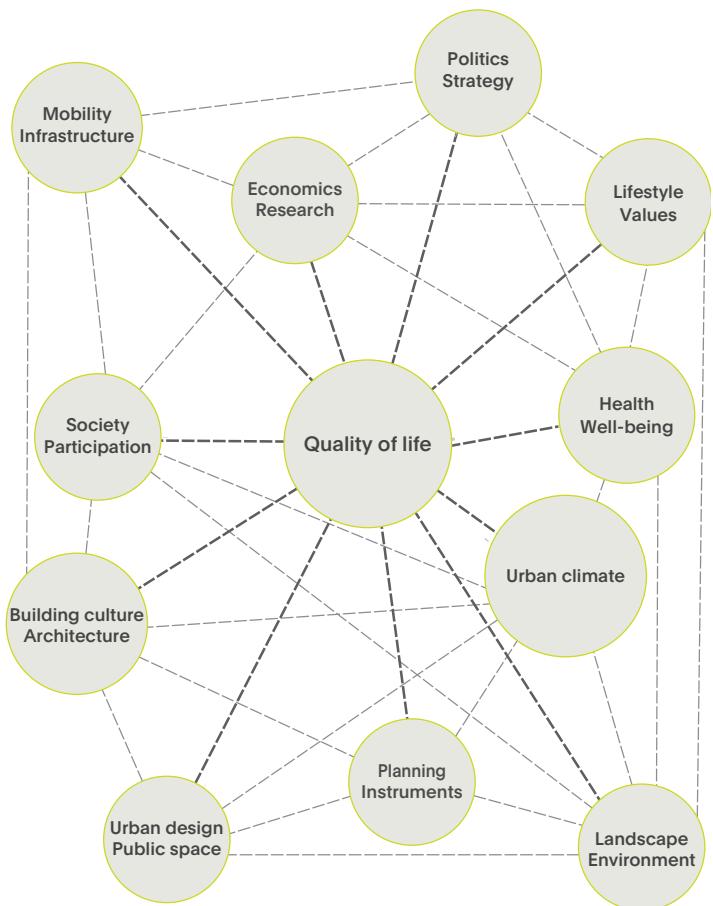
The liveable city

Finally, the question remains: In which city do we want to live? A good urban climate creates an important economic basis and contributes significantly to a high quality of life and to the location's attractiveness.

Urban climate is a cross- sectional task

There are many synergies between the urban climate and central areas of urban and community development. Urban climate is a cross-sectional task.

Urban climate as a cross-sectional task is an integral part of future-oriented spatial planning and value-added urban development. A good urban climate contributes to a high quality of life and is now considered as an important location factor.



There are many interrelations and synergies between urban climate and central issues of urban and municipal development. These should be enhanced. The urban climate is a key factor in ensuring a high quality of life in a city.

12 rules for a good urban climate.

With twelve simple rules, you can contribute to a good urban climate and at the same time create a significantly higher livability.

1 Avoid soil sealing

Impermeable pavements highly contribute to intensify urban heat islands in settlement areas. When designing new squares and infrastructure facilities, priority should therefore be given to permeable materials. In particular, desealing inner courtyards and parking spaces offers a great potential for improvement.

2

Promote greenery

Encourage green facades and roofs, e.g. in large industrial and commercial areas. Ensure the creation of new green spaces in neighbourhoods. In this way you create valuable cool spots and places for encounter.

3

Encourage natural green spaces

Design green spaces which are close to nature. This will increase biodiversity and species diversity.

4

Ensure an adequate ventilation

Cold air corridors bring fresh air and provide necessary cooling, especially during hot summers. Therefore secure space for fresh air corridors.

5

Arrange buildings correctly

By optimally aligning the buildings, you create space for attractive green areas and you provide the possibility to use natural ventilation for cooling.

6

Prioritize shading

Trees with large crowns provide shade and help to cool the space noticeably. Shaded paths leading to the cool spots contribute significantly to our daily well-being. Do support trees in the settlement area.

7

Optimise the choice of materials

By choosing the right materials for facades or pavements, you can reduce heat rejection and counteract the local effects induced by buildings.

