

## PROJECT FICHE FOR INVESTMENT MEASURE

<b>Municipality</b>	<b>Sofia Municipality</b>
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### 1. Name of the investment measure

“Blue-green acupuncture“ in Vazrazhdane Park“

### 2. Summary – general short description of the measure

The design idea "Blue-green *acupuncture*" in *Vazrazhdane Park* envisages addressing the local adverse manifestations of the urban heat island effect, separating a shared "cooled" space within a highly urbanized part of the city, to be used for both leisure and for reduction of the thermal stress of the visitors during the summer months, as well as for conducting training and educational events on environmental issues.

It is envisaged to shape a shaded green corner, set up as a cool area, combining different solutions for climate change adaptation - shading through greening, misting system, plasters containing reflective particles and high-albedo pavements, greening with climate resilient species.

### 3. Object and place

The object is located in the recreation Vazrazhdane zone in B5 neighborhood, on Opalchenska Blvd. in Sofia. Vazrazhdane Park extends covers an area of 52 acres, 24 of which belong to the “Sports Sofia” Complex, which has been in operation since August 2015. Over 100 benches, alleys, covered with multicolored mosaic, 3 faucets, amphitheater, circus playground, and a fountain represent a part of the park facilities.

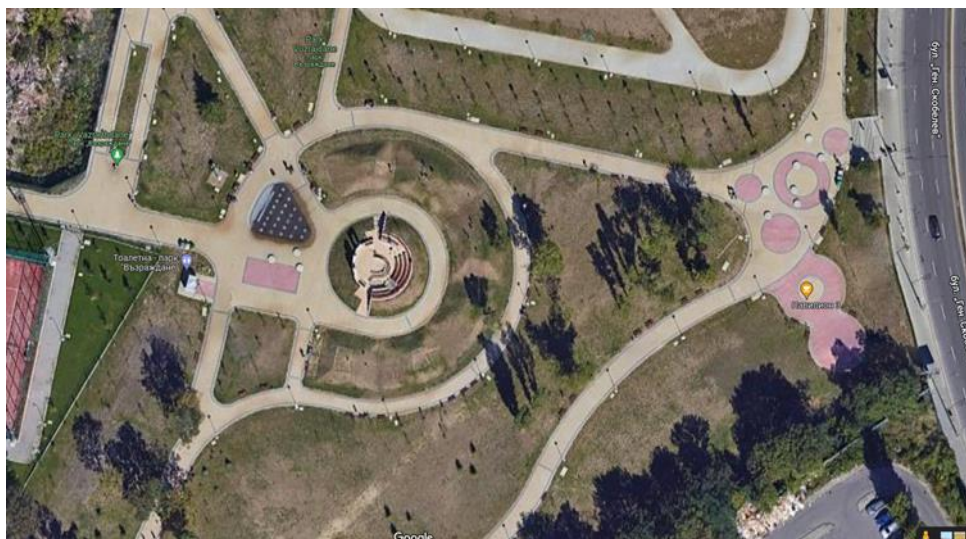
The park is located in the central city part and the passenger traffic through it is high. The population in the immediate vicinity is approximately 7,500 inhabitants. There are 1 school and 2 kindergartens and more than 1,600 students. The park is visited not only by people from the nearby residential neighborhood, given the fact that a circus, sport grounds, a food store and other highly frequented sites are located nearby, and that the park itself is "locked" between relatively big transport arteries.

A part of the woody vegetation in the park is relatively young and does not provide enough shade against excessive heating. Some of the areas are quite heated during the summer months and cannot provide the needed bio-climatic comfort for outdoor recreation.

The specific object of intervention is the amphitheater, which is located in the eastern part



of the park near a dry fountain. It has an area of 150 m<sup>2</sup> and a capacity of 90 visitors. The object consists of amphitheatrically mounted wooden benches and a small stage. There are three vertical ornamental structures with greening behind the stage. There is no high vegetation around the amphitheater, hence the place is extremely heated and for these reasons unusable. Despite that, using the necessary interventions, the site is suitable for setting up a "cooled" area, in which the park visitors could have the opportunity to reduce the heat load during the hot months avoiding the risk to their health associated with the expected longer and more frequent heat waves. In addition, the space is extremely appropriate and sought for in connection with the conducting of various events from the nearby located educational establishments and kindergartens, but due to its heavy exposure to the sun it is currently unused.



As regards the possibilities for replication of the pilot measure, it is applicable in the remaining parks of Sofia Municipality, as well as in other urban areas, due to the need to provide "cooled" zones for vulnerable groups, but also because of the relatively compact solution.

#### 4. Activities

The measure provides for the separation of a place for events - a shared "cooled" area in a highly urbanized part of the city using several interventions with a synergic effect:

- Shading of the whole amphitheater by means of a nature-based solutions – arched canopies allowing the maintenance of the climbing and other vegetation resilient to heat and drought.

In order the existing space to become usable, its shading is necessary. This is planned to be done with the help of a metal structure (if possible from recyclable material), which should allow the retention and development of suitable climbing vegetation, thus forming a natural shade. These sheds (arches) will cover the whole area of the amphitheater, including the stage. Drip irrigation system is envisaged.

- Setting up misting systems.

Water misting system (fogging type) will be installed along the metal structure.



Drinking water for its feeding will be supplied from the nearest tap.

- Construction of a rockery with appropriate climate-resilient vegetation.

The green spaces which surround the amphitheater will be shaped like a rockery - a green ornamental corner, which combines aesthetically arranged stones and / or rocky pieces with flowers, evergreen plants and other plant species which are suitable for the expected climate conditions in Sofia Municipality.

