Vienna Heat Action Plan

For a cool Vienna

City of Vienna

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"It is today that we create the conditions that enable the people of Vienna to enjoy a good and healthy life also in the future."

Michael Ludwig
Mayor of Vienna

Vienna is a fine city to live in and enjoy high quality of life. It is our objective and our task to ensure that Vienna will remain a place where people have a good life and like to live. In our time, the climate crisis is undoubtedly the biggest challenge for urban quality of life. Vienna confronts this challenge and puts climate protection and climate adaptation at the centre of its municipal policy. Climate neutrality by 2040! All our efforts are directed at reaching this goal – and the necessary steps have been taken by adopting the Smart City Wien Strategy and the Vienna Climate Guide. In this way, Vienna not only contributes to the attainment of the national, European and global climate goals, but also identifies solutions and becomes a model to follow for other cities and regions.

However, we also know that climate change is already progressing and its effects are more and more felt in Vienna, too. Even if humanity manages to keep the worldwide temperature increase at a tolerable level, it will become invariably hotter in Vienna over the coming years and decades. Heat concerns the city as a whole; everybody living in Vienna is affected.

For this reason, adaptation to climate change is the second pillar of Vienna's climate policy. The Heat Action Plan is a new and important instrument for climate adaptation. Its focus is squarely on concrete measures in order to protect and ensure the health and quality of life of all citizens of Vienna even during high summer temperatures and heatwaves.

Of course, these measures are embedded in more long-term structural and planning projects and tools, such as the creation of new parks and recreation areas or urban climate analyses that identify spots where steps have to be taken to combat local overheating. In this way, we make sure that Vienna will remain the most liveable city despite rising temperatures, where everybody can live a good and healthy life, irrespective of gender, education, origin, income or residential address.

"In Vienna, climate policy and policy for social equity are interlinked."

Jürgen Czernohorszky
Executive City Councillor for Climate, Environment, Democracy and Personnel

Peter Hacker
Executive City Councillor for Social Affairs, Public Health and Sports

Vienna is known for closely interlinking its climate policy with its policy for social equity. We take measures that are good for people and good for the environment. Thus, the new Vienna Climate Guide not only focuses on climate protection measures, but also on shielding the population from the effects of the climate crisis and, hence, reflects the Vienna Health Targets as well. In this, we always aim to provide for all people of Vienna.

When dealing with rising temperatures and increasing heat, however, social equity is also very important for us. Not all groups of the population are equally affected by the effects of the climate crisis. Elderly people and young children, people suffering from chronic diseases, people living in poverty, the homeless, but also pregnant women and people working outdoors are exposed to particularly high risks. Therefore, the Heat Action Plan pays special attention to protecting the health of these groups.

The measures laid down in the Heat Action Plan are varied and range from target group-specific information services and more drinking fountains to the provision of cool spaces (e.g. in churches, shopping malls, schools or universities) and the further stepping-up of "cool spots" – cool oases that are attractive to stay and spend time in on hot days. The entire city and its denizens stand to benefit from these measures as well as from the numerous longer-term initiatives implemented by the City of Vienna to combat heat – such as its tree, green space and soil campaigns or the practical application of the sponge city principle.

The Heat Action Plan is a joint achievement: Health and education experts, planning and communication professionals, technicians and engineers from different institutions of the City of Vienna and beyond have contributed to it. Our special thanks go to every one of them! They all will make sure that the measures agreed on will be implemented quickly, professionally and precisely as needed for the benefit of the people of Vienna.

"Heat reveals what's wrong with our society."

Andreas Januskovecz
Director for Climate Matters

Hans-Peter Hutter
Specialist in environmental medicine

It is getting hotter and hotter in Vienna. Already today, heat causes more fatalities than traffic. Hans-Peter Hutter is a specialist in environmental medicine and Deputy Head of the Department of Environmental Health at the Medical University of Vienna as well as an expert on health-related effects of climate change. In an interview with Andreas Januskovecz, Vienna's Director for Climate Matters, he calls for focused urban climate action to be taken by the City Government.

Januskovecz: Professor Hutter, the COVID-19 crisis has caused many other issues to fade into the background. And yet, increasing heat in the city is one of the most underestimated threats. In Austria, massive heat stress already causes more fatalities than road traffic today. **Will heat-related health complaints become the new widespread "popular disorder"?**

Hutter: In fact, the urgent crises of our time have not hidden from sight or disappeared at all. It's just that the public perception is focused on the COVID-19 crisis. In any case, the pandemic has significantly delayed any serious engagement with other crises, such as the climate and biodiversity crisis. With regard to the threat posed by increasingly frequent and intense heatwaves, we may assume that the number of persons heavily affected and even dying before their time will rise markedly – not least due to the growing number of elderly persons who often live alone in dwellings that offer but poor protection against heat.

The pandemic has significantly delayed any serious engagement with other crises, such as the climate and biodiversity crisis.

Still, I would not call this a "popular disease" in the sense of a complaint that affects large parts of the population **on a permanent basis.** However, this does not mean that heat-related stress concerns only a small group. Everybody, regardless of their age, has to cope at least with some impairment of their capabilities. In this sense, we could call this a "yearly heat scourge", to use a simple and somewhat flashy term.
Januskovecz: It is a declared goal of the City of Vienna to preserve and improve

high quality of life for all of its citizens despite the progress of climate change. For this reason, the present Heat Action Plan contains both general measures and measures targeted at groups especially affected by heat. **Which are the groups of persons that the City of Vienna should pay particular attention to?**

One should primarily focus on those groups that are unable to adequately help themselves.

Hutter: One should primarily focus on those groups that are unable to adequately help themselves. These are above all elderly persons living alone but also socially disadvantaged people, who tend to live in hotter neighbourhoods of our city. Moreover, persons suffering from chronic diseases, too, run higher heat-related risks. This includes people with chronic cardiovascular or lung diseases but also dementia patients. So far, persons with spinal cord injuries, too, have been but rarely considered as a vulnerable group. Due to their body's dysfunctional heat balance caused by the paralysis, paraplegics find it harder to adapt to heat.
Finally, there are still other groups of our society, such as the homeless, whose protection against heat has hitherto hardly been a subject of discussion.

Januskovecz: Heat means stress for the body, which obviously impairs a person's ability to work. One focus of the Heat Action Plan is therefore on ways of dealing with heat at the workplace. **Which sectors are particularly affected? Are the negative effects of heat at the workplace underestimated?**

Hutter: Yes, definitely. It's taken a long time until this issue was addressed at all. While the construction sector is the one among outdoor occupations most affected by heat-related conditions impairing work, it is mainly office jobs that tend to be discussed among indoor workplaces rather than, for example, jobs in bakeries, the steel industry or chemical industry. Here, the daily heat stress at the workplace is compounded by climate-related heat outdoors, which makes it even more difficult to find relaxation from work. There's no question, though, that this is not only about physical performance – the powers of concentration and attention, too, can be severely impaired. In parallel, the risk of accidents increases, for example at construction sites.

There's no question, though, that this is not only about physical performance – the powers of concentration and attention, too, can be severely impaired.

Januskovecz: We are especially concerned about persons with few social contacts, whose isolation may be intensified by heatwaves, causing enormous mental stress. **How can we best reach out to these individuals?**

Hutter: I have been studying this issue since the historic heatwave of 2003. In addition to strain on the psyche, an important factor is physical stress, which sometimes is recognised too late – for example, because relatives and physicians are on holiday. Reaching out to people who are difficult to reach is key to saving lives. But this is very hard to do even today, in our modern society. Several possible solutions do exist – for example, French cities draw on registers of residents to reach single individuals aged over 65 years, which makes it possible to ensure assistance by social workers during hot spells. However, the implementation of such models is very time-consuming and resource-intensive. It would be easiest if other people living in the same building took care of these individuals. However, close neighbourly relations that entail mutual assistance have become a rarity in modern residential buildings. Often, we only realise that a neighbour might have needed our help when that person has passed away without anybody noticing. Heat reveals what's wrong with our society.

Heat reveals what's wrong with our society.

Januskovecz: In inner-city neighbourhoods, rising temperatures cause the increasingly noticeable heat island effect. The City of Vienna is taking numerous measures with

long-term benefits to bring about cooler temperatures, e.g. planting trees or soil desealing. **However, individual ad-hoc measures aimed at creating cool spots, such as Vienna's spray mist showers, are viewed with a critical eye by some. Do you agree with this stance?**

Hutter: No, I don't share this opinion. Of course, comprehensive measures must be taken to combat heat. But it seems quite unrealistic to expect that this can be done overnight. Therefore, we also need activities that can be implemented quickly and easily. Among other things, these include spray mist showers, which in addition to the cooling effect also allow for a sort of playful approach – at least if you watch kids using these devices.

Januskovecz: According to current estimates for the coming years, the level of heat will continue to rise even more markedly in cities due to climate change, thus exacerbating health impacts. While measures to fight climate change can mitigate this trend, their effects will only become visible in the long-term. **How can we communicate the urgent necessity of a determined climate policy?**

Hutter: Let's be honest: Given the body of knowledge that we have amassed since 30 years ago, the way we have been dealing with this threat until now is proof of a very sorry state of affairs. Since I began to study this field of issues, I have witnessed innumerable political statements of intent in favour of climate protection, which is nowadays endorsed by all political forces with the sole exception of climate change deniers. However, as soon as the discussion turns to concrete action, the originally declared fundamental willingness often gets lost in a fog of noncommittal phrases. This is certainly not because the evidence and the sombre forecasts have not been explained and presented down to the smallest detail. One major problem definitely lies in the fact that the effects of measures and their success only become noticeable far into the future. This long-term horizon is an enormous hindrance for any kind of commitment in a democracy, for the rewards of success would only be reaped by politicians to come. Climate protection measures stand a chance solely if it is possible to render positive consequences more quickly noticeable for each single individual. The co-benefits, such as health-related advantages, which could be achieved, for example, through more active mobility without cars, would serve as a key to motivate the population.

Climate protection measures stand a chance solely if it is possible to render positive consequences more quickly noticeable for each single individual.

For politicians, the enormous costs that an unchecked temperature increase entails should be a sufficiently strong argument in favour of decisive action. Annual weather- and climate change-related damage alone currently amounts to an average of more than 2 billion euro in Austria. For 2030, a volume of 3 to 6 billion euro was calculated, rising up to 12 billion euro in 2050.

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If there existed a comparable degree of determination and systematic political enforcement even of unpopular measures based on scientific evidence of the kind we've seen in the course of the pandemic, we could be quite a lot further down the road. Hope springs eternal.

Januskovecz: Thank you for the interview.

Summary

In Vienna, the increase in **urban heat** is the most strongly perceived consequence of progressive climate change. But not only average temperatures over the whole year are on the rise: Particular stress is caused by more and more frequent and longer **heatwaves** characterised by high temperatures over several consecutive days with only minimal cooling-off during the night hours. Moreover, heat is not evenly distributed across the city: The **heat island effect** is felt especially in densely built-up inner-city districts – here, temperatures are in part significantly higher than in the outskirts and environs of Vienna.

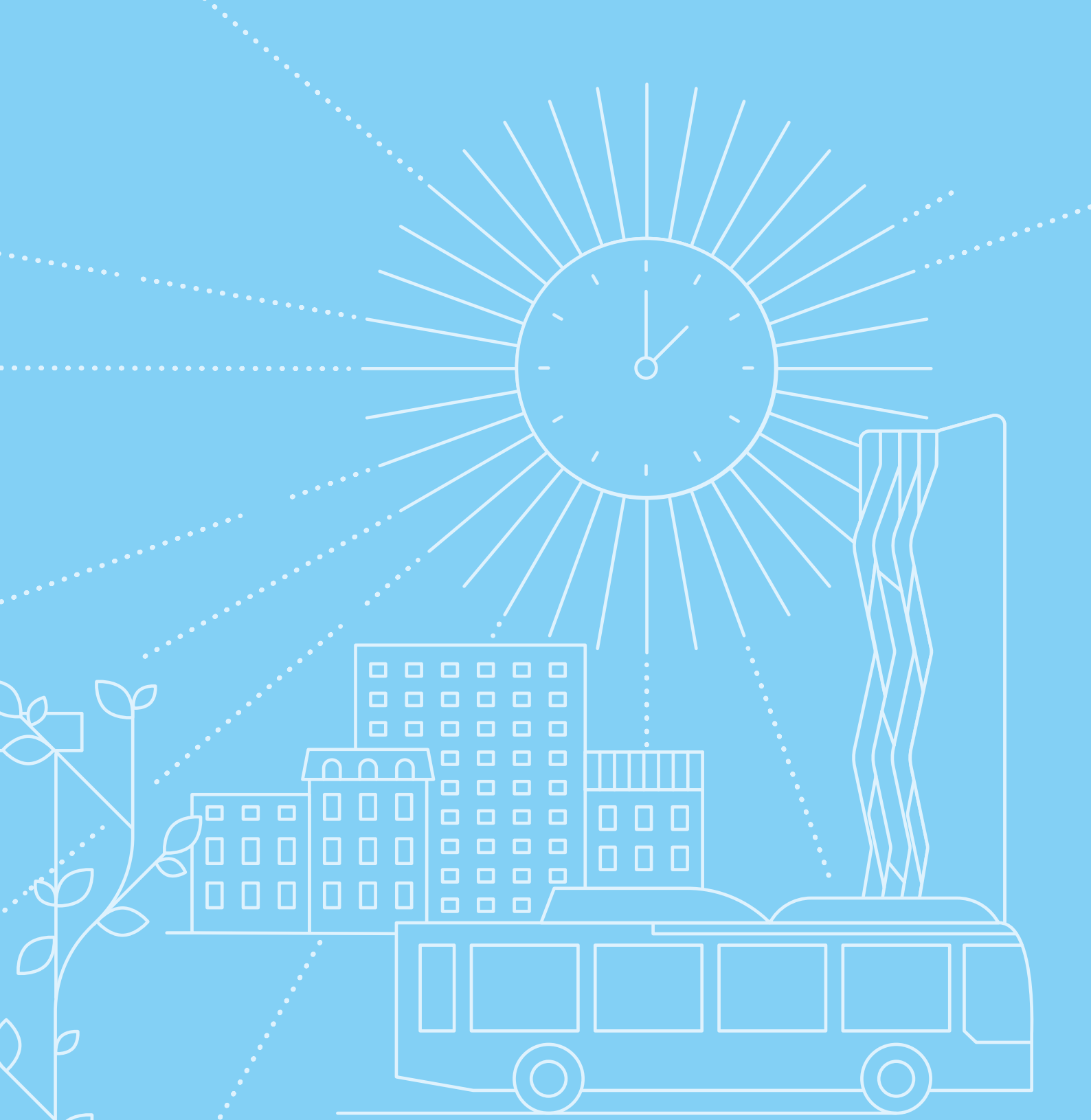
For city dwellers, heat constitutes a **source of growing stress** that can lead to severe health impairments and even to death. All over the world, heatwaves are already among those natural disasters with the highest number of fatalities. They especially affect **vulnerable individuals and risk groups** including elderly and socially isolated people, persons in need of care, individuals with chronic or mental diseases, pregnant women, young children or people living and working under particularly difficult conditions.

For this reason, it is the goal of the present Heat Action Plan to proactively define measures that are necessary both for the **prevention** of overheating in the city and for **coping** with heat when it actually occurs. This is to prepare above all the health facilities, care and nursing institutions of Vienna for heat-related emergencies and protect the population against the negative health effects of heat.

The emphasis of the Heat Action Plan is on **heat-related ad-hoc measures** and on measures that must be taken at relatively **short notice** to be well prepared for hot spells during the summer months. For this purpose, the Heat Action Plan specifies 29 key measures, half of which target the entire urban population, while the second half focuses on the particular needs of specific vulnerable groups. Further measures are aimed at the **long-term avoidance or reduction** of heat in the city – however, these measures are mentioned in the Heat Action Plan only by way of example and described in greater detail in other documents of the City of Vienna, such as the Vienna Climate Guide.