8

Develop networks of open spaces

From a certain size, green spaces have a long-distance effect. It is therefore important to ensure that these spaces are of sufficient size and well connected to each other. It is particularly interesting to connect green and public spaces in settlement areas with cool spots outside the built area.

9

Benefit from water

Water contributes in many ways to a pleasant urban climate. For example, use the cooling effect of water when designing squares. Or relieve the sewage system during heavy rainfall by collecting rainwater.

10

Enable smart solutions

Air pollution from traffic, industry and commerce as well as from heat generation plants affect the urban climate. Smart solutions reduce these emissions. Create a good environment for innovations and modern technologies. In doing so, you also contribute to a healthy economy.

11

Collaborate with the business community

By investing in green technologies, you invest in a healthy future and economy. Work together with the economy and use the synergies, e.g. in the development of climate-adapted infrastructure facilities or industrial and business parks.

12

Encourage participation

Even small measures have an impact. Encourage the population to get involved and create opportunities for participation. This will also increase the population's identification with the environment.

34 tips for effective implementation.

The implementation of effective measures is crucial for a good urban climate. There are many possibilities, as these 34 tips show.

Use the 34 tips as food for thought for developing your own, site-specific measures. The tips are divided into six key areas of action: buildings, open space, greening, sealing, emissions and participation.

Buildings

Open space

Greening

Sealing

Emissions

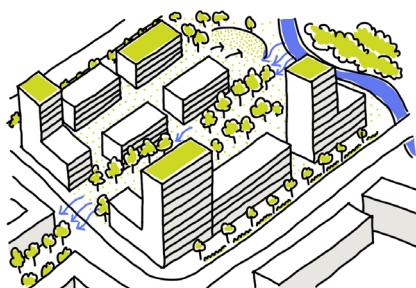
Participation

Clever planning is half the battle.

Buildings influence the urban climate through waste heat and emissions. Massive structures impede air circulation. Climate-adapted urban development has a large impact with little effort.

What you can do.

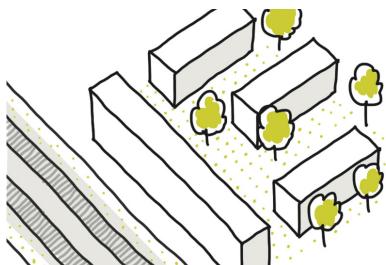
01 Avoid flow obstructions within the settlement area such as buildings blocks in the airflow.



Buildings should be arranged parallel to the flow direction of cold air streams.

A loose setting of the buildings encourages air circulation and the functional connection between indoor and outdoor green spaces.

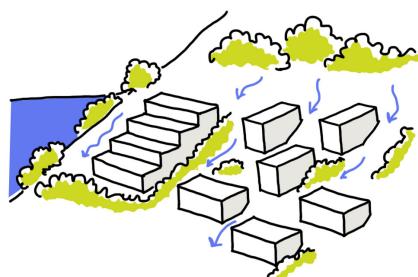
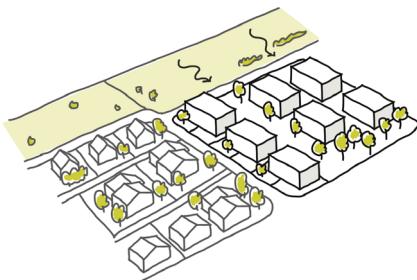
02 Ensure a pleasant microclimate through a specific arrangement of the buildings.



Buildings which act as a barrier to hot spots prevent the concentration of heat within a neighbourhood.

Well-arranged buildings shade paths and squares within the settlement.

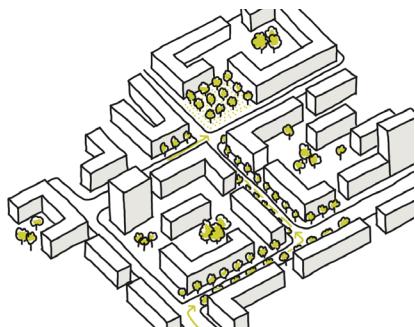
03 Design permeable settlement edges.



Settlement edges must be designed in such a way that cold air can flow from the surrounding countryside into the neighborhoods.

Loose development on the slopes promotes the flow of cold air down the slopes. Terraced houses should be arranged parallel to the direction of cold air flows.

