



HAJDÚBÖSZÖRMÉNY
A HAJDÚK FŐVÁROSA

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Ready4Heat

HOGYAN VÉDEKEZZÜNK A HŐSÉG ELLEN?

Hajdúszoboszló hőség- és UV-riadóterve



Summary of The Hajdúböszörmény Heat and UV Strategy and Action Plan

Hajdúböszörmény is increasingly vulnerable to the adverse effects of climate change, particularly extreme heat events. These include rising temperatures, longer heatwaves, and an increase in tropical nights, which place significant strain on both public health and urban infrastructure. Projections indicate that the region could see a 90% increase in the number of heat days by 2050, driven by its low elevation, flat terrain, and continental climate. The municipality's Heat and Health Action Plan (HHAP) responds to these challenges, aiming to protect residents and mitigate the health, social, and economic impacts of extreme heat and ultraviolet (UV) radiation.

Basic Climatic Characteristics of Hajdúböszörmény

Hajdúböszörmény is situated in a region characterized by a flat, low-lying landscape and a continental climate. These features contribute to the city's pronounced vulnerability to climate change and extreme heat events. The area experiences hot summers with an average of 30 heat days per year, a number expected to increase significantly by the mid-21st century. By 2050, the frequency of heat days could rise by as much as 90%, accompanied by an increase in the duration of heatwaves and tropical nights.

The lack of significant natural features such as large water bodies or mountainous terrain exacerbates the region's susceptibility to heat stress. This is compounded by the urban heat island effect, where densely built environments, extensive asphalt surfaces, and limited vegetation contribute to localized temperature increases of up to 5–10°C above rural surroundings.

Urbanization trends, such as the widespread use of heat-retaining building materials and reliance on air conditioning, further intensify heat challenges. Combined with projections of reduced frosty days and increased annual mean temperatures, these climatic characteristics underline the critical need for adaptive measures outlined in the HHAP to address the region's growing exposure to extreme heat events.

The HHAP identifies the groups most at risk from heat-related health issues. Vulnerable populations include infants, young children, pregnant women, and the elderly, who account for approximately 5,500 of the city's 30,000 residents. Those with chronic illnesses—such as cardiovascular and respiratory diseases, diabetes, and other metabolic disorders—are particularly at risk, with over 12,000 residents affected. Socially isolated individuals, outdoor workers, and people experiencing homelessness are also highlighted as critical groups requiring targeted interventions.

The document highlights that the region's urban characteristics exacerbate heat-related issues through the urban heat island effect, where temperatures in built-up areas can be up to 5–10°C higher than in surrounding rural areas. Factors such as extensive asphalt coverage, dense construction, and a lack of vegetation contribute to this phenomenon. At the same time, the increasing reliance on air conditioning raises energy consumption and contributes to outdoor heat emissions, further intensifying urban heat challenges.

Heat and UV radiation also pose significant health risks. During heatwaves, the number of heat-related illnesses, including heat exhaustion and heat stroke, increases substantially, along with dehydration-related complications. The city has already experienced a rise in hospital admissions and mortality during heat alerts, with national statistics indicating a 15% increase in daily mortality rates during severe heat events. UV radiation, meanwhile, has long-term implications, such as higher incidences of skin cancer, cataracts, and immune system suppression. The HHAP incorporates a UV warning system, raising public awareness and encouraging preventative measures such as protective clothing, sunscreen use, and reduced outdoor activity during peak radiation hours.

Objectives of the Heat and Health Action Plan (HHAP)

The primary goal of Hajdúböszörmény's Heat and Health Action Plan (HHAP) is to address the growing impacts of climate change, particularly extreme heat events, by improving the city's resilience and safeguarding public health.

The plan emphasizes the importance of short-, medium-, and long-term strategies to adapt to the rising frequency, intensity, and duration of extreme heat events, including heatwaves and tropical nights. A central aim is to reduce heat-related illnesses and mortality, particularly among vulnerable populations such as children, the elderly, and those with chronic health conditions.

Developing effective heat and UV radiation warning and response systems is a priority. These systems provide timely alerts and guidance to residents on protective measures during heatwaves.