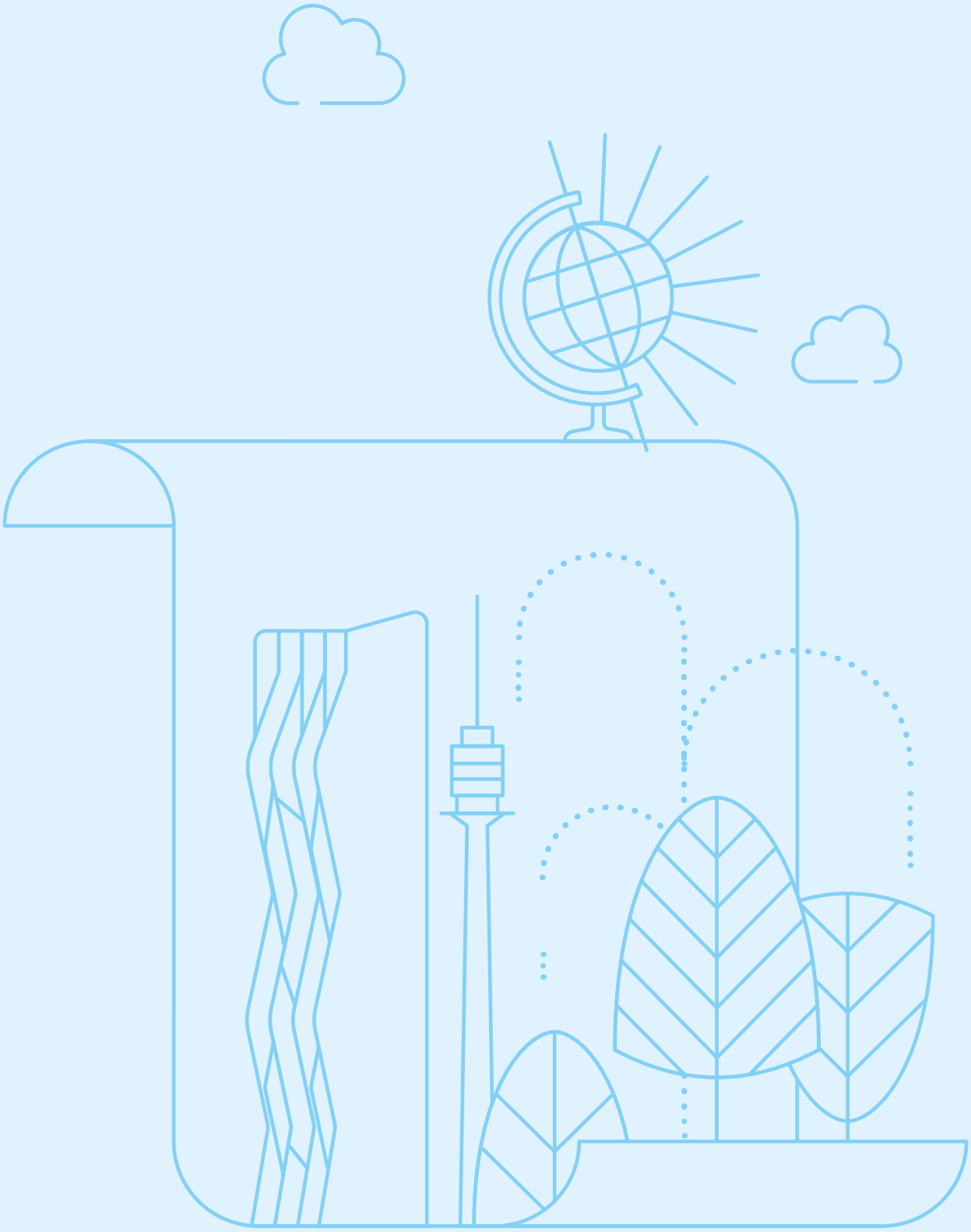
A decisive aspect lies in the fact that the Heat Action Plan identifies the **responsible body** for each measure as well as all institutions that have to contribute to ensuring its successful implementation. In this way, it creates the basis for smooth **co-operation** in urgent cases as well as in preparing for these situations and, moreover, safeguards the **ability to act** of all relevant organisations, authorities and institutions.

The Heat Action Plan is not a static, fixed document: In view of rapidly changing climatic conditions, the institutions of the City of Vienna, too, must react quickly and accordingly adjust their activities. This is ensured by a regular **monitoring and evaluation process** and a clearly defined **communication and management structure** involving all important players.



It is getting hotter – What can Vienna expect?

1. Why a Heat Action Plan?



Climate change – long considered a rather intangible threat that would occur sometime in the future – has been noticeable for quite a long while. Climate data of recent years show clearly that we are in the midst of a man-made climate change. The main source of rapidly progressing global warming is the combustion of fossil fuels – namely coal, petroleum and natural gas. But the destruction of forests and soil since the dawn of the Industrial Revolution has likewise triggered the release of enormous quantities of greenhouse gases.

Vienna is facing up to what is probably the greatest challenge of our time. With the Smart City Wien Strategy and the Vienna Climate Guide, the City Government has set itself an ambitious course to attain climate neutrality by 2040.

In view of the advanced stage of global climate change, however, the mere avoidance of greenhouse gas emissions is no longer sufficient. Already today, people all over the world suffer from the direct and indirect consequences of climate change. Moreover, the climate crisis has long arrived in Austria. For this reason, the importance assigned by Vienna to climate adaptation and protection from the effects of climate change is equal to that accorded to climate protection measures.

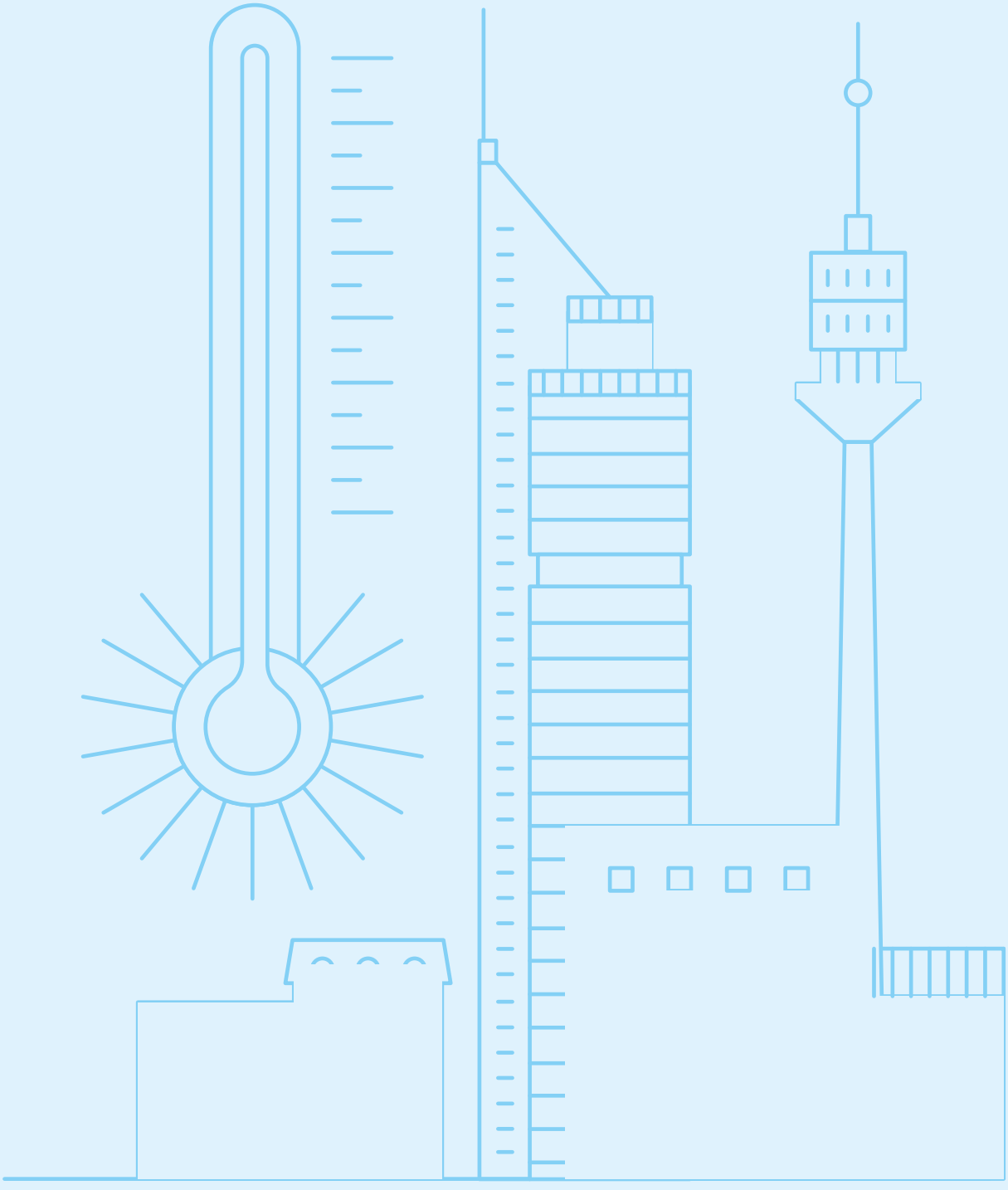
In the public mind, extreme weather events, such as storms, torrential rain and the floods caused by them, attract a great deal of attention. However, the biggest danger for cities like Vienna lies in increasing heat with its negative effects on health.

With the present Heat Action Plan, the Vienna City Government thus follows the objective of making an active contribution to

— preserving the high quality of life in Vienna, also during hot spells;
— improving the heat resilience, i.e. the capacities of resistance and adaptation, of Vienna's population;
— preparing the health facilities, care and nursing institutions of Vienna for heat-related emergencies; and
— protecting the citizens, in particular vulnerable groups, from the negative health effects of urban heat.

The focus of the Heat Action Plan is on the consequences of heat for the human organism. While other aspects – such as animal welfare, nature protection, critical infrastructure protection or disaster control (e.g. forest fires, damage caused to agriculture, etc.) – are important issues as well, they are not central to the present Heat Action Plan and therefore are covered by other documents and programmes of the City of Vienna.

2. Consequences of heat in Vienna



Climate change is evident.

Climate change has palpably altered the climatic conditions in Vienna over the past decades. Since the 1970s, the annual average temperature in Vienna has increased by close to 2 degrees Celsius.

In nearly two centuries and a half of temperature measurements, 13 out of 14 of the warmest years occurred after 2000. The last year with slightly below-average temperatures is fully 27 years in the past.[1]

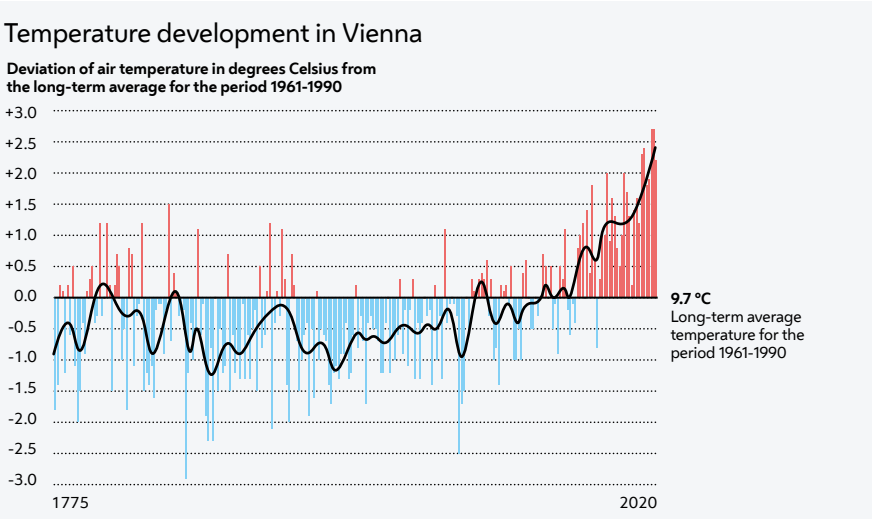


Figure 1
Deviation of annual mean air temperature in Vienna from the long-term average for the period 1961-1990 in degrees Celsius; own chart based on J. Hiebl, A. Orlik, A. Höfler (2021): Klimarückblick des Climate Change Centre Austria (CCCA), 2020

The number of very hot days and heatwaves, which put particular strain on human health, increased even more than average temperatures:
Between 1961 and 1990, Vienna experienced an average of 9.2 very hot days with maximum temperatures in excess of 30 degrees Celsius per year. From 1991 to 2020, this rose to 20.1 very hot days.[2] An even worse strain on health is caused by the fact that temperatures in the urban area decrease markedly less by night; "tropical nights" (when temperatures do not fall below 20 degrees Celsius) are the consequence.

Different definitions are used for hot spells: The climate scenarios for Austria (ÖKS) developed on behalf of the Federal Republic define a heatwave as a period during which a daily maximum temperature of 30 degrees Celsius is attained on at least three consecutive days and the night-time temperature does not fall below 18 degrees Celsius. Other definitions – such as that of the Vienna heat alert service – also take account of the "perceived temperature".

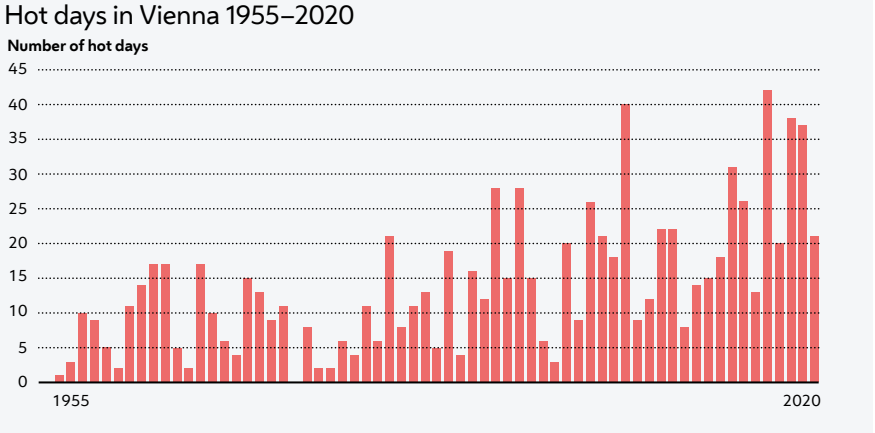


Figure 2
Number of hot days in Vienna for the period 1955-2019; chart by Marcus Wadsak, data furnished by ZAMG. Online: https://twitter.com/MarcusWadsak/status/1284074144267751427/photo/1

No trend reversal in sight.

The development of this trend over the coming years and decades will depend on the extent and success of global efforts to curb climate change. One thing is clear: An immediate trend reversal is currently not in sight.

Depending on the scenario, the average annual temperature will increase by 1.2 to 1.5 degrees Celsius in the period 2021-2050 (as compared to the average for the period 1971-2000). By the end of the century, it will be warmer by as much as 2.2 to 3.8 degrees Celsius, depending on whether the greenhouse gas emissions continue to augment unchecked ("business as usual" scenario) or effective climate protection measures are implemented.[3]

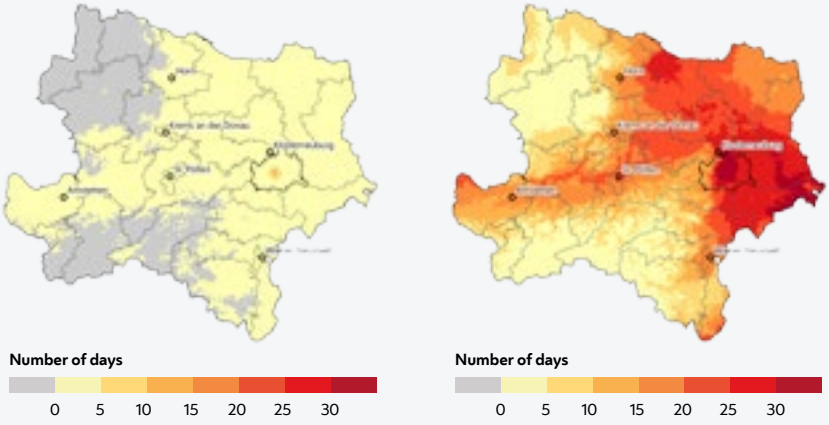


Figure 3
Development of tropical nights in Vienna and Lower Austria until 2100 (ClimaMap - CCCA data server, 2022). The maps show the number of days during which the daily minimum temperature does not fall below 20 degrees Celsius. They indicate the averages for the respective period. The right-hand panel presents the situation in case of little effort of climate protection (according to calculations by ÖKS15 – Climate scenarios for Austria).