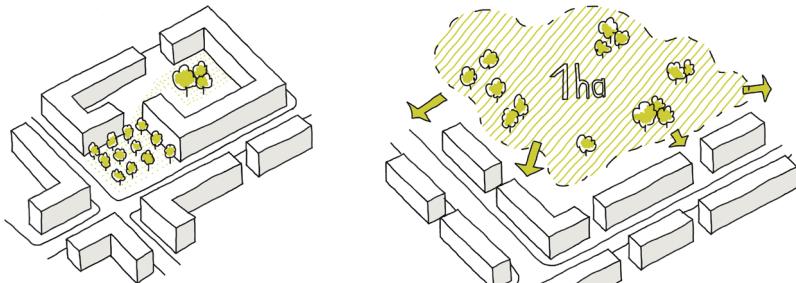
04 Use shade for a good urban climate.



A network of short and shaded paths significantly contributes to the well-being of the population, especially the elderly.

Trees with large crowns produce dense shading and - if correctly placed - efficient passive room cooling.

05 Create cool spots, reduce hot spots.

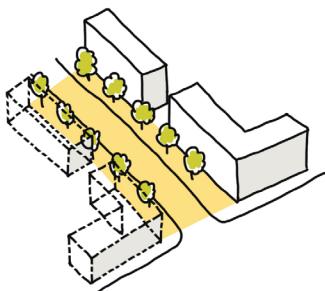


Small cool spots (e.g. pocket parks) provide the population with important places of stay and relaxation. A temperature control system with shaded paths leading to the cool spots can be very beneficial.

Green areas of one hectare or more achieve a long-distance cooling effect. For this reason, large green spaces should be created in settlement areas.

Large, sealed surfaces, on the other hand, should be avoided wherever possible in order to ensure a high quality of stay. They act as hot spots and are a burden to the urban climate.

06 Secure trees in the street space with a street planning from facade to facade.



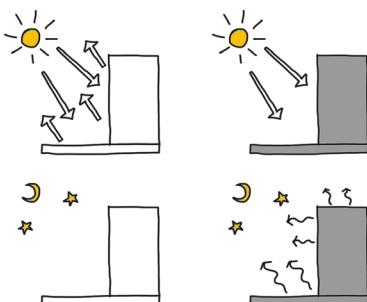
Especially in the case of special land use plans, there is a good opportunity to take the whole street space into account to plant or secure trees in the streetscape.

07 Use industrial and commercial sites to implement climate-protecting measures.



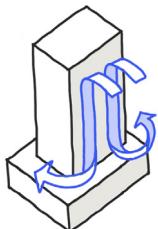
Industrial and commercial areas are climatic hot spots. As they are very large, they are particularly suitable for climate adaptation measures.

08 Reduce the residual heat from surfaces using suitable building materials.



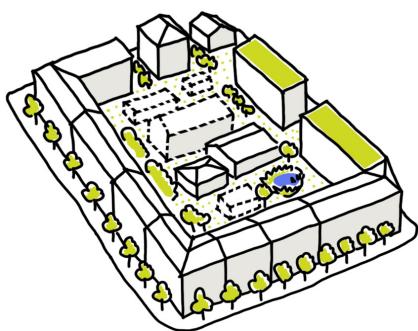
Bright surfaces reflect the sunrays more strongly and remain cool at night. Dark surfaces, on the other hand, absorb the energy and release it as heat radiation during the night.

09 Place high-rise buildings well to make use of fall winds.

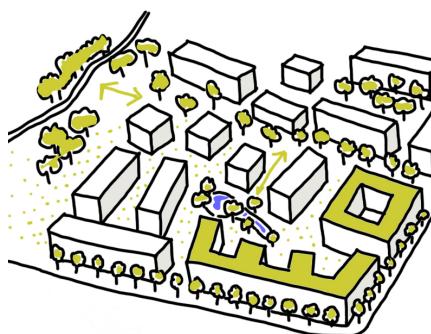


With the correct placement of buildings, (cold) winds can, depending on the situation, be used to regulate the urban climate.

10 Adapt existing settlement areas to the climate through dismantling, unsealing and greening.



Waste heat can be reduced by converting unused buildings as well as unsealing and greening the inner courtyard.



Permeable surfaces and interconnected green areas ensure pleasant temperatures through the evaporation process.

