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PROJECT

CLAIRO - Clear AIR and Climate Adaptation in Ostrava and other cities  
📍 Ostrava, Czech Republic

TOPIC

Air quality

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## CLAIRO National Conference: A system of green spaces contributes to a sustainable and healthy city

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Green spaces in a city are particularly relevant in stormwater management, as they help absorb water decreasing runoff rates. During heavy downpours blue and green infrastructure and specific park design can keep the water on the surface and to protect vulnerable low-lying parts of the city by retaining water in the higher-lying areas and releasing it only slowly when the sewer system is not overwhelmed anymore. This was one of the key messages of an online National Conference on 'Growing Greenery in the City' that was held under the CLAIRO project on 29 June.

Apart from the topic of using blue-green infrastructure for water retention, the event covered several themes linked to urban planning and health and wellbeing, such as the trends of air pollution in Ostrava and the health impacts of pollution exposure, and the secrets of quality green space design. At the start of the event *Jiri Hudec* from the City of Ostrava gave an overview of the CLAIRO project. Later under a workshop session of the event, CLAIRO project partners dived into the details of the project.

*Katerina Bonito*, the Project Manager of CLAIRO from the City of Ostrava, when talking about the relevance of the National Conference, stressed the importance of blue-green systems and climate adaptation:

Even if we think we are doing enough to protect our residents from dramatically changing climate conditions, in fact, we are not, we can always do more. There are numbers of good practices across Europe that we can use. Yes, it is challenging, it is expensive and hence (sometimes) politically unpopular, but it's important to be alert and not to give up. We must approach urban development responsibly and with respect for nature!

## Both low awareness of air quality and anxiety can reduce willingness to participate in improving the situation

The first external speaker of the event, *Bohumil Kotlik* from the Centre for Health and the Environment of the State Institute of Public Health in Czech Republic gave a general overview of the situation of air quality in the Moravian-Silesian Region. A survey undertaken in the region showed that residents have the perception that air quality is poor in the area and that industry has the greatest impact on it. On top of this, almost two-thirds of respondents considered the air quality situation to be worse today than it was 10 years ago. Contrary to this general opinion, there is evidence that the quality of the air in the Moravian-Silesian Region and in its capital, the city of Ostrava has been significantly improving for a longer time, mostly due to a major restructuring of the industry. Annual average PM10 concentrations dropped by 50 to 70 % at various measurement stations in Ostrava between 2005 and 2020. On the other hand, transport, domestic heating and transboundary flows of pollutants from Poland became over time relatively more important pollution sources in the region.

The general dissatisfaction with local air quality, as it was highlighted by Kotlik, could be significantly influenced by the media, that are very intensively involved in this topic. In a heavily industrialized area this negative perception can also reduce the willingness to contribute to the improvement of the air quality, since until large clearly visible industrial facilities are not eliminated, people might say that "it won't help anyway".

One of the major pollutants in the Moravian-Silesian Region is particulate matter. Furthermore, the situation is particularly critical in Ostrava in terms of benzo(a)pyrene, a carcinogenic polycyclic aromatic hydrocarbon (PAH) that is formed during the incomplete combustion of organic matter. The concentration of the pollutant is almost three times as high in the Moravian-Silesian Region than in the rest of Czech Republic. In urban localities the typical sources of PAH are domestic heating and transport. But this is not the case in the Ostrava-Karvina agglomeration, where large industrial units and long-distance transboundary pollution are added to the usual sources.

It was stressed by Kotlík that there is general lack of awareness of the dangers or the harmfulness of the combustion of certain types of fuels or waste incineration, or of the advantages and disadvantages of existing types of boilers. He has also underlined that low or sometimes also hysterical awareness of the negative effects of high concentrations of air pollutants is negatively reflected in citizens' willingness for changing their attitudes in support of a better air quality.

## Green roofs, green tram tracks, bioswales next to sidewalks can help retain stormwater

The series of presentations was continued by Ondřej Vysloužil and Zuzana Sanková with a focus on blue-green infrastructure and its application in Ostrava. *Ondřej Vysloužil* the City Architect of Ostrava and the Director of the City Studio of Spatial Planning and Architecture (MAPPa) introduced MAPPa, which is the main conceptual workplace of Ostrava in the field of architecture, urbanism and city design. MAPPa provides professional advice and information in the field of architecture, urban planning and city development to the local authorities and undertakes the organization of urban and architectural competitions. One of the main goals for establishing the organization in 2019 was to create an overarching vision of spatial development of the City of Ostrava.

The vision of spatial development of Ostrava functions as a complex tool that helps in city planning, showing how Ostrava should develop to be more a vital, residential and sustainable city. It is the basis for developing strategies, concepts, spatial planning documentation, and especially specific projects.

To make it as detailed as possible a range of experts, including architects, urban planners, landscape architects, transport specialists, and data and GIS experts were engaged in the creation of the vision. In addition, it is based on a wealth of data and information that MAPPa has been collecting, analysing and processing for almost a whole year. Twelve focus areas were identified that are covered by the vision, including historic development, urban values, types of locations, urban blocks, transport and also technical infrastructure.