The plan seeks to counteract urban heat islands by integrating sustainable urban planning practices, such as increasing green spaces, tree cover, and shaded areas. Public education campaigns aim to improve understanding of the risks associated with extreme heat and UV radiation and promote preventative behaviors to enhance individual and community resilience.

The HHAP outlines a three-tiered strategy to address these challenges. In the short term, the city focuses on emergency responses, including the provision of cooling centers, public water access points, and real-time communication of heat warnings. Medium-term actions emphasize sustainable urban planning, such as increasing tree canopy cover and implementing shaded "green islands" across the city. These areas, equipped with natural and structural shading, serve as public refuges during heat events. In the long term, the plan seeks to integrate heat adaptation measures into urban development policies, reduce greenhouse gas emissions, and foster resilience within the local community.

To facilitate effective implementation, the HHAP calls for close collaboration among municipal departments, public health organizations, and community groups. Workshops conducted as part of the Ready4Heat project have engaged stakeholders in identifying priorities and formulating context-specific solutions. The strategy emphasizes education and public outreach, helping residents understand the risks of extreme heat and UV radiation and empowering them to take preventative measures.

The HHAP also highlights the importance of monitoring and evaluation, with periodic assessments to ensure the effectiveness of implemented measures. By combining immediate interventions with long-term sustainable strategies, Hajdúböszörmény aims to reduce heat-related mortality and morbidity, safeguard public health, and enhance the city's overall climate resilience.

HHAP positions Hajdúböszörmény as a leader in proactive climate adaptation, addressing the interconnected challenges of heat and UV exposure. The plan demonstrates a comprehensive approach that balances immediate needs with strategic investments in sustainability, ensuring a safer and more liveable environment for all residents in the face of climate change.

Heat protection measures for the City of Hajdúböszörmény

- COMMUNICATE THE HEAT ALERT WITH RECOMMENDATIONS
- MONITORING MORBIDITY AND MORTALITY
- OPENING AND COMMUNICATING COOL AND CHILLED BUILDINGS, PROVISION OF DRINKING WATER, VAPOUR GATES
- SUPPORT FOR ORGANISATIONS WORKING WITH DEPRIVED PEOPLE LIVING ALONE
- EXTENDING EARLY ASSISTANCE SERVICES
- HEALTH AWARENESS DEVELOPMENT AND WIDESPREAD DISSEMINATION
- HEAT PROTECTION EDUCATION FOR THOSE WORKING WITH VULNERABLE GROUPS
- PROVIDING DRINKING WATER IN PUBLIC AREAS, OPERATION OF VAPOR GATES
- NETWORK AND CONSULTING SERVICES FOR OUTDOOR WORKERS
- INFORMATION CAMPAIGN ON THE POSSIBILITIES OF BUILDING WITH GOOD THERMAL PROPERTIES
- AFFORESTATION, CARE OF URBAN TREES, TREE PLANTING, LANDSCAPING
- SUPPLEMENTING THE BUILDING ORDINANCE WITH ARCHITECTURAL SOLUTIONS WITH GOOD THERMAL PROPERTIES
- ANALYSIS AND PLANNING OF URBAN CLIMATE WITH GREEN ELEMENTS
- DEVELOPMENT OF SUSTAINABLE TRANSPORT SECTORS AND MULTIMODAL TRANSPORT
- PROMOTING AN ACTIVE LIFESTYLE AND INCREASING THE FITNESS OF THE POPULATION
- SHADING AND AIR-CONDITIONING OF EDUCATIONAL INSTITUTIONS
- SUPPORT FOR THE PLACEMENT OF GARDEN RAINWATER COLLECTION CONTAINERS AT HOME

S1 Short-term (acute) heat protection measures (occasional heat wave management)

COMMUNICATE THE HEAT ALERT WITH RECOMMENDATIONS

Informing the public about the expected extent, arrival and duration of the heatwave. Provide recommendations to the public for successfully surviving heatwaves. Active actors receive target- group-specific information. Community interest sites (multipliers) provide heat alerts and behavioral recommendations to their target groups.