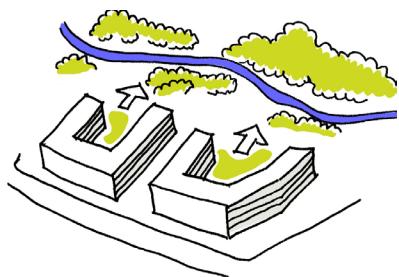
**Open spaces bring
fresh air.**

**Connected open
spaces serve as air cor-
ridors. They bring fresh
air and cool down the
surroundings.**

What you can do.

11

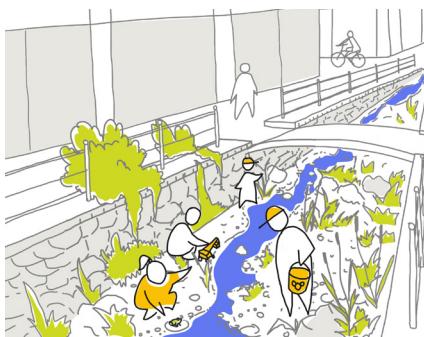
Preserve and promote connected open spaces.



The interaction between the surrounding open spaces and the public space inside the settlement area has to be optimised. This will create extensive green spaces with a long-distance climate-enhancing effect.

12

Promote water in open spaces for the well-being of the population and make it an experience.



The restoration of streams, which were previously channelled and underground, improves the water regime and leads to new experiences.

Creeks in settlement areas increase the retention capacity during heavy rainfalls.

13

Secure strategic areas for fresh air corridors.

Interconnected green spaces form corridors of biodiversity and provide fresh air.

Green spaces should be prioritised according to size, efficiency and surrounding environment.

14

Design industrial and commercial areas as cool spots.

In industrial and commercial areas, large open spaces can be created for a good urban climate by setting the buildings in a way which takes climatic requirements into account.

15

Keep the settlement area permeable for cold air currents through connected green spaces.

The integration of the surrounding landscape, in the form of "green fingers" into settlement areas, intensifies the exchange of fresh air in residential areas.

Greenery compensates.

Vegetation areas counteract the local climatic effects of building development. Their size and natural design have a decisive impact.

What you can do.

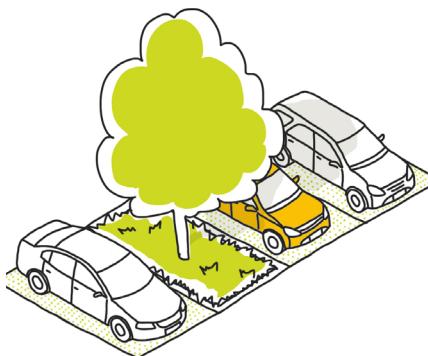
16 Create additional green spaces through climate-adapted planning.



By reducing the distance to the border and to the road for trees and shrubs, space is created for trees with large crowns.

The greening of existing inner courtyards ensures pleasant temperatures within the settlement.

17 Wherever possible, use trees with large crowns to shade building facades, streets and squares.

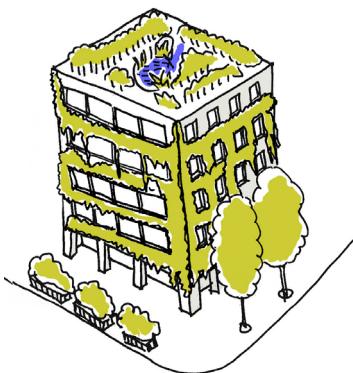


Trees with large crowns provide a pleasant climate both indoors and outdoors and make a significant contribution to the quality of stay.

Trees in car parks reduce the heating of the cars.

18

Promote vertical and horizontal greening of buildings.



Green facades and roofs improve the local air quality.

By granting a bonus for the greening of facades and roofs, additional incentives are created for the greening of buildings.

19

Make public spaces which are green and close to nature.

The greening of public spaces has a cooling effect and is decisive for the quality of stay.

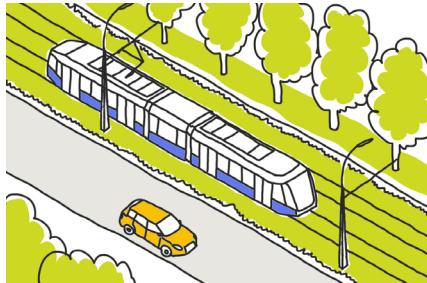
Natural landscaping makes an important contribution to the promotion of biodiversity.