Hot spells, which lasted for an average of five days in the period from 1971 to 2000, will have a duration of about 15 to 28 days, depending on the scenario, by the end of the 21st century.[4]

Depending on the success of global climate protection efforts, the climatic conditions (i.e. temperatures) recorded in Vienna around 2080 will resemble those of the port city of Marseille in Southern France or the West African metropolis of Dakar.[5]

The heat island effect heats up inner-city neighbourhoods.

As a rule, summer temperatures in cities are by several degrees higher than in surrounding rural areas, a difference that may be up to twelve degrees Celsius by night. Moreover, heat is not evenly distributed across the urban area, either. Heat islands occur with increasing frequency above all in densely built-up and heavily sealed inner-city neighbourhoods.

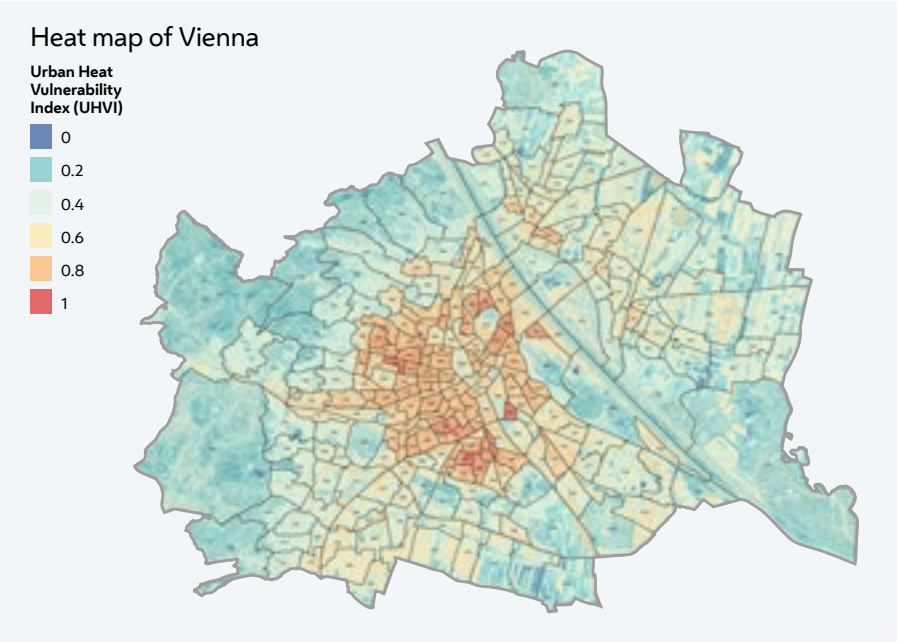


Figure 4
Urban heat vulnerability map of Vienna. The map identifies 10 heat zones; these are the areas most vulnerable to heat (shown in red on the map). Assessment based on census districts. Visualisation: City of Vienna - Energy Planning, ViennaGIS, PID, Pixabay, 2019

The surfaces of streets and buildings usually are made of heat-absorbing materials that in many cases are also impermeable to water. Thus, precipitation quickly runs off; the cooling effect caused by evaporation is prevented. Vertical building surfaces absorb both direct sunlight and the radiation reflected by the surfaces of other buildings. Moreover, buildings impede the circulation of air. This effect may be exacerbated by industrial waste heat and heat released by air conditioning systems and motor vehicles.

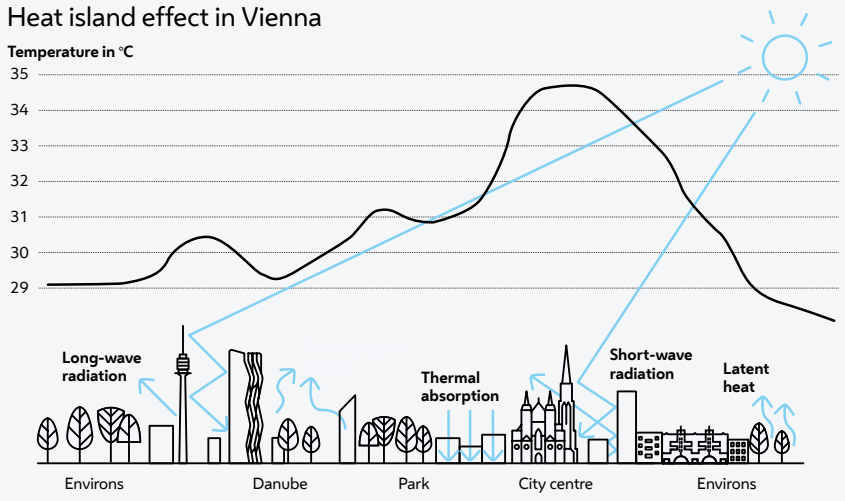
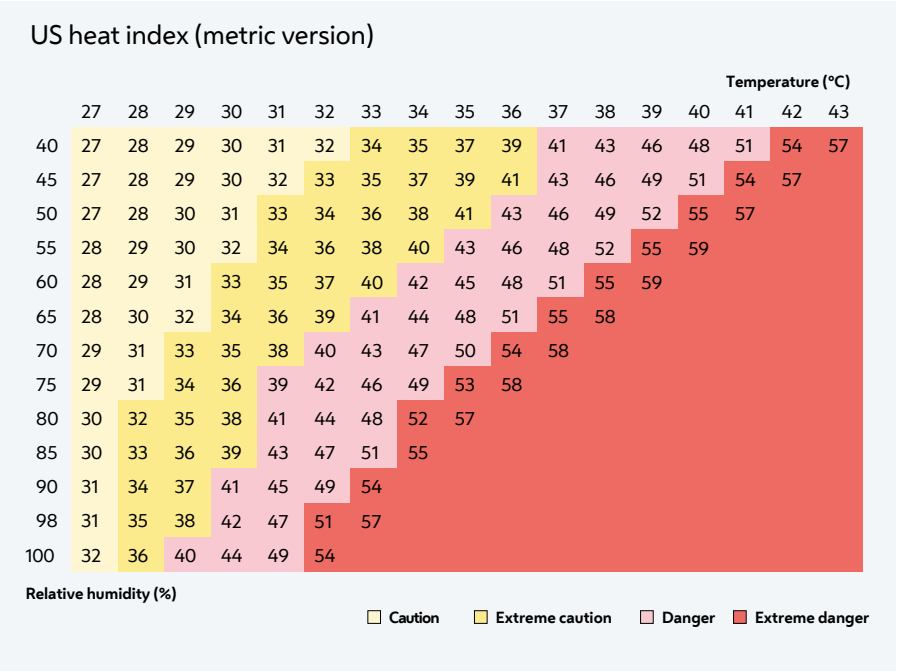


Figure 5
Schematic visualisation of the heat island effect. Source: Urban Heat Island Strategy – City of Vienna, 2015

The most pronounced heat island effect is observed in calm and cloudless nights: Building materials often store heat and, after sunset, radiate it to their surroundings. Temperature differences between individual parts of the city are frequently even more marked during night hours than in the daytime.

3. Health-related effects of heat

Heat means very hard work for the human organism: It must make sure that the body temperature does not rise too much; otherwise, endogenous proteins are damaged. For this, the body activates its cooling system and produces moisture – sweat. Perspiration cools the epidermis because sweat evaporates on the skin. However, in case of very protracted and excessive heat, sweating no longer functions properly. By perspiring, the body loses fluids and minerals (electrolytes), which must be replaced by drinking and eating. High temperatures combined with high humidity and a lack of wind or breezes are experienced as a particular strain on the body: Sweat evaporates more slowly, and no cooling airflow can develop.



Relative humidity (%)	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
40	27	28	29	30	31	32	34	35	37	39	41	43	46	48	51	54	57
45	27	28	29	30	32	33	35	37	39	41	43	46	49	51	54	57	
50	27	28	30	31	33	34	36	38	41	43	46	49	52	55	57		
55	28	29	30	32	34	36	38	40	43	46	48	52	55	59			
60	28	29	31	33	35	37	40	42	45	48	51	55	59				
65	28	30	32	34	36	39	41	44	48	51	55	58					
70	29	31	33	35	38	40	43	47	50	54	58						
75	29	31	34	36	39	42	46	49	53	58							
80	30	32	35	38	41	44	48	52	57								
85	30	33	36	39	43	47	51	55									
90	31	34	37	41	45	49	54										
98	31	35	38	42	47	51	57										
100	32	36	40	44	49	54											

Figure 6
Heat alert table. Starting at an air temperature of 32 degrees Celsius, high humidity means increased danger for human health, while as much as 40 degrees Celsius does not automatically trigger a "red alert" if the air is dry. Source: MikeRun

During hot spells, not only high diurnal temperatures prove a burden on the organism, but also the lack of cooling-off at night, which would enable the body to recuperate. The main relevant factors in this context are both the air temperature measured and what is called "thermal sensation", i.e. the temperature perceived by the individual, which also takes account of direct sunlight, humidity, airflow (draughts, wind), etc.

The perceived temperature or "physiological equivalent temperature" (PET) is defined as the temperature corresponding to the thermal sensation of a person wearing typical light clothing and engaged in light physical indoor activity in a room with an air velocity of 0.1 m/s, a water vapour pressure of 12 hPa (corresponding to a humidity of 50% at 20 °C).[6] PET is also used for heat warnings issued by ZAMG and by the preventive heat alert service since this coefficient expresses diurnal heat stress better than the air temperature measured. Conversely, the "normal" air temperature measured is highly relevant particularly for night hours: Relaxing sleep and, hence, adequate regeneration only become possible if temperatures drop to a sufficient extent.

How dangerous is heat?

Too much heat is as detrimental to the organism as too much cold. Heat causes the body temperature to rise – in the worst case to over 40 degrees Celsius. This triggers heat cramps, nausea, dizziness and even loss of consciousness.

An increase of body temperature by merely one degree Celsius may already impair the ability to concentrate. An increase by five degrees Celsius may lead to circulatory collapse. Body temperatures in excess of 42 degrees Celsius are fatal.

The failure of the body to cool down puts strain on the cardiovascular system. Hence, heat is doubly dangerous for persons in poor health and other groups at risk (such as the elderly or young children), above all because they cannot adapt quickly to sudden heatwaves.

Heavy sweating causes the body to lose fluids and, consequently, salt. The lack of salt may lead to painful cramps of the limbs and/or abdomen. If the body is not provided with fluids and electrolytes for a longer period, heat exhaustion may occur.

Moreover, heat stress causes the blood vessels to dilate. Blood pressure drops, the heart beats faster – in extreme cases, this may result in a life-threatening heatstroke. A drop in blood pressure impairs adequate oxygen supply to the brain. This may lead to dizziness, giddiness, fainting and possibly also to heat cramps. The diminished supply of oxygen reduces the proper functioning of the brain.

On a global scale, heatwaves are the natural disaster that causes the highest number of fatalities. Only in Europe, 70,000 "extra" deaths were recorded in the wake of the 2003 heatwave.

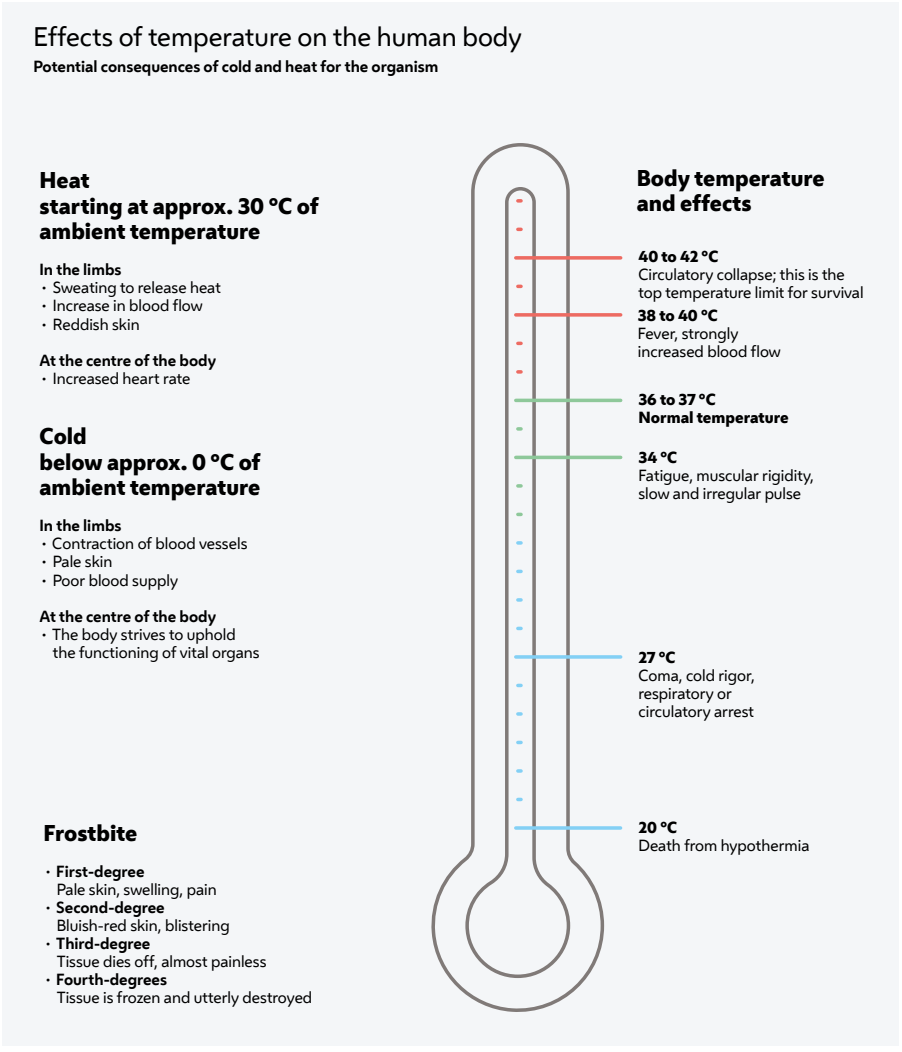


Figure 7
Possible consequences of cold and heat for the human body. Source: APA, dpa

Heat impairs air quality.

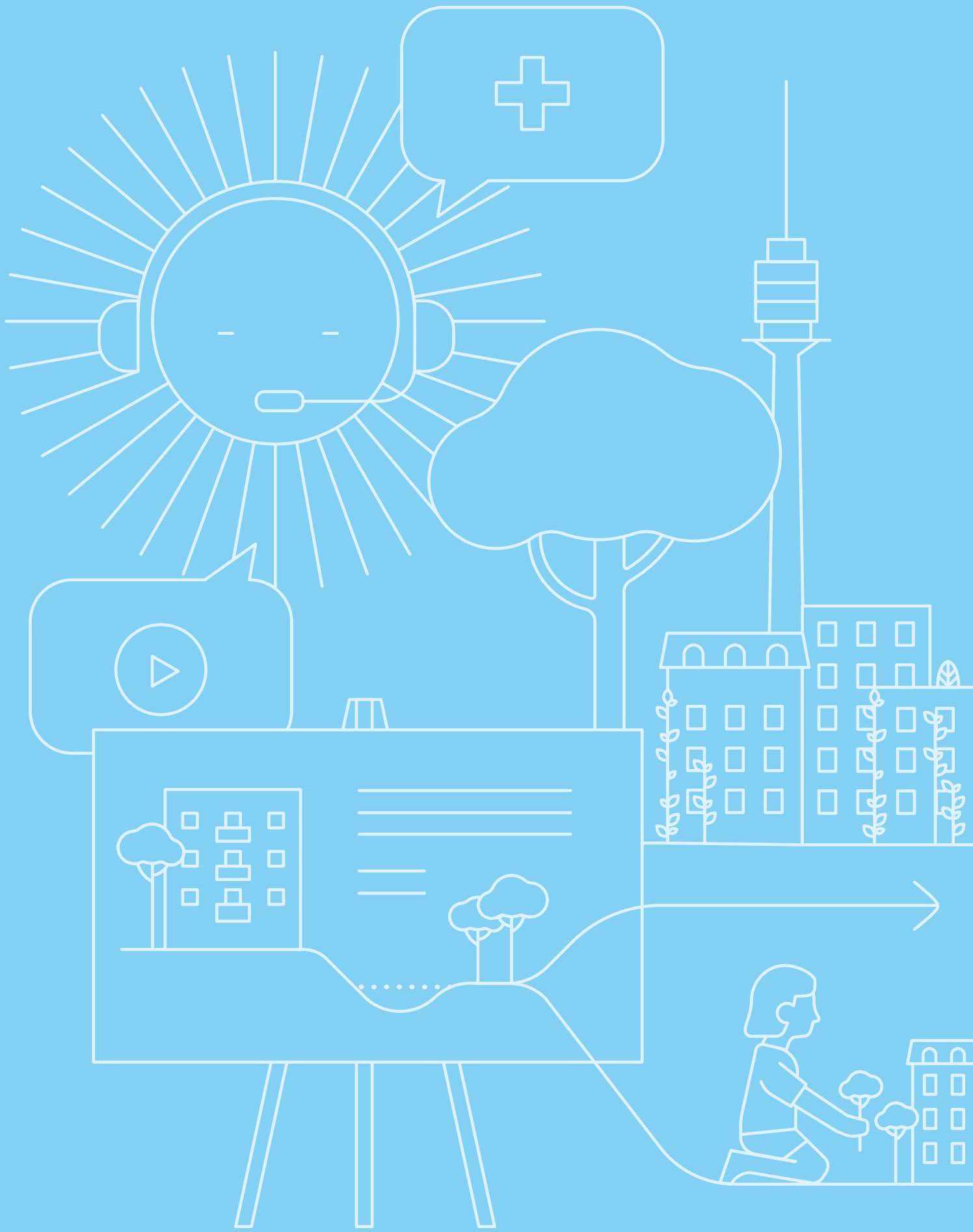
A number of factors influence the extent to which people's health is affected by heat. These factors include environmental impacts, such as air pollution or noise, but also poverty and lifestyles (e.g. unhealthy diets).