The public can be informed about the coming heat wave (and how to protect themselves and others) through various information channels:

- on the municipality's own website or on the heat alert subpage
- on the municipality's official social media pages (Facebook)
- in the customer service office
- in the local newspaper (Szabadhajdú weekly, Hajdúböszörmény Szuperinfó Újság)
- SMS notification for the disabled and deaf
- Hajdúböszörmény Municipal Television (HBTV)
- on city billboards

S2 Short-term (acute) heat protection measures (occasional heat wave management)

MONITORING MORBIDITY AND MORTALITY

During heatwaves, the number of cases and deaths increases. Knowledge of temperature data and health data can point to areas for improvement, but this requires research. For this research, statistics on health institutions are needed.

S3 Short-term (acute) heat protection measures (occasional heat wave management)

OPENING AND COMMUNICATING COOL AND CHILLED BUILDINGS, PROVISION OF DRINKING WATER, VAPOUR GATES

During heat waves, an immediate, quick step to alleviate the health consequences of heat is to free up shelters from the heat, which cool and cooled buildings are suitable for.

A short-term solution for heat emergency (costly, waste-generating, unsustainable) is water distribution, where for some reason there is no public well or drinking water tap. (Medium-term solution: operation of public wells and drinking water taps.)

Part of a heat emergency solution may be to install additional vapor gates.

S4 Short-term (acute) heat protection measures (occasional heat wave management)

SUPPORT FOR ORGANISATIONS WORKING WITH DEPRIVED PEOPLE LIVING ALONE

People in need of living alone are primarily dealt with by the Social Service Centre, so it is important to support this organization.

S5 Short-term (acute) heat protection measures (occasional heat wave management)

EXTENDING EARLY ASSISTANCE SERVICES

Preterm babies, newborns, infants, young children; pregnant mothers and breastfeeding mothers are highly vulnerable, vulnerable population groups that may need preventive and first-round early assistance during heatwaves. These population groups are dealt with by health visitors, so it is necessary to extend and strengthen their assistance services.

M1 Medium-term heat protection measures (heatwave avoidance strategies)

HEALTH AWARENESS DEVELOPMENT AND WIDESPREAD DISSEMINATION

Health awareness related to heat and sustainability (climate change, environmental problems and opportunities for action) should be included among the tasks of public education. Public media (TV, radio, websites, newspapers, posters) and events (appearances at cultural events, posters, banners, leaflets) are designed for all ages.

M2 Medium-term heat protection measures (heatwave avoidance strategies) HEAT

PROTECTION EDUCATION FOR THOSE WORKING WITH VULNERABLE GROUPS

Social workers working in the Social Service Centre primarily deal with vulnerable population groups during the heatwave, therefore heat protection training preparing them for heat management is particularly important for them.

M3 Medium-term heat protection measures (heatwave avoidance strategies)

PROVIDING DRINKING WATER IN PUBLIC AREAS, OPERATION OF VAPOR GATES

In the summer heat, especially during heat waves, it is extremely important to consume enough drinking water. The easiest way is to have accessible and working sources, public wells, ornamental wells, drinking fountains, water taps or refill points in reasonably designed places. Water intake is necessary primarily in

places used for longer stays squares, parks, stations, pedestrian streets, shops, sports grounds, leisure parks (recreational areas). First, drinking water should be provided at Bocskai Square and the bus station, then drinking fountains should also be installed in other busier places: Szent István square, Korpona street – Kálvin square roundabout, Újváros street, City Market. The vapor gate currently operates in one place (2 pieces on Bocskai square). It is recommended to operate steam gates in some other areas with high pedestrian traffic: in the public area in front of the post office (Korpona Street), at the intersection of Szent István Square – Kossuth Street and around the City Market.

M4 Medium-term heat protection measures (heatwave avoidance strategies)

NETWORK AND CONSULTING SERVICES FOR OUTDOOR WORKERS

Outdoor workers are directly exposed to heat and heat waves during their working life, supported by network and advisory services.