20

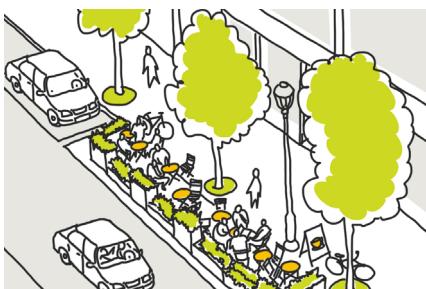
Use industrial and commercial areas for extensive greening.

Areas designed close to nature with native plant species provide an important source of food and additional habitat for the local fauna. They can make a significant contribution to biodiversity.

21 Use greening options when planning the transport infrastructure.



Elements of transport infrastructure, such as stops or tram lines, offer potential for greening.



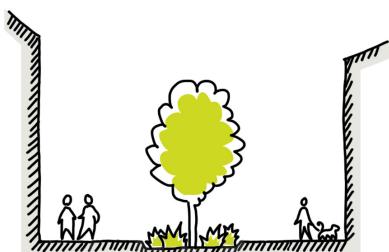
The conversion of parking spaces into green parklets contributes to the revitalisation of public space.

Unsealed surfaces ensure pleasant temperatures.

Sealed soils contribute significantly to the heat load of cities. Conversely, unsealed and green areas balance the temperature.

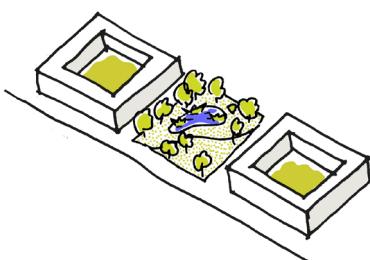
What you can do.

22 Avoid hot spots by reducing sealed surfaces.



When redesigning squares, car parks and driveways, surfaces that can drain water must be used. They have a cooling effect through the evaporation of water. At the same time they store less heat than sealed surfaces.

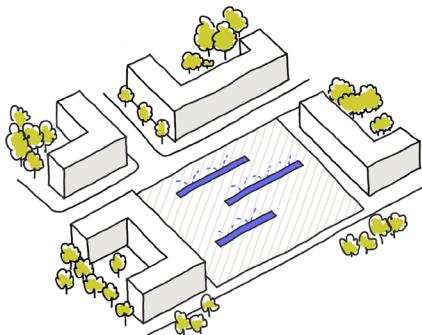
23 Preserve unsealed areas and plant vegetation where possible.



Dense vegetation, but also water elements on permeable pavements, enhance the cooling of the space and act climatically balancing.

Due to permeable pavements, infiltration increases during heavy rainfall, thus reducing surface runoff.

24 Concentrate sealed surfaces and add cooling elements.



Sealed surfaces should be concentrated in a few predetermined locations.

Water elements on sealed surfaces have a cooling effect and contribute to a higher quality of stay.

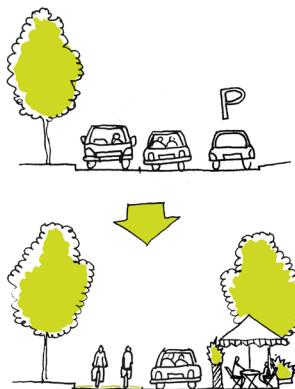
25 In dense areas, soil permeability can be increased through the dismantling of certain buildings, the use of coverings which enable water infiltration and the creation of urban wetlands.

Smart solutions reduce emissions.

Air pollution from traffic, industry, commerce and heat generation plants affect the urban climate.

What you can do.

26 Reduce traffic-related air pollution by promoting smart mobility.



The promotion of sustainable mobility contributes significantly to a good urban climate and creates space for new green spaces.

27 Be open to urban innovation and the opportunities of digitalisation to promote small-scale mixing and a city of short distances.

28 Reduce air pollution emissions from heating and hot water production as well as room cooling through a climate-sensitive urban development.