In the course of a day, an individual inhales between 10 and 15 kilograms of air and thereby supplies the body with oxygen, which is essential for our survival. However, airborne pollutants, which may include particulate matter and nitrogen oxides, can enter the body in this way and cause a number of diseases. Therefore, legal threshold values were introduced for airborne pollutants to protect human health.

Combined with intense sunlight, high air temperatures foster the formation of ground-level ozone, which is hazardous to human health. Increased ozone concentrations may lead to irritations of the airways, headache and shortness of breath. If the threshold values for ozone are exceeded, the competent authority will inform the population accordingly.

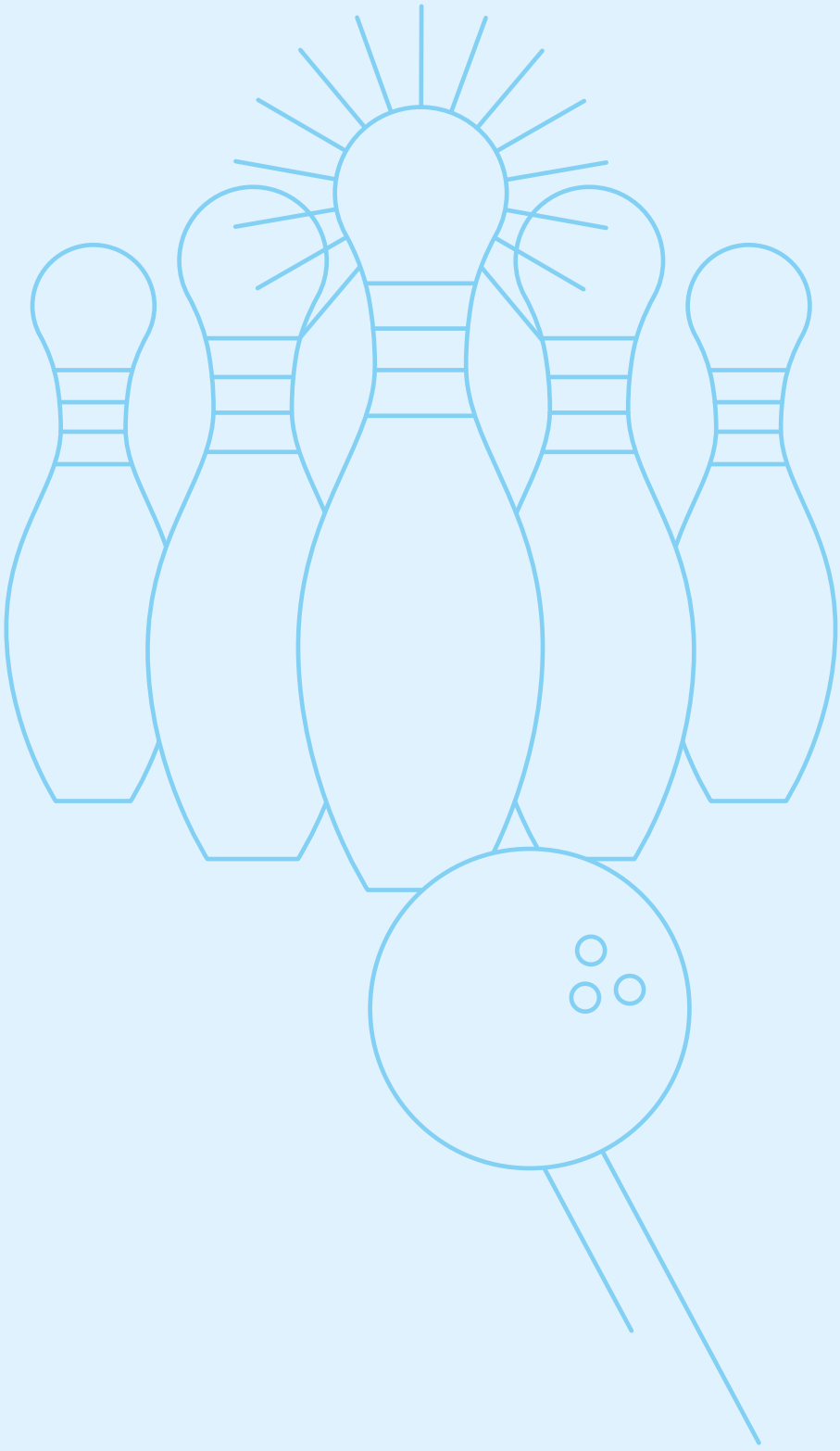
Particulate matter is the result of abrasion in households, traffic and industrial processes and is composed of tiny, invisible particles. Particulate matter can penetrate deeply into the lungs and in this way cause cardiovascular diseases.

In case of elevated loads of ozone or particular matter, persons at risk, such as individuals suffering from severe diseases of the respiratory tract or impaired lung function, should avoid unaccustomed, heavy outdoor exercise as a precautionary measure.



Is it getting hotter – What measures does Vienna take?

4. Measures



The Heat Action Plan comprises measures that have an effect on the entire urban population, while others focus on one or several particularly vulnerable target groups. These include young children, pregnant women and the elderly, persons suffering from chronic or mental diseases and individuals living in social isolation or in difficult socio-economic conditions.

Furthermore, the measures of the Heat Action Plan are distinguished according to the time required to deploy their effect:

— Short-term / ad-hoc measures: These measures are taken in case of heat alerts during and immediately before a heat event.
— Seasonal preparatory measures: These measures are taken in advance – for example, in spring – in order to prepare for expected heat events.
— Long-term measures: These measures – for example, urban planning measures, greening, etc. – are taken on an ongoing basis as part of the climate adaptation policy of the City of Vienna.

The focus of the Vienna Heat Action Plan is on short-term and seasonal preparatory measures.

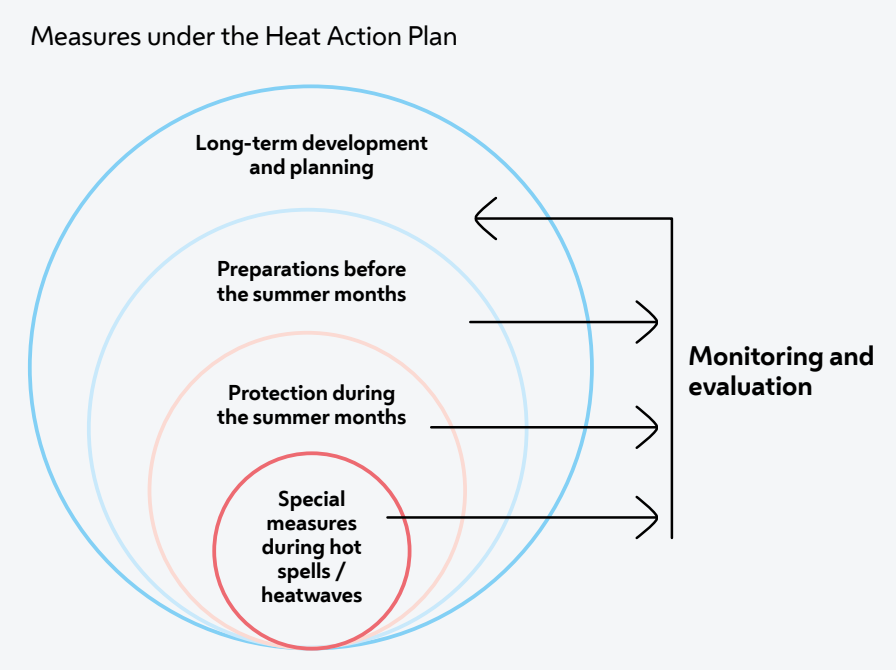


Figure 8
Time schedule for measures under the Heat Action Plan

4.1 Overview of measures

Overview of measures across target groups

	Title	Impact
Ü1	**Vienna Heat Manual (*Wiener Hitzeratgeber*), information leaflets**	
Ü2	**Training of physicians and nursing staff**	
Ü3	**Ensuring care and assistance for an increasing number of persons suffering from heat**	
Ü4	**"Teach the Teachers" workshops / Green School Programme**	
Ü5	**Special training focusing on aspects of heat protection and climate change within the sphere of activities of the City of Vienna**	
Ü6	**Heat-related information on the website of the City of Vienna**	
Ü7	**Heat-related information via WienBot (digital assistant)**	
Ü8	**Heat alert system at the workplace within the sphere of activities of the City of Vienna**	
Ü9	**Urgent measures taken by the City of Vienna on very hot days and during heatwaves**	
Ü10	**Shady outdoor workplaces in parks**	
Ü11	**Cooling zones ("recreation islands")**	
Ü12	**New cool spots on squares and in parks**	
Ü13	**"Shady benches"**	
Ü14	**Extension of the drinking fountain and drinking hydrant network**	
Ü15	**Preferably city-wide deployment of air-conditioned vehicles by Wiener Linien**	

Overview of measures for specific target groups

	Title	Target group	Impact
Z1	**"Heat Toolbox"**	People living in difficult socio-economic conditions	
Z2	**Workshops and themed weeks on heat-relevant aspects at schools**	Children and young people; people living in difficult socio-economic conditions	
Z3	**Heat prevention at kindergartens, groups for young children**	Infants and young children	
Z4	**Addressing and activating paediatrician surgeries**	Infants and young children	
Z5	**Heat standards for hospitals, residential and nursing homes, day-care centres for senior citizens as well as home care services**	Elderly people and people in need of care, people suffering from chronic diseases	

Z6	**Information of staff in therapy and counselling facilities as well as clinics for mentally ill people**	People suffering from mental diseases	
Z7	**Integration of heat-relevant aspects into existing education tools of the City of Vienna**	Children and young people	
Z8	**Package of measures for homeless people**	Homeless people	
Z9	**Establishment of a "heat line"**	Elderly people	
Z10	**Neighbourhood assistance during heatwaves**	Elderly people, people suffering from chronic diseases, socially isolated people, pregnant women, infants, people suffering from mental diseases	
Z11	**Medical consultations by phone during heatwaves**	Elderly people, people suffering from chronic diseases, socially isolated people	
Z12	**Heat protection for people working outdoors, within the sphere of activities of the City of Vienna**	Staff of the City of Vienna working outdoors	
Z13	**Examination of options to adapt working hours for staff of the City of Vienna working outdoors, taking account of the specific requirements of relevant departments**	Staff of the City of Vienna working outdoors	

Overview of long-term measures

	Title
L1	**(Avenue) tree initiative**
L2	**Desealing drive**
L3	**New parks**
L4	**Sponge city principle**
L5	**Financial support**
L6	**Vienna Climate Team**
L7	**Cooling of buildings such as schools, hospitals, care facilities, surgeries, etc.**
L8	**Urban climate analysis**
L9	**Climate-sensitive planning**

Seasonal preparatory Short-term, ad-hoc

4.2 Measures across target groups in detail

Seasonal preparatory and short-term ad-hoc measures

The City of Vienna takes a wealth of measures that are aimed either at the general public or at a number of target groups.

Ü1 Vienna Heat Manual (*Wiener Hitzeratgeber*), information leaflets

Description of the measure
The Vienna Heat Manual is available online. It offers practical suggestions to prepare for and cope with heat events and informs about related contact points and webpages of the City of Vienna. A key focus of the Heat Manual is on prevention, i.e. measures that must be taken at an early moment to successfully counter heat (e.g. modification of dwellings).
The services of Vienna's municipal indoor and outdoor swimming pools are to be presented as well.

Actions
- Updating and adaptation of the Heat Manual as an ancillary communication tool to complement the Heat Action Plan
- Specific outreach to all target groups
- Discussion of individual issues (e.g. effects of heat on medication) in brochures and leaflets
- Obtaining an overview of as well as integrating existing information tools

Target group
General public

Impact
Seasonal preparatory

Responsibility
City of Vienna – Public Health Services (MA 15)

Contributors
City of Vienna – Environmental Protection (MA 22), Building Inspection (MA 37), Municipal Swimming Pools (MA 44), Vienna Hospital Association, Chamber of Pharmacists, Vienna Social Fund, partner organisations of Vienna Social Fund, etc.

Performance indicators
Number of downloads from website

Ü2 Training of physicians and nursing staff

Description of the measure
Climate change causes the emergence of new health hazards. For this reason, the basic and advanced training of physicians and nursing staff should also address health-relevant aspects of climate change. Targeted training courses deal in particular with the effects of heat on chronic diseases and medication as well as with the implementation of countermeasures.

Actions
- Evaluation of existing basic and advanced training options for the integration of heat-related problems
- Definition of thematic focuses
- Development of an e-learning tool

Target group
General public

Impact
Seasonal preparatory

Responsibility
Vienna Hospital Association

Contributors
City of Vienna – Public Health Services (MA 15), Medical Chamber, institutions for basic and advanced training, e.g. AWZ Soziales Wien GmbH (basic and advanced training centre of Vienna Social Fund), FH Campus Wien (university of applied sciences), etc.

Performance indicators
Number of training courses held; number of participants

Ü3 Ensuring care and assistance for an increasing number of persons suffering from heat

Description of the measure
Medical and ambulance services, hospitals, physicians, etc., must prepare for a potentially fast rising number of persons suffering from heat. Vulnerable groups are at particular risk.

Actions
- Evaluation of capacities for dealing with emergencies, rescue and admission
- Overlay of the urban analysis map (vulnerable areas) with the location of kindergartens, residential and nursing homes, facilities for assisting the homeless, disabled persons and refugees
- Definition of vulnerable areas in order to determine potential focuses of emergency responses

Target group
General public

Impact
Seasonal preparatory

Responsibility
City of Vienna – Emergency Medical Services (MA 70)

Contributors
Vienna Hospital Association, Medical Chamber, City of Vienna – Urban Development and Planning (MA 18), Vienna Social Fund, etc.

Performance indicators
Number of emergency responses during heat events; number of emergency cases during heat events

Ü4 "Teach the Teachers" workshops / Green School Programme

Description of the measure
Children are multipliers. For this reason, it is important to place emphasis on the issues of climate change and, specifically, heat. Based on the experiences made with the education initiative of DigitalCity.Wien, learning content addressing climate change and urban heat can be systematically integrated into the syllabus. Priority is to be given to neighbourhood projects for education co-operation (*Bildungsgrätzl*), teacher training and special education initiatives at schools.