M5 Medium-term heat protection measures (heatwave avoidance strategies)

INFORMATION CAMPAIGN ON THE POSSIBILITIES OF BUILDING WITH GOOD THERMAL PROPERTIES

The thermal properties of architectural solutions of buildings determine energy consumption and heat properties from the outset. (Thin walls without thermal insulation, large windows and glass surfaces, bituminous flat roofs, paved courtyards, etc. lead to significant warming of the building in summer.) It is worth promoting increasing the proportion of green space in courtyards, modern possibilities of shading and thermal insulation, sustainable architectural solutions for roof design, ingenious engineering ideas of the past forgotten and pointing to the present, because they prevent the development of heat problems. Through information campaigns, knowledge of these sustainable building options can be disseminated and hopefully brought into fashion over time. All solutions that reduce energy use, provide shading and increase biomass can be recommended and supported. Within the framework of the information campaign, presentations, competitions, exhibitions, conferences, event desks, posters, educational films, infographics, websites, etc. can be designed and organized.

L1 Long-term thermal protection measures (sustainability against climate change)

AFFORESTATION, CARE OF URBAN TREES, TREE PLANTING, LANDSCAPING

Urban trees, with their presence, greatly reduce the extreme warming of summer days and the formation of heat islands. They provide shade and act as natural vapor barriers, their habitat role is also significant, they also act as ecological corridors. They greatly improve the tolerability of urban climate (urban climate) and act against climate change (global warming).

With landscape architect and gardening experts, it must be determined in a planned manner where it is possible to plant new trees, rows of trees and groups of trees in the public areas of the city and in the institutional courtyards maintained by the municipality, locations in priority order.

When determining tree sites, it is necessary to consider:

- public utility developments planned in connection with existing and possible future investments, so that trees can develop properly and do not need to be cut down prematurely
- the characteristics of the site, which influence the optimal species and varieties for the given tree location (crown width and shape, maximum height, light demand, etc.)

The choice of species and varieties is supported by the annually updated list of city-tolerant trees suitable for road and street wooding, published by the Association of Hungarian Ornamental Gardeners (List of Row Trees in Public Areas). A sustainability aspect is to give preference to native tree species.

Where possible, it is recommended to plant saplings using the Stockholm Tree Planting System, which ensures longer lifespan and optimal development conditions for woody vegetation in urban environments (<https://www.gardenfutura.hu/stockholm-faultetesi-rendszer>).

For planting trees in public areas, it is recommended to observe the standard "Planting ornamental trees and ornamental shrubs in public areas of settlements, MSZ 12172:2019".

Regular care and tree care greatly contribute to maintaining the good health of trees and increasing their lifespan, so this must be integrated into the local green space management system and tasks.

L2 Long-term thermal protection measures (sustainability against climate change)

SUPPLEMENTING THE BUILDING ORDINANCE WITH ARCHITECTURAL SOLUTIONS WITH GOOD THERMAL PROPERTIES

The thermal properties of architectural solutions of buildings determine energy consumption and heat properties from the outset. (Thin walls without thermal insulation, large windows and glass surfaces, bituminous flat roofs, paved courtyards, etc. lead to significant warming of the building in summer.) If sustainability building rules apply to the green area-stone surface ratio of yards, shading, thermal insulation, glass surface ratio and roof design, this will prevent heat problems. All solutions that reduce energy use, shield and increase biomass can be recommended and supported.

L3 Long-term thermal protection measures (sustainability against climate change)

ANALYSIS AND PLANNING OF URBAN CLIMATE WITH GREEN ELEMENTS

The study of the urban climate of Hajdúböszörmény has shown the right directions for development. In addition to afforestation (L1), several other green elements are needed to reduce the heat island effect of the settlement:

- Application of solar sails (parasols): Installation of solar sails on playgrounds, under which benches can also be installed, a natural shaded playground can be quickly created, simultaneously lowering the air temperature, improving people's well-being and helping to avoid sunstroke. Supplement solar sails with tree planting, which grows slowly and provides shade as a long-term solution.
- Planting vineyards: Planting resistant vineyards, which can be run on racks to quickly create a natural shaded resting place, even with benches, simultaneously increasing the green area, reducing the air temperature, and improving urban air quality by trapping dust.
- Stone paving: Elimination of high tub plants ($\sim 1\text{m}^3$) and "regreening" of the area covered by them (Bocskai Square – the main square of the city). The $\sim 1\text{m}^2$ removal of the paved surface and foundation of the site, and then filling its place with topsoil and planting a tree species that tolerates living in this concrete heap. The care of these plants – after rooting – requires significantly less work than that of current tub plants (moving, planting, regular watering – for almost zero shade). The resulting green space itself provides heat and UV shielding for those occupying the square. To enhance this, trees growing canopy could later be surrounded by benches, thus providing them with physical protection from possible damage, and creating a "cooling point" around them. The trees placed in the right distribution can also provide a pleasant and enjoyable venue for regular events on the square. A containerized or ground ball tree planting method can significantly accelerate their growth.
- Water permeable pavements: Application of water-permeable pavements in public spaces.
- Concrete demolition: demolition and plantation of unused concrete, asphalted surfaces and islands (perennials, shrubs, trees).
- Installation of green roofs, green facades, rain gardens, etc.
- Fountains, water fountains, ornamental ponds, boating ponds: installation, operation, maintenance.
- Establishment of water playgrounds: Water playgrounds are playgrounds containing water-operated adventure elements, such as steam gates, gargoyles and tipping toys, typically intended for children, and are classified as type 3 public baths. Their placement in public spaces are freely accessible heat seating points that can also have an impact on the urban climate.
- Development of private gardens: encouraging and supporting garden owners to plant (perennial, shrub and tree division action).

L4 Long-term thermal protection measures (sustainability against climate change)

DEVELOPMENT OF SUSTAINABLE TRANSPORT SECTORS AND MULTIMODAL TRANSPORT

Car-centred urban development and everyday transport (supporting cars and crowding out other transport sectors) have significantly contributed to the spread of asphalt pavement and the reduction of the fitness of the population. However, in a mixed (multimodal) transport system, motorists do not crowd out other,

mostly sustainable transport sectors, i.e. bicycle, walking, micromobility and public transport are on an equal footing with car transport. Another advantage is that the reduction of car lanes and car parks contributes to the increase of green spaces. Those who travel actively and muscularly (e.g. commuting to work, school, shopping) will be significantly fitter, and less susceptible to the strain caused by the heat wave and various urbanization diseases.

L5 Long-term thermal protection measures (sustainability against climate change)

PROMOTING AN ACTIVE LIFESTYLE AND INCREASING THE FITNESS OF THE POPULATION

Urbanization habits distanced people from nature and naturalness in Hajdúböszörmény as well. One consequence of this is the appearance of neighborhoods suitable for the formation of heat islands, and another consequence is that people become increasingly ill and their fitness decreases. The lifestyle of the population can be changed by influencing everyday and leisure activities, which depends largely on the level of development (infrastructure).

- multimodal transport (L4)
- development and support of walking and cycling to school, work and shop (L4)
- construction of outdoor fitness parks
- development of active tourism (e.g. around Boating Lake [Csónakázótó], towards Bodaszőlő and Hortobágy)
- support and organization of outdoor sports events

L6 Long-term thermal protection measures (sustainability against climate change)

SHADING AND AIR-CONDITIONING OF EDUCATIONAL INSTITUTIONS

Several educational institutions have certain rooms that are unsuitable for their functions during hot days. In this case, these rooms become so hot and hot that educational work cannot continue in them with sufficient efficiency. Therefore, efforts should be made to ensure that adequate shading and, as a last resort, mechanical air conditioning of these rooms are solved as soon as possible. Possible solutions for shading: sun sails (giant umbrellas/parasols) and shading with trees.

L7 Long-term thermal protection measures (sustainability against climate change)

SUPPORT FOR THE PLACEMENT OF GARDEN RAINWATER COLLECTION CONTAINERS AT HOME

An important abandonment of climate adaptation is water retention and collection, which needs to be encouraged at municipal level. Partly because of finite drinking water resources, clean and healthy water is a great treasure. Partly because irrigation with rainwater is better for garden crops (due to the chemistry of the water). Therefore, helping to improve the material conditions of domestic rainwater collection, raising awareness and education related to it is a voluntary task for local governments.