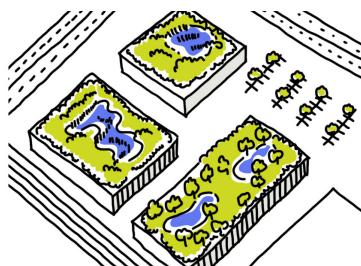
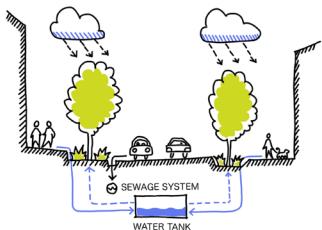
29

Create pleasant room temperatures by means of adapted building envelopes.

Green facades, climate protection facades and the choice of suitable materials have a significant influence on indoor temperatures.

30

Use rainwater to relieve sewage systems and streams during heavy rainfall.



Rainwater collected in retention tanks can be used to irrigate plantings.

Retention roofs on commercial and industrial buildings can be used for rainwater management and room cooling.



In residential buildings, use rainwater for irrigation of greenery and as service water.

One person can make the difference.

Big changes begin on a small scale. There are many ways to contribute to a good urban climate. New forms of participation represent an opportunity.

What you can do.

31

Create platforms for collaboration and participation.



(Digital) platforms can be used to raise awareness and encourage implementation among key stakeholders.

Participation opportunities increase the willingness to implement measures.

32

Raise the awareness of all involved parties about the various possibilities for action.



Make use of synergies between different actors, such as the inhabitants or the economy.

Strengthen local production through urban farming.

33

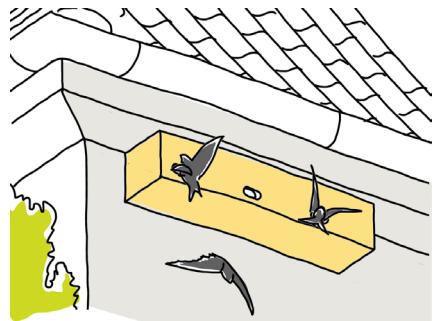
Strengthen cooperation to promote a favourable urban climate.

34

Encourage small-scale measures that have a positive effect on the urban climate.

Greenery in the private sector contributes to a good urban climate.

Native plants in private gardens and on balconies help to strengthen biodiversity.



What does it mean for planning?

The greatest possible impact is achieved if the topic of urban climate is already integrated into higher-level plans on a strategic conceptual level and is further developed in the subsequent planning stages.

The most important overarching planning instruments include spatial development concepts and strategies. For future-oriented planning, the thematic of urban climate has to be an integral part of these plans. Specific instruments, such as municipal land use

plans and special land use plans, allow more design freedom. For the implementation of a good urban climate, the following fields of action are in the focus of planning:

Analysis

Conception

**Framework
conditions**

Measures

Analysis

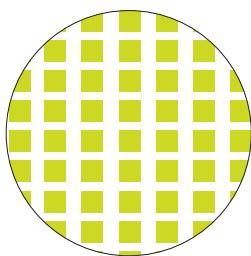
Urban climate is an integral part of an overall spatial development concept. Climate maps are part of the analysis.

Climate analysis is becoming an increasingly important tool as the basis for more detailed conception. One of the central analysis maps for spatial development is the climate indication map. The planning reference maps for the night situation show, among others, the overheating in settlement areas, the bioclimatic importance of green and open spaces, and the cold air balance. The heat load in the settlement area and the quality of green and open spaces are of particular importance for assessing the daytime situation. Climate analysis provides important information for the development of neighbourhoods and public spaces that are adapted to climate change.

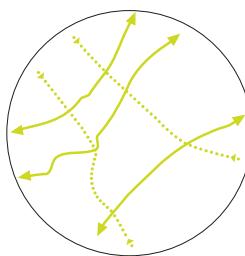
Conception

At the conceptual level, the theme of urban climate must be related to the field of landscape, while at the same time ensuring coordination with other central themes of urban development - especially urban planning.