Actions
- Examination of existing services for the integration of heat-relevant topics
- Definition of teaching content addressing climate change and heat
- Integration of content into the syllabus

Target group
Primary school pupils, lower and upper secondary school students

Impact
Seasonal preparatory

Responsibility
Vienna Board of Education

Performance indicators
Number of workshops

Ü5 Special training focusing on aspects of heat protection and climate change within the sphere of activities of the City of Vienna

Description of the measure
A complementary training course informs staff members of municipal authorities in direct contact with the population about heat-relevant issues (preventive measures, information about heat protection, first aid, etc.).

Actions
- Evaluation of existing training courses and of the possibility to integrate this topic into existing training programmes
- Definition of training content regarding heat
- Development of an internal training course and integration of heat-relevant content
- Extension of this measure beyond the sphere of activities of the City of Vienna

Target group
Staff of municipal authorities in direct contact with the population

Impact
Seasonal preparatory

Responsibility
City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing (internal training institution Wien-Akademie)

Contributors
Directorate for Climate Matters (development of training courses)

Performance indicators
Number of training courses held; number of participants

Ü6 Heat-related information on the website of the City of Vienna

Description of the measure
The website wien.gv.at offers concrete information on the issue of urban heat. A wealth of information dealing with the problem of heat is presented in a clearcut, easy-to-understand manner, with links to all departments of the City of Vienna and other partners (e.g. charitable organisations). Both the general public and vulnerable groups at risk find information tailored to their needs. The services of Vienna's municipal indoor and outdoor pools, too, are presented. Personalised heat-related information is integrated into mein.wien (by means of push messages, fine-tuned to location / age, etc.).

Actions
— Setting-up of a central webpage

Target group
General public

Impact
Seasonal preparatory / short-term, ad-hoc

Responsibility
City of Vienna – Press and Information Services (MA 53)

Contributors
City of Vienna – Public Health Services (MA 15), Municipal Swimming Pools (MA 44), Directorate for Climate Matters, Vienna Social Fund, Vienna Hospital Association, etc.

Performance indicators
Number of website visitors

Ü7 Heat-related information via WienBot (digital assistant)

Description of the measure
This free app for Android and iOS offers quick answers to questions related to heat (suggestions on how to deal with heat, location of drinking fountains, parks, spray mist showers, swimming pools, etc.). This content is integrated into mein.wien.

Actions
— Review and addition of answers to heat-related questions by means of concrete information (both across target groups and for specific target groups) about the measures of the Heat Action Plan
— Clarification of whether the app permits reporting the location of identified hot spots

Target group
General public

Impact
Seasonal preparatory / short-term, ad-hoc

Responsibility
City of Vienna – Press and Information Services (MA 53)

Contributors
City of Vienna – Directorate for Climate Matters

Performance indicators
Number of downloads

Ü8 Heat alert system at the workplace within the sphere of activities of the City of Vienna

Description of the measure
The Vienna Act on the Protection of Municipal Employees of 1998 and the Act on the Protection of Workers obligate employers to ensure occupational safety and health for their staff members. High temperatures have a negative effect on the performance and ability of concentration and contribute to an increased risk of accidents. This applies in particular to outdoor work. For this reason, it is important to take adaptive measures in case of extreme heat stress, including shading, passive cooling, night-time ventilation, flexible working hours, working from home, etc.

Actions
— Evaluation of the internal relaying of suggestions to cope with heat
— Communication of measures via the internal municipal homepage for operational health management of the City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing
— Extension of this measure beyond the sphere of activities of the City of Vienna

Target group
Staff of the City of Vienna working outdoors, as multipliers

Impact
Seasonal preparatory / short-term, ad-hoc

Responsibility
City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing

Contributors
Centre for Occupational Medicine of KFA (health insurance institution for the employees of the City of Vienna)

Performance indicators
Number of adaptive measures developed to counter heat

Ü9 Urgent measures taken by the City of Vienna on very hot days and during heatwaves

Description of the measure
Through the constant flow of water, 61 monumental and com-memorative fountains operated by the City of Vienna – Vienna Water (MA 31) have a cooling effect on their environs (e.g. high jet fountain on Schwarzenbergplatz square). In addition, numerous cooling measures are employed to mitigate urban heat. A total of 100 "Sommerspritzer" spray mist showers and
75 "Brunnhilde" drinking fountains with an additional spray mist function are provided across the entire city. Suggestions for places of installation submitted by the districts are taken into account.

Actions
— Additional cooling measures co-ordinated by social affairs divisions with districts and technical divisions in case of an undersupply of vulnerable areas

Target group
General public

Impact
Short-term, ad-hoc

Responsibility
City of Vienna – Vienna Water (MA 31)

Contributors
City of Vienna – Road Management and Construction (MA 28), Parks and Gardens (MA 42), Climate, Forestry and Agriculture (MA 49), Water Management (MA 45), etc.

Performance indicators
Number of additional cooling measures

Ü10 Shady outdoor workplaces in parks

Description of the measure
Rising temperatures call for the provision of more options for people to spend time in green, cool open spaces. For this reason, it makes sense to transfer workplaces temporarily outdoors. In fair weather conditions during the warm months, outdoor co-working spaces offer an alternative to stuffy office premises. Adele-Jellinek-Park would, for example, be a good location for this purpose.

Actions
— Setting-up of further workspaces in Viennese parks situated in vulnerable areas
— Ensuring good Wi-Fi connection (e.g. via public Wi-Fi hotspots)

Target group
General public and vulnerable groups

Impact
Short-term, ad-hoc

Responsibility
City of Vienna – Parks and Gardens (MA 42)

Contributors
City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing

Performance indicators
Number of outdoor workplaces

Ü11 Cooling zones ("recreation islands")

Description of the measure
During heatwaves, many flats cannot cool down sufficiently and, in this way, become heat traps, above all for vulnerable groups of the population. For this reason, it is essential to create or adapt cool spaces to enable these persons to spend a few hours in a cool environment. Existing premises can be used for this purpose, such as Vienna City Hall (Volkshalle), shopping malls, schools, universities, etc.
Small-scale investments can support social service providers in implementing measures for cooling (shading systems, passive climate control, greening). This results in cool spaces for public use.

Target group
General public and vulnerable groups

Impact
Short-term, ad-hoc

Responsibility
City of Vienna – Directorate for Climate Matters

Contributors
Vienna Social Fund, Caritas, Red Cross, Workers' Samaritan Federation, Wiener Linien, etc.

Performance indicators
Number of cool spaces

Actions

— Survey of potentially suited cool spaces in co-operation with stakeholders and charitable organisations
— Identification and mapping of cool spaces
— Integration into the *Cooles Wien* app
— Provision of data as open government data
— Examination of potential shuttle services to transport vulnerable groups (elderly people, persons with disabilities, etc.) to cool spaces
— Examination of options to provide discounted or free Wiener Linien tickets for people who want to reach cool spaces (e.g. people living in difficult socio-economic conditions, homeless people, etc.)

Ü12 New cool spots on squares and in parks

Description of the measure

Cool spots are pleasant, cool oases with high atmospheric quality that are designed to offer an optimised cooling effect. Elements used to achieve this include shade, spray mist devices, etc. Two cool spot prototypes have been installed in Vienna so far – at Schlingermarkt in the 21st district Floridsdorf and in Esterhazypark in the 6th district Mariahilf. Both locations are monitored by measuring climate parameters (vapour pressure, wind velocity, temperature, humidity, global radiation, etc.). The Bathing Facilities Strategy 2030 envisages the creation of shady spots in municipal outdoor bathing facilities.

Actions

— Examination of the potential establishment of further cool spots for squares and parks in vulnerable areas

Target group
General public

Impact
Short-term, ad-hoc

Responsibility
City of Vienna – Executive Group for Construction and Technology

Contributors
City of Vienna – Urban Development and Planning (MA 18), Road Management and Construction (MA 28), Parks and Gardens (MA 42), Municipal Swimming Pools (MA 44)

Performance indicators
Number of cool spots

Ü13 "Shady benches"

Description of the measure

In many areas of the city, it is difficult to provide shade by planting trees. However, already existing shade created by buildings and trees offers a partly unused potential to curb the heat island effect in inner-city areas. The geographic information system of the City of Vienna calculates potential shady spots and visualises them in a "shade map". If the spots identified in the streetscape offer sufficient space, "shady benches" are put up. As a prototype and first step, it is planned to install seven shady benches in the 11th district Simmering.

Actions

— Putting-up of seven shady benches in Simmering
— Examination of the possibility of extending this idea to other parts of the city in co-operation with the districts
— Plans to extend the shady bench idea to spots shaded by trees

Target group
General public and specific vulnerable groups

Impact
Short-term, ad-hoc

Responsibility
City of Vienna – Architecture and Urban Design (MA 19)

Contributors
Municipal districts, City of Vienna – Road Management and Construction (MA 28), Parks and Gardens (MA 42), Environmental Protection (MA 22)

Performance indicators
Number of shady benches put up

Ü14 Extension of the drinking fountain and drinking hydrant network

Description of the measure
Vienna's municipal territory boasts more than 1,300 permanent drinking fountains and drinking hydrants. Of these, about 560 are operated by the City of Vienna – Vienna Water (MA 31). Some types of hydrants can be converted to drinking hydrants to serve the same function as drinking fountains. As a rule, drinking fountains and drinking hydrants feature a water bowl for dogs, too. These devices can be ordered by the districts.

Moreover, 75 "Brunnhilde" mobile drinking fountains mounted on hydrants also offer an additional spray mist function. The "Brunnhilde" fountains are in operation from April to late October. Requests made by districts are taken into account when choosing a location. The installation of these fountains is tied to specific criteria that have to be evaluated on a case-by-case basis by MA 31. The official map of the City of Vienna shows the locations of the drinking fountains.

Actions
— Extension of the drinking fountain and drinking hydrant network depending on the orders placed and the financing provided by the districts

Target group
General public

Impact
Short-term, ad-hoc

Responsibility
City of Vienna – Vienna Water (MA 31)

Contributors
Municipal districts, City of Vienna – Road Management and Construction (MA 28), Parks and Gardens (MA 42), etc.

Performance indicators
Number of drinking fountains set up in total; number of drinking fountains additionally set up in vulnerable areas

Ü15 Preferably city-wide deployment of air-conditioned vehicles by Wiener Linien (public transport provider)

Description of the measure
Systematically implemented air conditioning of the vehicles operated by Wiener Linien ensures the usability of public transport services (Vienna Underground, bus, tram) during heatwaves.

Actions
— Enlargement of the pool of air-conditioned vehicles
— Increased deployment during hot periods

Target group
General public

Impact
Short-term, ad-hoc

Responsibility
Wiener Linien

Performance indicators
Percentage of air-conditioned vehicles used during heatwaves

4.3 Vulnerable risk groups

Some groups of people are particularly at risk during persistent heatwaves.
They include:

1. Elderly people
2. Socially isolated people
3. People in need of care
4. People suffering from chronic diseases
5. People suffering from mental diseases
6. Pregnant women
7. Infants and young children
8. People working outdoors
9. People living in difficult socio-economic conditions
10. Homeless people

Long spells of very high temperatures aggravate the general vulnerability of these groups. Therefore, framework conditions have to be created to maintain their quality of life as high as possible. Vulnerable groups have to be made aware of heat risks and measures and addressed in a targeted way.

Elderly people

Around 318,000 people aged 65 years or more currently live in Vienna. That corresponds to roughly ten percent of Vienna's overall population. Districts with a high share of elderly people are, for example, Donaustadt, Floridsdorf, Favoriten, Liesing and Penzing. In extreme heat, elderly people are at increased risk because they perceive heat only to a limited extent and, as a result, frequently take countermeasures too late. Moreover, the feeling of thirst decreases with age so that elderly people are in danger of dehydrating.
The capacity of elderly people for heat regulation is reduced and slowed down. Women tend to feel faint more often than men as they sweat less, which also means that their cooling function is less effective.

Socially isolated people

People who involuntarily live in social isolation and, hence, have few social contacts they experience as positive and feel lonely have an elevated risk of suffering from certain diseases. This also increases their vulnerability to heat. The risk is highest among elderly people who are not visited by home care services. They lack social control, offers of support and people who can be contacted in case of complications.

People in need of care

Care dependency refers to a situation in which persons affected by a disease or disability – frequently related to their age – cannot cope with everyday life on their own and therefore need care or help from others. Extreme heat can be dangerous for people in need of care. As their health is frequently impaired, their ability to take action is much restricted. Their body adapts poorly to high temperatures. This may lead to severe health problems or worsen existing conditions.
Moreover, a lack of support in drinking or reduced thirst may result in dehydration. This may cause symptoms such as fatigue, headache, sickness, vomiting or vertigo. Other consequences are fever, cramps, disorientation and dizziness or even circulatory failure and shock. Drowsiness and weakness, in their turn, increase the risk of falls.

People suffering from chronic diseases

A disease is considered to be chronic if it persists for a long time and is difficult to cure or cannot be cured completely. People suffering from chronic diseases have to undergo treatment repeatedly. Chronic diseases of the cardiovascular system, lung diseases, cancer therapies, obesity, diabetes and malnutrition, Alzheimer's and dementia as well as allergies, etc., exacerbate heat vulnerability.
Heat can aggravate complaints. Due to poor health, the body cannot respond to the extreme conditions as well as in healthy people. Thus, symptoms frequently worsen. Chronically ill people increasingly suffer from problems such as drowsiness, fatigue or heart arrhythmia during hot spells. In most cases, they have to take medication every day. Under the influence of heat, the effects and side effects of drugs (in particular drugs lowering the blood pressure) may change. In some cases, medication has to be adjusted to avoid decompensation.

People suffering from mental diseases

The most widespread mental illnesses are anxiety disorders, followed by alcohol-related disorders and depression. Patients are frequently affected by several mental diseases that may reinforce each other. For example, depression is frequently found in conjunction with anxiety disorders. In case of conditions such as depression, self-care is reduced. People suffering from them are slower to take action to improve their own situation. Schizophrenia patients experience diminished physical sensations so that they may not notice that they are sweating. Others cannot bear the heat at all and increasingly isolate themselves when temperatures are high. Moreover, only a small percentage of people affected by mental diseases have contacts with the medical system. This lack of contact makes it more difficult to reach out to them and support them.
During hot periods, anxiety and depression increase markedly among the elderly or predisposed people. They cannot escape the heat and are afraid of the next heatwave. People having mental problems feel additional stress when it is hot. Patients suffering from anxiety or panic disorders seldom attribute symptoms such as shortness of breath or mild circulatory problems to the heat. Instead, panic attacks become more frequent.
Psychiatric drugs, such as tranquillisers, neuroleptics, serotonin agonists and anti-depressants, strain the cardiovascular system and increase the heat vulnerability of mentally ill people. People suffering from dementia are only able to a limited extent to respond adequately to extreme situations. Without assistance, they frequently do not drink enough liquids.

Pregnant women

Pregnant women are less heat-tolerant. Therefore, they can experience circulatory problems, drowsiness and heavy legs on hot days. During pregnancy, the body produces more heat because the metabolic rate and blood flow are higher than usual. The blood vessels of the skin dilate and release the heat. High temperatures can put a heavy strain on the body – especially if the circulatory system is not entirely stable. Moreover, the skin is more sensitive to the sun due to pregnancy hormones. As a result, skin irritation, sun allergies, skin discoloration or pigment patches occur more frequently.

Infants and young children

Infants need special protection when it is hot. They are highly vulnerable and depend on persons taking care of them. Small children, too, cannot effectively protect

themselves against heat and UV radiation without guidance. Babies and toddlers are less tolerant to heat and suffer from overheating faster than grown-ups. As they have fewer sweat glands in relation to their body volume, it is more difficult for them to regulate their core body temperature and they overheat up to five times faster than adults.
Children dehydrate more easily because they have less liquid reserves. Moreover, ozone levels may be elevated on hot days, which particularly affects infants as their oxygen demand is high. Factors related to their social situation, home and housing environment may additionally raise the vulnerability of children.

People working outdoors

People working outdoors are active, for example, in construction, agriculture or gastronomy. Even though they are not a typical risk group, they partly are subject to extreme heat and UV exposure and require special attention.
When temperatures are high, their performance is lower than on days with normal conditions. At the same time, the quality of work declines; mistakes are made more frequently, and the risk of accidents rises. Employers therefore have to adapt working conditions (e.g. by adjusting working hours and rules for breaks).