The planning and development of blue-green infrastructure is addressed by the vision as natural conditions and values, and the network of public spaces are key focus areas that are covered by the tool.



*Zuzana Sanková* a landscape architect at MAPPa spoke about the vital role of blue-green systems in retaining rainwater that can be reused for watering urban-greenery. She has highlighted that an interconnected system of blue-green infrastructure elements, which is developed based on the nature-friendly principle of rainwater

management, contributes to a sustainable and healthy city.

She has listed a number of positive examples for blue-green infrastructure projects in Ostrava. These include among others a green roof garden in Vitkovice district which won the Green Roof of the Year award in 2016, and the green roof of the community centre of the Poruba district of Ostrava, which was the winner of Adaptterra Awards in 2019. She mentioned also the greening of tram tracks, flower beds scattered around the city, bioswales bordering the pedestrian area, the regeneration of the embankment of the Ostravice river, the revitalization of a forest park, or the development of water features for children in urban green spaces.

## How to create better parks?

*Peter Bednar*, an architect and urban planner working at Jakub Cigler Architekti (JCA) in Prague looked into what makes a good green space. He has pointed out that attractive parks can define a city, and can indicate how a city actually treats public space. Parks, as he has highlighted, are not only built for adornment, but they can be the basis for a sound business case through their ability to increase automatically the value of the surrounding properties.

He also stressed that having simply larger quantities of green space does not mean that a park is well designed. In a well-defined park our brain will work better, we will feel safer and more relaxed. One indicator of a good park is when people are not scared to walk through it at night.

Green spaces can have multiple beneficial functions, such as provision of fresh air, the ability to strengthen social cohesion, a place for recreation and sports, a place for relaxation and peace, provision of shade, an ability to cool down the surrounding area, water retention, a place where visitors can enjoy sunlight, or increasing biodiversity in the urban space.

Bednar has emphasized that large open green areas devoid of any functions will not attract people, and will not be able to bring life to a city. According to him a compact built-up area with larger buildings of various functions surrounded by a diversity of smaller green spaces, a high number of destinations and clearly defined parks makes a pedestrian city. In contrast, an urban space characterized by monocultural buildings located far apart and bordered by large swaths of open green areas, but few parks will instead lead to the creation of a city for cars. Bednar has argued that the number of green areas in a city is more relevant than their total area, highlighting that a city where everyone lives in the green is actually a city where everyone has to drive anywhere.



# Combating flooding with climate parks, cloudburst streets and green parking

*Jiri Vitek*, the managing director of JV PROJEKT VH s.r.o., a consultancy in the field of water management dived further into the details of the topic of retaining water in the city using blue-green infrastructure.

He stressed that we need to adapt our cities to the future climatic crisis, illustrating the dire consequences of inaction by showing examples of what could happen when cities do not focus on stormwater retention.

He mentioned the case of Copenhagen. In 2011 a massive cloudburst dropped 135 mm of rain in less than three hours in the Danish capital, flooding major roads, streets and buildings, causing an EUR 800 million damage. The indirect and social damage totalled an additional EUR 600 million. Around 60 % of the residents of Copenhagen experienced damage to their property.

Following the intense flooding the city decided to adopt a Cloudburst Management Plan and to implement it with the rollout of hundreds of cloudburst projects over the next decades. A key element of the plan is to increase blue and green infrastructure across the city to prevent flooding.

The main principles of the plan are to keep the water on the surface and to protect vulnerable low-lying parts of the city by retaining water in the higher-lying areas and releasing it only slowly following the storm. Cloudburst streets channel water away from vulnerable areas. Green retention streets with swales and permeable pavements located typically upstream from low-lying areas prone to inundation retain water. Public spaces, such as parks, sport fields and parking areas have a central role in retention.

A new 'climate park' design is also implemented by the city as part of the plan to capture the water of flash floods. Certain zones of the park are lowered to function as water basins during heavy storms. To control water flow, the park is equipped with small levees and levee gates. In case of everyday rainstorms, water flows from the neighbourhood into an underground reservoir in the park to store water for irrigation. In case of heavier storms, the water starts to fill up the lowered areas in the park, finally the entire park is filled up. When the sewer system is not overwhelmed anymore, with the opening of the levee gates the water is slowly released from the park.



Other cities are beginning to use similar approaches, such as Rotterdam, Dortmund, Bochum and Ulm.

Vitek also demonstrated how to provide good conditions for tree growing while ensuring sufficient rainwater supply for the plant, by using a layer of crushed rock below the pavement that allows the infiltration of surface water and the aeration of the soil, which is combined with a deeper layer of larger granite stones. Using a catchment chamber can further boost water infiltration and the airing of the soil.

Vitek highlighted the benefits of a specific system ideal for greening parking lots that is based on the use of mesh-like panels. The load distribution system of the panels reduces the compaction of the subsoil creating optimal conditions for deep rooting, ensures water retention and protects the substrate and turf from shear.

Finally, *Anna Paskova*, a representative of the Ministry of the Environment introduced the funding opportunities in Czech Republic linked to environment, climate adaptation, air quality and blue-green infrastructure.

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