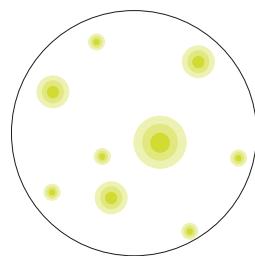
For the development of neighbourhoods adapted to climate change, it is necessary to think conceptually with areal, linear and punctual structures. Areal structures include, for example, areas with general rules and guidelines for climate-friendly development, especially in the areas of building development, greening, open spaces, sealing and emissions. These areas are superimposed by linear structures (including cold air flow channels) and by punctual structures of climate adaptation (including reduction of heat islands, climate-suitable design of public spaces, etc.).



Areal
structures

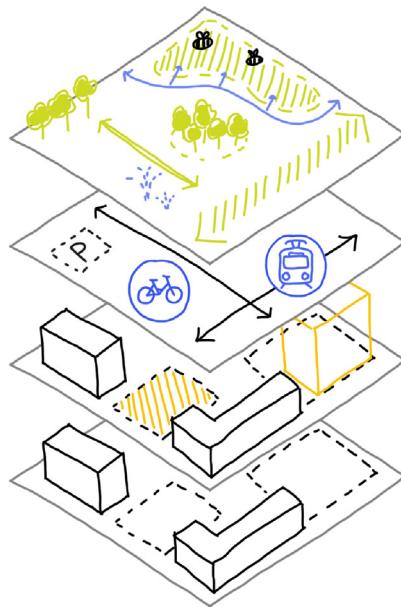


Linear
structures



Punctual
structures

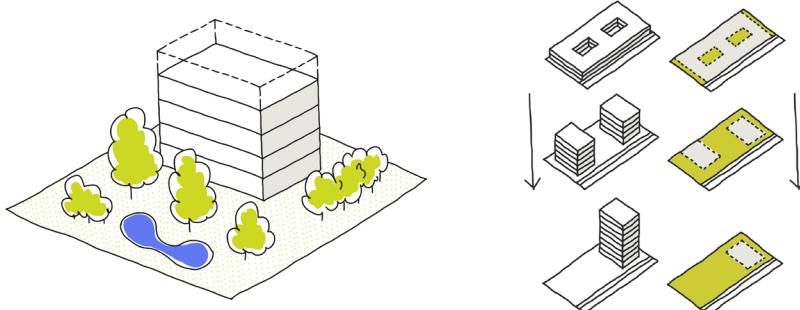
As part of an integrated development, the areal, linear and punctual structures of the urban climate are coordinated with the conceptual statements in the fields of housing and urban planning as well as mobility and development.



Framework conditions

In order to ensure the successful implementation of the developed concepts, the necessary framework conditions must be ensured during the detailed planning stages.

Municipal land use planning offers considerable freedom of design. For example, an area bonus in the building regulations or the instrument of design plans can be used to promote a climate-adapted development. By extending the perimeter of the design plan from facade to facade or by removing the distance to the limit for trees, valuable green space is created between buildings and in the street space.



In land use plans, incentives for climate-friendly site development can be created, e.g. through an area bonus or a design plan.

New green spaces can be created while maintaining the same floor area ratio by means of higher buildings at certain points instead of a general additional full storey.

Measures

The implementation of efficient measures is of great importance for a good urban climate.

Urban design and development strategies have a key role to play during the implementation. Three categories of measures can be distinguished: active initiation, consultation and incitation. While in the case of an active initiation the city or municipality takes the lead in implementation, it has an advisory function in the other two categories of measures. In the case of consultation, the city or municipality advises actors, e.g. from the private sector, on the implementation of measures already planned in order to promote a good urban climate. Finally, the city or municipality can motivate and train third parties to implement new measures.

actively initiating

consulting

incitating

Learnings

- ◆ Integrate the topic of urban climate into the overall (spatial) development strategies and concepts.
- ◆ Ensure that housing and urban design, transport and mobility as well as landscape and urban climate are optimally coordinated.
- ◆ Create the necessary framework conditions for successful implementation in the subsequent planning tools, especially in municipal land use planning.
- ◆ Use the synergies, for example with politics and the business community, to promote a good urban climate.
- ◆ Raise awareness and motivate the population for implementing ideas.

Urban climate is explored in the Spacelab.

What are the needs of the city in the 21st century? How are cities, agglomerations and municipalities getting prepared for climate change? In our Spacelab we are engaged in urban research and generate unique ideas and solutions for the challenges of tomorrow. We communicate our approaches in teaching and seminars and put them into practice in our projects.