People living in difficult socio-economic conditions

Gender and social inequalities adversely affect health. In many cases, women, people at risk of poverty and people exposed to prolonged strain, such as workers with physically demanding jobs, have a worse health status. This restricts their ability to adapt to heat. Further potential risk factors are educational disparities and language barriers. As a result, these people have limited access to information on heat-related health hazards. Above all elderly people living in difficult socio-economic conditions increasingly seclude themselves in their homes when the weather is very hot. This behaviour becomes problematic especially if poor housing conditions exacerbate the heat.

Homeless people

Homelessness is the condition of lacking a permanent home and having to sleep in public spaces, outdoors or in emergency accommodation. In industrialised countries, the majority of homeless people are male.
Heat harbours massive hazards for the homeless. They are exposed to it without any protection and can only seldom retreat to cool places. Dehydration and circulatory failure may ensue. Clothing soaked with sweat impairs the healing of open wounds. The homeless also face the risk of foodborne infections as they cannot refrigerate food adequately when temperatures are rising. Alcohol and drug abuse put strains on the body. Intoxication reduces body sensations so that dehydration, overheating or heatstroke is recognised less quickly.

4.4 Measures for specific target groups in detail

Special measures for specific vulnerable risk groups are described below. The measures are effective either for one target group or several target groups.

Z1 "Heat Toolbox" for people living in difficult socio-economic conditions

Description of the measure
The Heat Toolbox contains information materials such as flyers, maps and videos. It includes, for example, recommendations for hot days at home and at work, a video with health tips, outings to cool destinations ("cool tours" through the city), maps showing cooler places in selected districts as well as a cookbook with light and refreshing recipes for the summer. The Toolbox is mainly intended for people who work with people living in difficult socio-economic conditions (e.g. Area Management Offices, health centres, municipal departments of the City of Vienna, physicians' surgeries, Caritas, Volkshilfe, etc.). The information is to be made available in several languages.

Actions
— Examination of potential applications of the Heat Toolbox in the City of Vienna

Target group
People living in difficult socio-economic conditions

Impact
Seasonal preparatory

Responsibility
City of Vienna – Integration and Diversity (MA 17)

Contributors
Area Management Offices, charitable organisations, Vienna Social Fund, etc.

Performance indicators
Number of Heat Toolboxes distributed

Z2 Workshops and themed weeks on heat-relevant aspects at schools

Description of the measure
Pupils and students are multipliers. They also talk about topics addressed at school with their parents at home. The subject of urban heat could, for instance, be presented and discussed in workshops or themed weeks. In this way, especially parents of disadvantaged children living in difficult socio-economic conditions can be alerted to hazards caused by heat.

Actions
— Definition of heat-relevant contents
— Organisation of workshops and themed weeks
— Identification of multipliers

Target group
Children and young people
People living in difficult socio-economic conditions

Impact
Seasonal preparatory

Responsibility
Vienna Board of Education

Contributors
City of Vienna – Social Welfare, Social and Public Health Law (MA 40), Integration and Diversity (MA 17), Die Helfer Wiens

Performance indicators
Implementation of themed weeks and workshops

Z3 Heat prevention at kindergartens, groups for young children

Description of the measure
In kindergartens and groups for young children, preventive measures are continually taken to protect children and infants against heat. The decision on measures to be implemented (e.g. water playgrounds, possibilities for ventilation by night, parasols, fans, shading, etc.) are taken on site.

Actions
— Preparation and further development of the set of measures for kindergartens and groups for young children
— Regular discussion of the topic of heat protection in staff meetings
— Selection of suitable measures
— Implementation checks

Target group
Infants and young children

Impact
Seasonal preparatory

Responsibility
City of Vienna – Kindergartens (MA 10)

Contributors
Districts, City of Vienna – Building and Facility Management (MA 34)

Performance indicators
Number of kindergartens and groups for young children implementing measures

Z4 Addressing and activating paediatrician surgeries

Description of the measure
In addition to parents, paediatricians play an important role in providing information on the hazards resulting from heat for children. Tips on appropriate behaviour can be disseminated to parents by means of folders or in a video shown in the waiting area (depending on the equipment available in surgeries).

Actions
— Definition of measures and contents
— Active, easily accessible education on heat risks and appropriate protective actions by means of heat-related information material and – if possible – videos in the waiting area

Target group
Infants and young children

Impact
Seasonal preparatory / short-term, ad-hoc

Responsibility
City of Vienna – Directorate for Climate Matters

Contributors
Vienna Hospital Association, paediatricians, Medical Chamber, City of Vienna – Public Health Services (MA 15)

Performance indicators
Number of folders; number of counselling talks

Z5 Heat standards for hospitals, residential and nursing homes, day-care centres for senior citizens as well as home care services

Description of the measure
Heat standards on how to deal with hot days and heatwaves will be introduced in hospitals, residential and nursing homes, day-care centres for senior citizens as well as home care services. Examples of concrete measures are: Processes for cooling rooms and lowering body temperature, ensuring liquid supply, changing menus to light dishes, protecting the nursing staff against heat strain, etc.

Actions
— Review of existing heat standards
— Identification of criteria for the development and expansion of heat standards
— Development and communication of heat standards in the relevant facilities

Target group
Elderly people and people in need of care, people suffering from chronic diseases

Impact
Seasonal preparatory

Responsibility
Vienna Hospital Association: hospitals; Vienna Social Fund: residential and nursing homes, day-care centres for senior citizens as well as home care services

Contributors
Residential and nursing homes, home care services, Medical Chamber, Dachverband Wiener Sozialeinrichtungen (umbrella organisation of Vienna's social care institutions), Vienna Social Fund

Performance indicators
Development of heat standards; effectiveness of heat standards

Z6 Information of staff in therapy and counselling facilities as well as clinics for mentally ill people

Description of the measure
Self-care and physical sensation are severely limited among people suffering from mental diseases. Therefore, caregivers have to be informed of the special needs of mentally ill people in dealing with heat during hot spells.

Actions
- Preparation of information on how to deal with mentally ill people during heatwaves
- Ensuring that staff and therapists actively address and inform mentally ill people during spontaneous consultations and regular therapy appointments

Target group
People suffering from mental diseases

Impact
Seasonal preparatory

Responsibility
City of Vienna – Directorate for Climate Matters

Contributors
City of Vienna – Public Health Services (MA 15), hospitals, Medical Chamber

Performance indicators
Preparation of information

Z7 Integration of heat-relevant aspects into existing education tools of the City of Vienna

Description of the measure
The City of Vienna offers a comprehensive climate and environmental education programme for children and young people. Heat-relevant aspects will be integrated into existing education tools, such as Lobau Forest School, Vienna Water Class, Hirschstetten Botanical Gardens, Kagran School Garden, Mauerbach Tree Nursery, Of the greenhouse effect and renewable energies (Von Treibhauseffekt und erneuerbaren Energien) at the Wien Energie World of Experience, etc.

Actions
- Selection of suitable education tools
- Definition of contents and integration of heat-relevant aspects
- Examination of extension to other education programmes and tools

Target group
Children and young people

Impact
Seasonal preparatory

Responsibility
City of Vienna – Climate, Forestry and Agriculture (MA 49)

Contributors
City of Vienna - Vienna Water (MA 31), Parks and Gardens (MA 42), Wien Energie, Die Helfer Wiens, Vienna Board of Education, Education and Youth (MA 13), WienXtra, VWJZ (association of Viennese youth centres), etc.

Performance indicators
Implementation of education programmes that integrate heat-relevant aspects

Z8 Package of measures for homeless people

Description of the measure
Homeless people are often exposed to heat without any protection. Therefore, heat strain has to be reduced for this target group. Cool facilities are to be provided for them. Additionally, water, sun lotion, sun umbrellas, hats, glasses and hygiene products are to be distributed in the streets to protect homeless people against dehydration, burns and direct exposure to the sun. Shower facilities are to be expanded to improve hygiene.

Actions
- Examination of further measures for cooling the day-care centres for homeless people (including budgetary requirements)
- Survey of current capacities in the field of social street work
- Closer co-operation and exploitation of synergies across social work performed by various departments of the City of Vienna in public spaces

Target group
Homeless people

Impact
Seasonal preparatory / short-term, ad-hoc

Responsibility
Vienna Social Fund

Contributors
Partner organisations of the Vienna Social Fund, Die Helfer Wiens, Sucht- und Drogenkoordination Wien (co-ordination centre for addiction and drugs), Vienna Area Management Offices, etc.

Performance indicators
Frequency of service use; satisfaction of homeless people with municipal services

Z9 Establishment of a "heat line"

Description of the measure
Citizens at particular risk (elderly people and people living alone as well as pregnant women, infants, disabled or chronically ill people) can register so that they receive a call or an SMS or app message combining a personal warning with useful tips on days when a heat alert is issued. During calls, the staff of the "heat line" watches out for signs of health issues. If necessary, they inform the competent GP for follow-up home visits (team of nurse plus paramedic).

Actions
— Check of whether the health advice hotline of the City of Vienna can be expanded
— Possible integration of the "heat line"
— If appropriate, development of a dedicated tool

Target group
Elderly people and socially isolated people, people suffering from chronic or mental diseases, pregnant women, infants

Impact
Short-term, ad-hoc

Responsibility
Vienna Social Fund

Contributors
Medical Chamber (home visits), Area Management Offices, districts, Die Helfer Wiens, etc.

Performance indicators
Number of people registering; number of calls

Z10 Neighbourhood assistance during heatwaves

Description of the measure
Vulnerable groups, such as the elderly, isolated people, etc., depend on outside help and mutual assistance in their neighbourhood. In Vienna, there are numerous neighbourhood and local facilities (e.g. Wien Zimmer as a place of encounter, neighbourhood centres, Area Management Offices). They can act as multipliers and provide useful tips. Assistance services, such as domestic support, meals on wheels, etc., can be used to establish direct contacts with the people concerned.

Actions
— Survey of services offered by the City of Vienna in the field of neighbourhood assistance
— Development of an awareness campaign
— Establishment and expansion of a network of volunteers aimed at raising awareness of the heat issue

Target group
Elderly people, people suffering from chronic diseases, socially isolated people, pregnant women, infants, people suffering from mental diseases

Impact
Short-term, ad-hoc

Responsibility
City of Vienna – Directorate for Climate Matters

Contributors
Die Helfer Wiens, charitable organisations, Vienna Social Fund, Area Management Offices

Performance indicators
Number of services offered

Z11 Medical consultations by phone during heatwaves

Description of the measure
On hot days, physicians may be consulted by phone. Thus, patients do not need to leave their home, for example, to get a prescription for their medication. More home visits could be made as well. Physicians could also have a list of elderly or isolated people who are contacted, asked how they are and informed on how to protect against the heat. Drugs could be delivered by pharmacies' delivery services.

Actions
— Check of whether consultations by phone are also possible during heatwaves (similarly to the COVID-19 pandemic)
— Clarification of the issue of home visits
— Survey of delivery services offered by pharmacies

Target group
Elderly and socially isolated people, people suffering from chronic diseases

Impact
Short-term, ad-hoc

Responsibility
Vienna Social Fund

Contributors
Medical Chamber, etc.

Performance indicators
Number of phone consultations

Z12 Heat protection for people working outdoors, within the sphere of activities of the City of Vienna

Description of the measure
Effective measures are to protect employees working outdoors against excessive exposure to the sun: Employers are to raise awareness among their employees. They can provide skin protectants, sunglasses with UV protection, headwear, beverages or (protective) clothing, adapt breaks and dishes offered at canteens and accordingly update first-aid know-how. By conveying information to and raising awareness among employees, it is to be ensured that precautions are taken on hot days. Furthermore, it is to be examined whether additional heat protection measures (going beyond existing legal requirements) can be made mandatory.

Actions
— Definition of contents
— Provision of information to contractors on heat protection measures to be taken
— Check of whether heat protection measures can be made mandatory in the City of Vienna's own sphere of activities
— The objective is to expand the measure beyond the City of Vienna's own sphere of activities

Target group
Staff of the City of Vienna working outdoors, as multipliers

Impact
Seasonal preparatory / short-term, ad-hoc

Responsibility
City of Vienna – Chief Executive Office – Executive Group for Personnel and Internal Auditing

Contributors
City of Vienna – Climate, Forestry and Agriculture (MA 49), Parks and Gardens (MA 42), Vienna Water (MA 31), Water Management (MA 45), Waste Management, Street Cleaning and Vehicle Fleet (MA 48), Road Management and Construction (MA 28) and other relevant municipal departments, Centre for Occupational Medicine of KFA (health insurance institution for the employees of the City of Vienna)

Performance indicators
Information provided; feedback from members of the target group

Z13 Examination of options to adapt working hours for staff of the City of Vienna working outdoors, taking account of the specific requirements of relevant departments

Description of the measure
High temperatures reduce performance and increase accident risks. Taking account of available working time models, the working and service hours of municipal employees working outdoors are, therefore, to be made more flexible as far as the law allows.

Actions
— Identification of the relevant workplaces
— Definition of recommendations on a more flexible design of existing working time models
— The objective is to expand the measure beyond the City of Vienna's own sphere of activities.

Target group
Staff of the City of Vienna working outdoors, as multipliers

Impact
Short-term, ad-hoc

Responsibility
City of Vienna – Chief Executive Office,
Executive Group for Personnel and Internal Auditing

Contributors
City of Vienna – Climate, Forestry and Agriculture (MA 49), Parks and Gardens (MA 42), Vienna Water (MA 31), Water Management (MA 45), Waste Management, Street Cleaning and Vehicle Fleet (MA 48), Road Management and Construction (MA 28) and other relevant municipal departments, Chamber of Labour

Performance indicators
Number of steps taken to raise flexibility

4.5 Long-term measures

Under its Climate Protection Programme, the City of Vienna has successfully taken climate protection measures for many years. The Smart City Wien Strategy and the new Vienna Climate Guide provide important impulses for climate protection and climate adaptation. The focus of the Heat Action Plan is on short-term and seasonal preparatory measures. As a result, the list given below highlights only a few examples of the numerous long-term measures taken against urban overheating.

L1 (Avenue) tree initiative

Description of the measure
Identification of new sites for trees in parks and along streets by 2025 to cool down the city in the medium and long term. Above all, avenue trees reduce temperatures in hot streets. Shading devices (e.g. at Zimmermannplatz or Christian-Broda-Platz) provide for cool shade.

Responsibility
City of Vienna – Road Management and Construction (MA 28), Parks and Gardens (MA 42)

L2 Desealing drive

Description of the measure
Desealing of asphalt-covered surfaces managed by MA 28 and greening them by planting combinations of grasses and shrubs that are particularly tolerant of heat and drought, easier to maintain and, additionally, insect-friendly.

Responsibility
City of Vienna – Road Management and Construction (MA 28), Parks and Gardens (MA 42)

L3 New parks

Description of the measure
Creation of new park areas totalling 400,000 m². Vienna's Urban Development Plan provides for additional parks, for example in Seestadt Aspern and Adele-Jellinek-Park.

Responsibility
City of Vienna – Urban Development and Planning (MA 18), District Planning and Land Use (MA 21), Parks and Gardens (MA 42)

L4 Sponge city principle

Description of the measure
Roots are given more space below the streets. Hence, stored and retained rainwater is available to the trees for a longer time. The City of Vienna deseals pathways and squares and sets up shady (greened) pergolas. Pilot projects are implemented in Seestadt Aspern, at Johann-Nepomuk-Berger-Platz and Johann-Nepomuk-Vogl-Platz.

Responsibility
City of Vienna – Road Management and Construction (MA 28)

L5 Financial support

Description of the measure
Promotion and participation programmes supporting climate adaptation. The Liveable Climate Model City programme is intended for districts and provides funding for greening buildings, e.g. roofs, façades and courtyards. The installation of externally mounted sunshades (e.g. retrofitting of blinds) is subsidised as well. Funding is provided for consulting, planning services and implementation. The pilot programme "150 Green Buildings" offers a set made up of a planter, substrate, climbing aids and two climbing plants.

Responsibility
City of Vienna – Executive Group for Construction and Technology, Environmental Protection (MA 22), Housing Promotion and Arbitration Board for Legal Housing Matters (MA 50)

L6 Vienna Climate Team

Description of the measure
Implementation of participatory budgets at the district level (climate teams). Citizens can submit their ideas for projects in the field of climate protection and climate adaptation. They are implemented together with experts.

Responsibility
City of Vienna – Energy Planning (MA 20)

L7 Cooling of buildings such as schools, hospitals, care facilities, surgeries, etc.

Description of the measure
Advice and initiation of pilot projects combining active and passive measures for cooling buildings without conventional air conditioning systems. Passive measures are, for example, externally mounted sunshades or the greening, shading and ventilation of the area covered by planning. Active measures include the use of low-temperature heating systems – in particular by means of thermal component activation as well as ceiling heating and cooling systems. In the long term, a combination with seasonal storage (e.g. via geothermics) or the reuse of waste heat (e.g. by feeding it into the district heating network or using it for hot water supply) makes buildings fit for the summer.

Responsibility
City of Vienna – Energy Planning (MA 20)

L8 Urban climate analysis

Description of the measure
Using urban climate analysis maps to take better account of aspects of the urban climate already in the planning phase. A climate analysis map shows the thermal aspect of the urban climate and, hence, highlights overheated areas. The thematic map on cold air at night presents flows and accumulations of cold air.

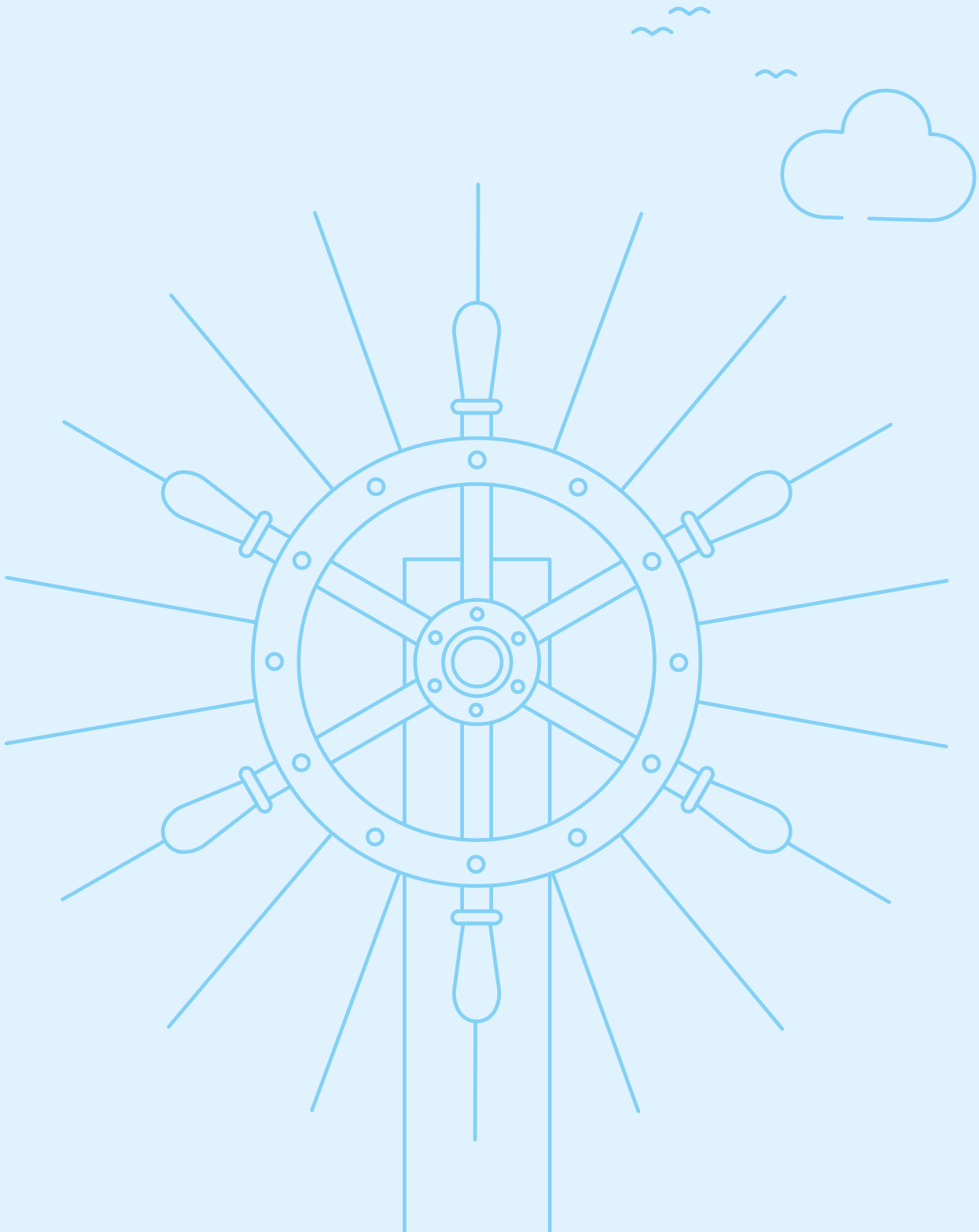
Responsibility
City of Vienna – Urban Development and Planning (MA 18)

L9 Climate-sensitive planning

Description of the measure
Development and continuation of strategic measures designed to prevent urban heat islands. Heat emissions and their impact on the microclimate and mesoclimate are assessed for new projects.

Responsibility
City of Vienna – Environmental Protection (MA 22)

5. Management and communication



5.1 Communication cascade

The Vienna Heat Action Plan presents cross-cutting measures for the general public as well as measures for one or more selected vulnerable target groups. The measures have been described, and the schedule and the players responsible for implementation have been laid down.

On this basis, a "communication cascade" is established. It defines the sequence of communication steps that are needed in order to take preparatory measures in the run-up to a heatwave. The communication cascade structures the communication process of the different players from public authorities to social and care facilities, pharmacies or the Medical Chamber. Here, a distinction has to be made between forward planning to prepare for the hot season and urgent action in case of an imminent heat event.

Specific information packages have to be developed for various target groups. The objective is to ensure that all relevant organisations, authorities and institutions continue to be able to act during heat events.

Heat alert system of the City of Vienna

When a heatwave is imminent, the heat alert system of the City of Vienna is the starting point of the communication cascade.

In 2010, the Vienna Health Board implemented a preventive heat alert service that warns against impending severe heat stress in co-operation with the Central Institute for Meteorology and Geodynamics (ZAMG). Thus, Vienna's population, in particular vulnerable people and their caregivers, can prepare for heatwaves early on.

ZAMG issues heat alerts for hot spells lasting three or more days with a high level of heat stress (mean perceived temperature of 35 degree Celsius or more and minimum night-time temperature of not less than 20 degree Celsius). The following institutions directly receive alerts and all-clear messages by e-mail from ZAMG on behalf of the Vienna Health Board:

— Vienna Hospital Association
— Private hospitals with in-patient services in Vienna
— Vienna Social Fund
— Dachverband Wiener Sozialeinrichtungen (umbrella organisation of Vienna's social care institutions)
— Vienna Board of Education
— City of Vienna – Chief Executive Office, Executive Group for Organisation and Security, Crisis Management and Security Group
— City of Vienna, Chief Executive Office - Executive Group for Personnel and Internal Auditing
— City of Vienna – Kindergartens (MA 10), private kindergartens via the Child and Youth Welfare Service (MA 11)
— City of Vienna – Integration and Diversity (MA 17)
— City of Vienna - Vienna Water (MA 31)
— City of Vienna – Social Welfare, Social and Public Health Law (MA 40) / Nursing Home Supervision
— City of Vienna – Parks and Gardens (MA 42)
— City of Vienna – Municipal Swimming Pools (MA 44)
— City of Vienna – Waste Management, Street Cleaning and Vehicle Fleet (MA 48)
— City of Vienna – Climate, Forestry and Agriculture (MA 49)
— City of Vienna – Press and Information Services (MA 53) / editor on duty

— City of Vienna – Schools (MA 56)
— City of Vienna – Fire Services and Disaster Relief (MA 68) / provincial alarm centre
— City of Vienna – Emergency Medical Services (MA 70)
— Vienna Red Cross
— St. John's Ambulance Service in Vienna
— Hospitaller Service of the Order of Malta in Vienna
— Workers' Samaritan Federation in Vienna
— Die Helfer Wiens
— Vienna Police Directorate
— Area Management Offices

The persons in charge in umbrella organisations, associations, etc., who receive information and alert messages forward heat alerts and information on risks and measures to their contacts within their sphere of activities.

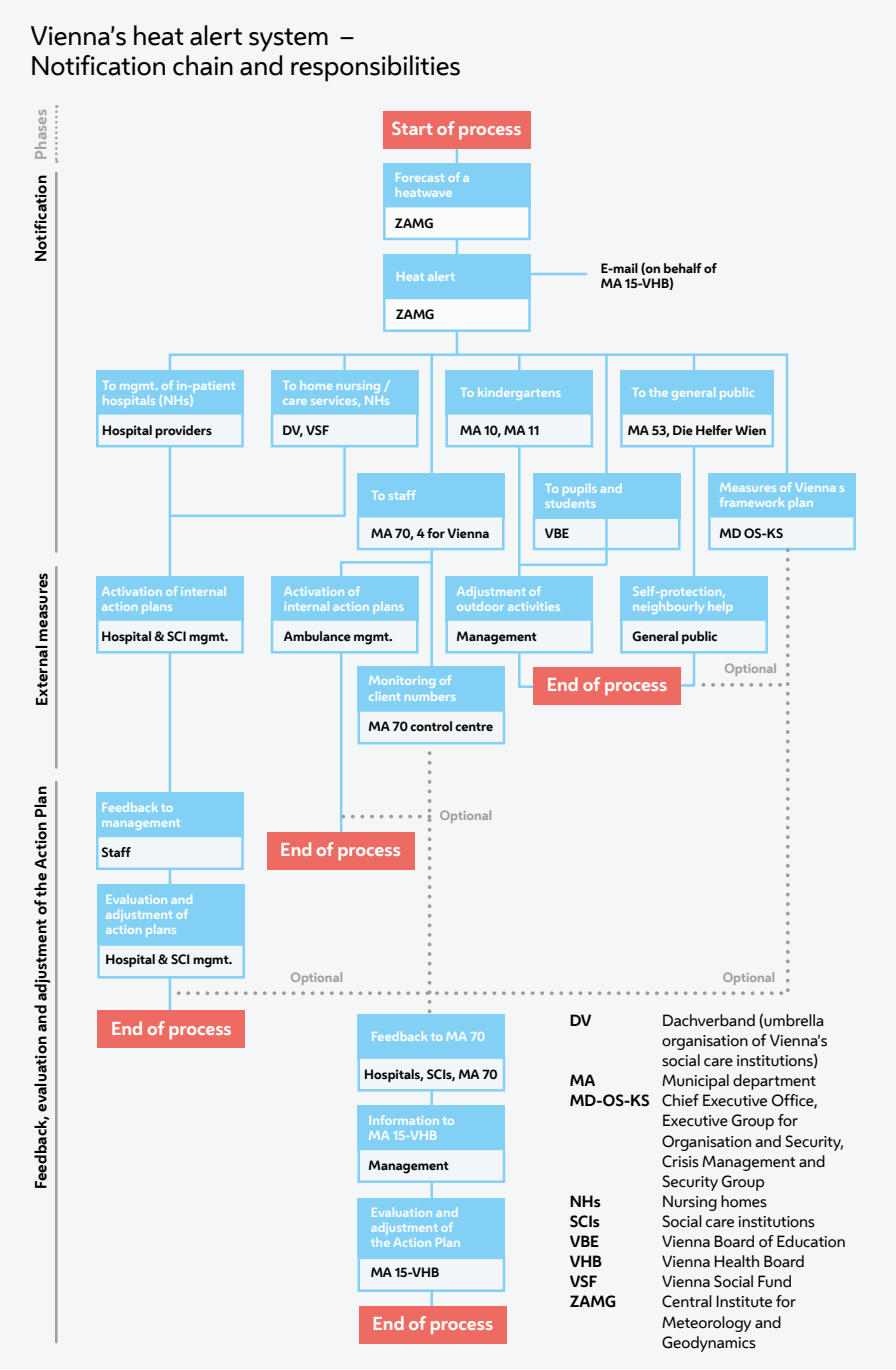


Figure 9
Schematic overview of Vienna's heat alert system; source: City of Vienna, Vienna Health Board (2018). Leitfaden Hitzemaßnahmenplan Wien

5.2 Management and co-ordination

The strategic co-ordination and management of the Heat Action Plan is ensured by the Steering Board, which convenes twice a year. The first meeting of the year always takes place before summer and is to make preparations for the hot season: Are all measures on track? Are there any new measures? The second meeting of the year is held in autumn and focuses on evaluation: What did work out well? What has to be improved? Which new measures are necessary?

The Steering Board represents the needs and requirements of the players and stakeholders (municipal departments, institutions, charitable organisations, etc.) and ensures that they are taken into account in the Heat Action Plan.

The Directorate for Climate Matters prepares the Steering Board meetings with regard to the matters to be dealt with and convenes them.

The following entities are represented on the Steering Board:

— City of Vienna – Chief Executive Office, Directorate for Climate Matters
— City of Vienna – Chief Executive Office, Executive Group for Organisation and Security
— City of Vienna – Chief Executive Office, Executive Group for Organisation and Security, Crisis Management and Security Group
— City of Vienna – Chief Executive Office, Executive Group for Organisation and Security, Process Management and ICT Strategy Group
— City of Vienna – Executive Group for Construction and Technology
— City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing
— City of Vienna – Kindergartens (MA 10)
— City of Vienna – Public Health Services (MA 15)
— City of Vienna – Integration and Diversity (MA 17)
— City of Vienna – Urban Development and Planning (MA 18)
— City of Vienna – Energy Planning (MA 20)
— City of Vienna – Environmental Protection (MA 22)
— City of Vienna – Economic Affairs, Labour and Statistics (MA 23)
— City of Vienna – Road Management and Construction (MA 28)
— City of Vienna – Vienna Water (MA 31)
— City of Vienna – Parks and Gardens (MA 42)
— City of Vienna – Climate, Forestry and Agriculture (MA 49)
— City of Vienna – Press and Information Services (MA 53)
— City of Vienna – Schools (MA 56)
— City of Vienna – Emergency Medical Services (MA 70)
— Vienna Social Fund
— Vienna Board of Education
— Vienna Hospital Association

Moreover, additional relevant players and stakeholders are called in as required.

The Steering Board is supported by a Scientific Advisory Council that can be consulted on detailed issues related to health and social aspects. Its members are:

— Hans-Peter Hutter, Deputy Head of the Department of Environmental Health at the Medical University of Vienna and expert on the health effects of climate change,
— Andreas Matzarakis, professor at the Research Centre Human Biometeorology of the Deutscher Wetterdienst in Freiburg,
— Andrea E. Schmidt, Head of Department, Competence Centre for Climate and Health and Senior Health Expert, Gesundheit Österreich GmbH, and

— Ulli Weisz, Key Researcher at the Ludwig Boltzmann Institute for Lung Health and the LEAD Study Center.

Once a year, all stakeholders, civil society players affected by the Heat Action Plan as well as interested members of the general public are invited to a symposium to discuss new directions and aspects across all sectors.

5.3 Evaluation and monitoring

The primary objective of the Heat Action Plan is to protect the population – especially vulnerable groups – against the impacts of heat in the city. Therefore, it is important to conduct regular reviews of the effectiveness of the measures and the communication cascade in consultation with relevant players and stakeholders and to adjust and optimise them, if necessary. The evaluation and monitoring of the Heat Action Plan continuously accompanies its implementation.

— In autumn, the focus is on the evaluation of the measures: Which measures have been effective and which measures need to be adapted? Which new measures have to be developed in order to reach out effectively to specific vulnerable risk groups?
— In winter, the Heat Action Plan and downstream activities are optimised. New measures are defined, new communication channels are set up and materials are developed.
— In spring, preparations are made for the hot season. If appropriate, basic and advanced training sessions are held. Information material is distributed, etc.
— In May or June (varying in line with the weather situation, depending on the number of summer days), awareness campaigns may be launched.
— As temperatures go down in autumn, the evaluation cycle of the Heat Action Plan is completed, and another round starts.

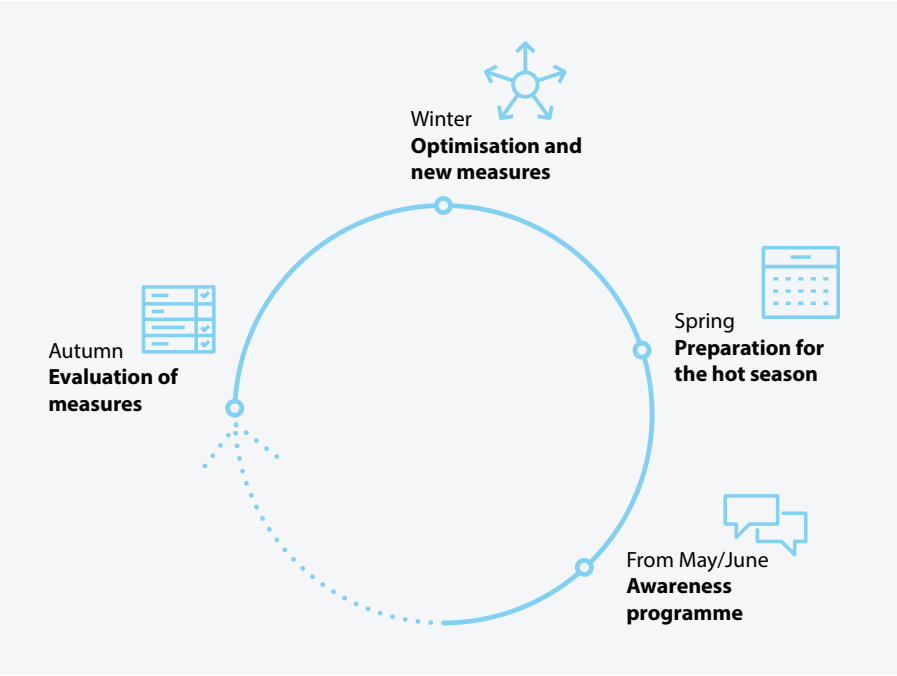


Figure 10
Schematic overview of the implementation, evaluation and development process of the Heat Action Plan

5.4 Supporting communications

The purpose of supporting communications and public outreach activities is to initiate health-relevant behavioural change and thereby reduce heat-related deaths and harm. The communication strategy is broken down into two phases: the preparatory phase before the summer and the acute phase during a heatwave.

Be prepared!

The preparatory communication phase comes before the first heatwave (approximately in May). Its aim is to raise awareness of health risks, resources and services offered in the field of heat protection.

Take action!

During a heatwave, information and warnings have to be communicated in a timely fashion. Recommendations for actions have to be worded clearly and concisely.

Target group-specific outreach

General communication measures designed for the public at large are to inform about health risks and provide tips on heat protection, heat reduction and available services and resources. The communication channels to be used include, for instance, the online and print media of the City of Vienna, classic media reporting and a symposium.

The vulnerable groups already defined are to be addressed specifically to ensure that they have easy access to information. Examples of related communication measures are target group-oriented fact sheets, the dissemination of information through relevant institutions and training for relevant communicators and multipliers.

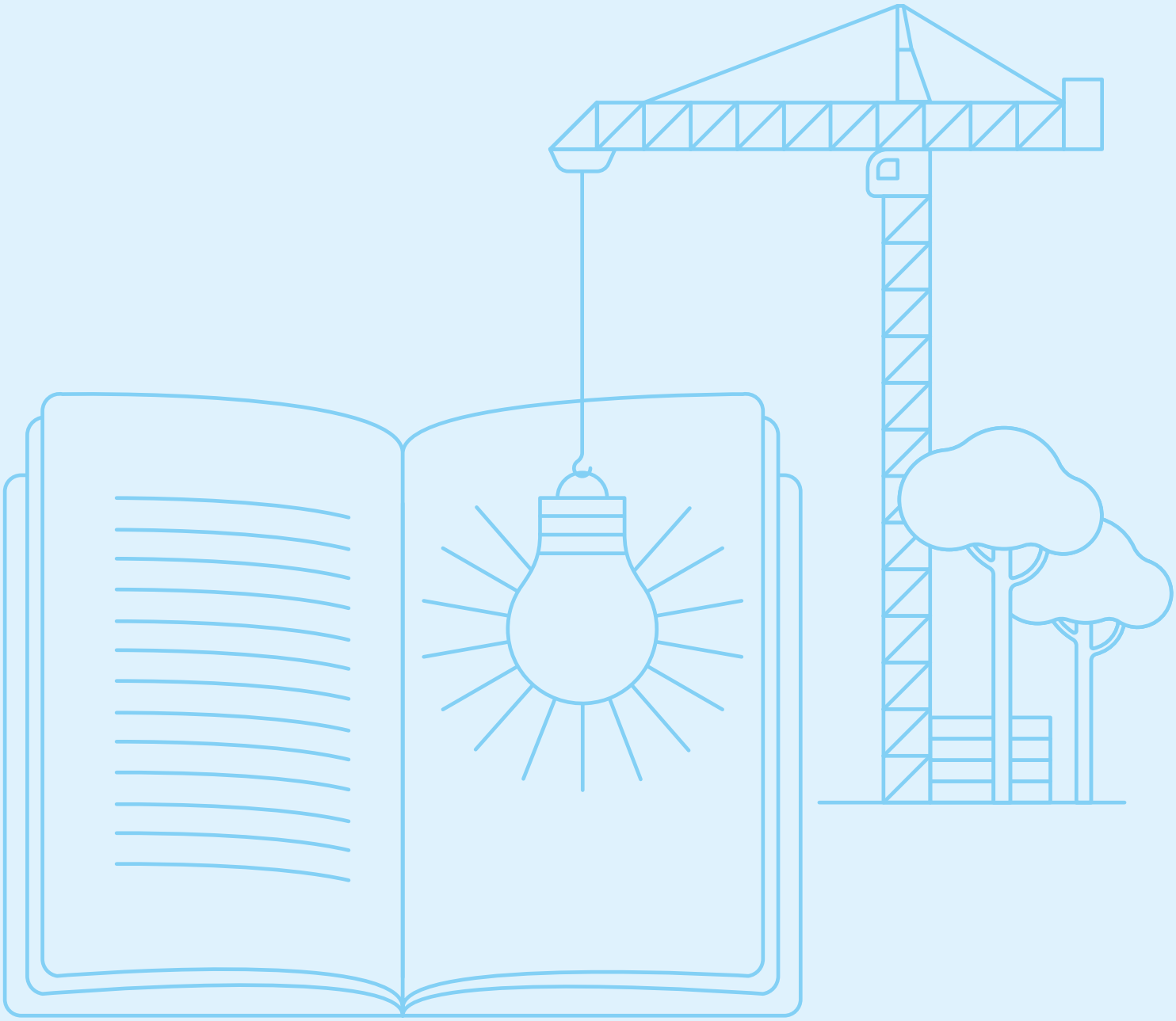
Data and innovation

A headline goal of the Smart City Wien Strategy is to make Vienna a digitalisation capital and to become a digital innovation leader and trendsetter. Therefore, the dissemination of information related to the Heat Action Plan should also be based on data.

Among others, the plans in place provide for:

— Data-based information and dashboards (similarly to COVID-19 dashboards)
— Monitoring of heatwaves
— Real-time information
— Early warning and alert systems via mobile phones / location-based information and heat alerts
— Personalised information via the internet / social media (push messages)
— Finding of solutions and identification of problems through citizens' involvement (interactive elements on websites, in apps, etc.)
— Networking opportunities for volunteers / buddies
— Long-term integration of digital urban planning tools
— Optimisation of information processes / information chains and reporting

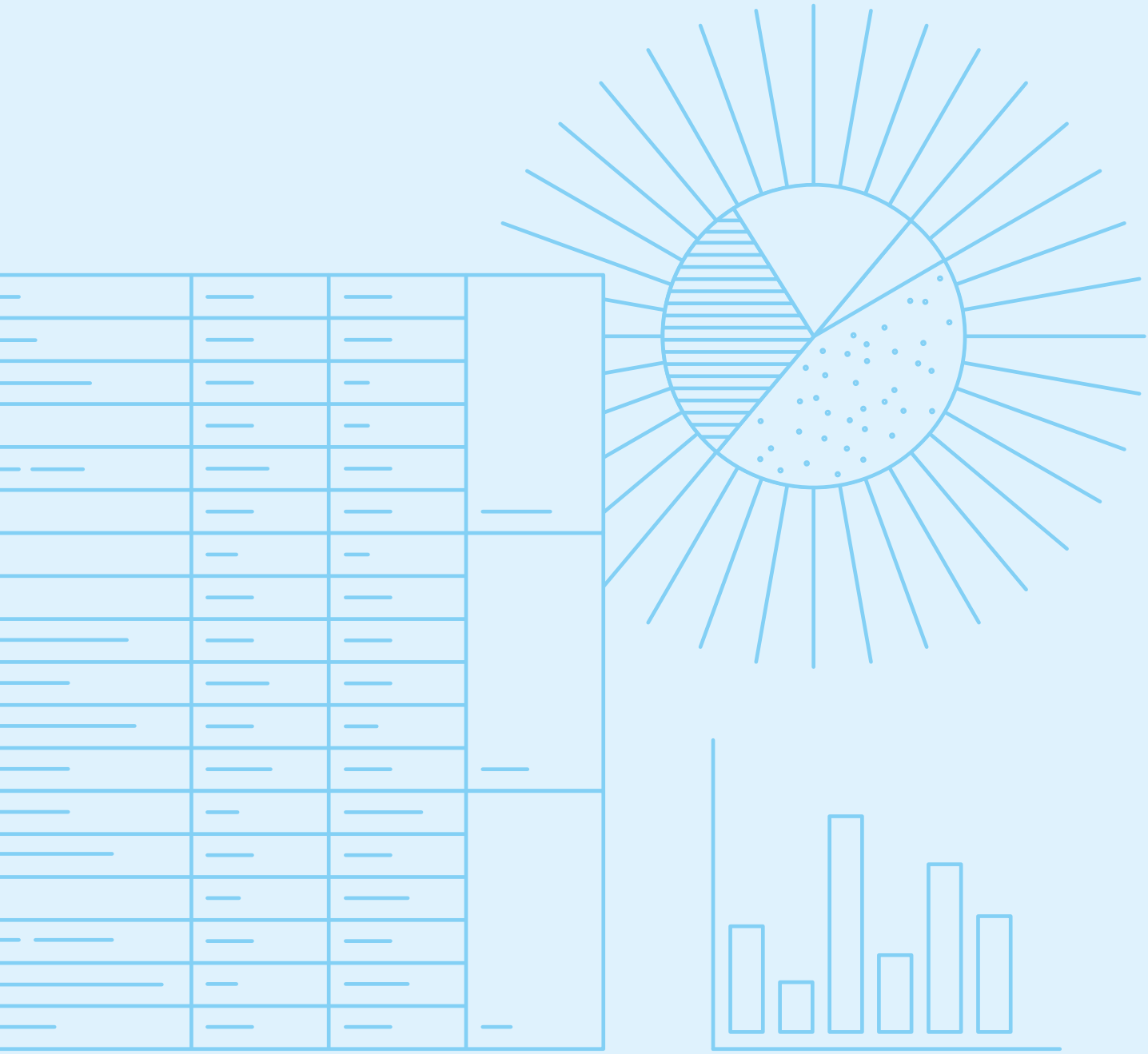
6. Perspectives



The present Heat Action Plan is not set in stone – it rather is a living document that will be adapted regularly. The periodic evaluation of the measures and concomitant monitoring allow for the continuous improvement, expansion or adjustment of the measures.

The City of Vienna takes its responsibility seriously. Rising temperatures put a strain on vulnerable urban areas and, in particular, risk groups. In view of climate change, Vienna faces the great challenge of responding to changing conditions in a fast and flexible manner and developing further on an ongoing basis.

As a result, the Heat Action Plan has to be understood not only as a comprehensive information paper but also as a working basis for sustained efforts to keep the quality of life at a high level for the citizens of Vienna also in the future.



Annex

At a glance: Measures and responsibilities

Responsibility	Measures	Impact
City of Vienna – Road Management and Construction (MA 28) City of Vienna – Parks and Gardens (MA 42)	L1 (Avenue) tree initiative	
City of Vienna – Road Management and Construction (MA 28) City of Vienna – Parks and Gardens (MA 42)	L2 Desealing drive	
City of Vienna - Urban Development and Planning (MA 18) City of Vienna – District Planning and Land Use (MA 21) City of Vienna – Parks and Gardens (MA 42)	L3 New parks	
City of Vienna – Road Management and Construction (MA 28)	L4 Sponge city principle	
City of Vienna – Chief Executive Office, Executive Group for Construction and Technology City of Vienna – Environmental Protection (MA 22)	L5 Financial support	
City of Vienna – Energy Planning (MA 20)	L6 Vienna Climate Teams	
City of Vienna – Energy Planning (MA 20)	L7 Cooling of buildings such as schools, hospitals, care facilities, surgeries, etc.	
City of Vienna – Urban Development and Planning (MA 18)	L8 Urban climate analysis	
City of Vienna – Environmental Protection (MA 22)	L9 Climate-sensitive planning	
City of Vienna – Public Health Services (MA 15)	Ü1 Vienna Heat Manual (*Wiener Hitzeratgeber*), information leaflets	
Vienna Hospital Association	Ü2 Training of physicians and nursing staff	
City of Vienna – Emergency Medical Services (MA 70)	Ü3 Ensuring care and assistance for an increased number of persons suffering from heat	
Vienna Board of Education	Ü4 “Teach the Teachers” workshops / Green School Programme	
City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing	Ü5 Special training focusing on aspects of heat protection and climate change within the sphere of activities of the City of Vienna	
City of Vienna – Press and Information Services (MA 53)	Ü6 Heat-related information on the website of the City of Vienna	
City of Vienna – Press and Information Services (MA 53)	Ü7 Heat-related information via WienBot (digital assistant)	
City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing	Ü8 Heat alert system at the workplace within the sphere of activities of the City of Vienna	

City of Vienna – Vienna Water (MA 31)	Ü9 Urgent measures taken by the City of Vienna on very hot days and during heatwaves	
City of Vienna – Parks and Gardens (MA 42)	Ü10 Shady outdoor workplaces in parks	
City of Vienna – Directorate for Climate Matters	Ü11 Cooling zones ("recreation islands")	
City of Vienna – Executive Group for Construction and Technology	Ü12 New cool spots on squares and in parks	
City of Vienna – Architecture and Urban Design (MA 19)	Ü13 "Shady benches"	
City of Vienna – Vienna Water (MA 31)	Ü14 Extension of the drinking fountain and drinking hydrant network	
City of Vienna – Integration and Diversity (MA 17)	Z1 "Heat Toolbox"	
Vienna Board of Education	Z2 Workshops and themed weeks on heat-relevant aspects at schools	
City of Vienna – Kindergartens (MA 10)	Z3 Heat prevention at kindergartens, groups for young children	
City of Vienna – Public Health Services (MA 15)	Z4 Addressing and activating paediatrician surgeries	
Vienna Hospital Association Vienna Social Fund	Z5 Heat standards for hospitals, residential and nursing institutions, day-care centres for senior citizens as well as home care services	
City of Vienna – Public Health Services (MA 15)	Z6 Information of staff in therapy and counselling facilities as well as clinics for mentally ill people	
City of Vienna – Climate, Forestry and Agriculture (MA 49)	Z7 Integration of heat-relevant aspects into existing education tools of the City of Vienna	
Vienna Social Fund	Z8 Package of measures for homeless people	
Vienna Social Fund	Z9 Establishment of a "heat line"	
City of Vienna – Directorate for Climate Matters	Z10 Neighbourhood assistance during heatwaves	
Vienna Social Fund	Z11 Medical consultations by phone during heatwaves	
City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing	Z12 Heat protection for people working outdoors, within the sphere of activities of the City of Vienna	
City of Vienna – Chief Executive Office, Executive Group for Personnel and Internal Auditing	Z13 Examination of options to adapt working hours for staff of the City of Vienna working outdoors, taking account of the specific requirements of relevant departments	

Seasonal preparatory Short-term, ad-hoc

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