- Replacement of the existing compromised (broken, missing at some places) pavement by a pavement made out of natural materials with low thermal capacity; placing plaster on the vertical amphitheater parts, which has a high reflective capacity, that protects the foundation against water and moisture penetration but also against heating; refreshment of wooden benches, again with a heat-protection coating, which protects them against heating.
- Provision of a movable screen and multimedia for events and educational objectives with a focus on raising the awareness among children, young people and the public on climate change and adaptation issues, as well as practical advice to vulnerable groups for reducing the thermal stress and preventing the adverse health effects deriving from the hot weather.
- In addition, information plates (QR codes) will be placed, providing information about the site, used materials and vegetation, cooling effect, etc. A thermometer will also be placed to record the temperature in the cooling zone.

The plant species, used in the intervention, will take into account the expected climate change trends (jointly with the University of Forestry) and will select species, which require minimum care being provided as a part of the ongoing park maintenance and will be included in the municipal plans and budgets also after the end of the five-year project monitoring period. This will also allow testing of these species in a real environment and could serve as a starting point for landscape solutions in the other green areas of the city as well.

## 5. Threat, with regard to which the adaptation is performed

According to the produced analyses, a part of the Sustainable Energy and Climate Action Plan of Sofia Municipality (SM) 2021-2030, the Climate Change Adaptation Strategy and a joint work of SM with universities, the identified major threat for SM is the extreme heat, exacerbating the negative effects of the so-called urban heat island. The increase of the air temperature by significantly higher than the limit values (average and maximum), especially during the summer months in an urban environment, creates conditions for a number of negative effects across the different sectors. The greatest danger to the health of the population is the retention of unusually hot weather for a few days in a row, the so-called heat wave, whose manifestation is associated with an increase in the cases of heat exhaustion of the organism and in the number of the heat strokes, cardiovascular diseases, respiratory and other diseases, exacerbation of chronic cardiovascular, respiratory and kidney diseases, as well as other negative effects on the human health. Therefore, it is important to separate "cooled" areas in an urban environment, where the vulnerable groups are provided with the opportunity to take a rest and reduce the heat load.

The urban planning is also a sector, which is vulnerable with regard to the extreme heat





threat in terms of, for example, residents, workers and visitors / tourists who use the green infrastructure within the heat island areas in the lower parts of the city. There is a specific vulnerability in more densely and intensively built-up neighborhoods with a large proportion of dark sealed surfaces, less common woody vegetation, lack of green and blue elements.

## 6. Used experience from Norway and/or from the Report on good practices

The visited sites in Norway, related to climate change adaptation measures, were mainly focused on threats caused by intense and heavy rainfalls, floods, landslides, etc. - mainly for the purpose of retaining and diverting the stormwater flows. Although the identified climate risk for Sofia Municipality is the urban heat island, some of the used in Norway practices are also applicable with regard to our objectives. Such examples are the selection of appropriate for the specific conditions plant species, open water areas and nature-based solutions. A specific example is the visited “Blue-green infrastructure site in the city of Bergen - urban development project in Mindemyren”, where there is also a separated "green" corner, an amphitheater in the open and a rockery.

## 7. Innovation:

Innovation is frequently defined as a new idea that has also proved to be successful in practice. Namely, this is the expected result from the implementation of the proposed measure, which integrates several interventions with a synergic effect. The proposed intervention has product and organizational innovative nature. Shading using natural vegetation, as well as misting, is not a wide spread measure on public places in an urban environment. The provision of a cooling area during the heat waves is particularly important for the most vulnerable population groups. The use of light-reflective materials also contributes to the achievement of a cooling effect.

The creation and organization of an information and educational corner in the open with a focus on adaptation topics is also innovation. This idea aims at behavioral changes related to climate change adaptation within heterogeneous target groups, but mostly among children and youth.

## 8. Indicative budget of the project idea:

The total cost of the intervention is BGN 441,000 with VAT, of which BGN 421,000 will be used for construction and installation works (CIW) and BGN 20,000 - for investor control. The development of a detailed design and the obtaining a construction permit (CP) will be awarded, as a result of which the quantities will be finalized and quantified.

The project idea includes the following components:

- Shading - metal structure, vegetation, labor
- Building misting systems - materials, supply of drinking water from the nearest source in the park, labor
- Replacement of pavement, plaster, refreshment of benches - materials, labor
- Movable screen and multimedia, thermometer, QR code development, materials, labor
- Rockery - materials, labor
- Investment control





## 9. Project readiness:

Design, coordination and issuing of construction permit will be awarded, after which CIW will be performed.

## 10. Procurement mode:

The Municipality is planning to award the development of a technical / detailed design, which will be coordinated and used for the issuing of a construction permit. Once the precise quantities of materials and labor are finalized, a contract will be signed with a contractor pursuant to the provisions of the Public Procurement Act (PPA).

The procurement procedure will be conducted by the district administration of Vazrazhdane district of Sofia, because the site is located on the territory of this district.

## 11. Compliance with the municipal policies – plans, strategies:

The proposed intervention is part of a measure included in the key strategic document on climate change of Sofia Municipality – “Sustainable Energy and Climate Action Plan of SM 2021-2030”. Measure A.4.3 of the plan “*Creation of “blue-green” arches for cooling in an urban environment and green acupuncture*” envisions implementation of small-scale solutions, with a high effect with regard to adaptation in an urban environment.

The activity is also consistent with the Climate Change Adaptation Strategy of SM, which includes the measure “*Investments in blue-green infrastructure*”, that has been awarded the maximum score with regard to the following criteria: “usefulness” (to what extent the proposed measure is relevant for addressing climate risks and will contribute to the climate change adaptation of the municipality) and “synergic effect” (to what extent the implementation of the measure will lead to synergies (double benefits) in terms of other priorities and objectives). The SM strategy also envisages information campaigns, awareness-raising and societal commitment to climate change with which the proposed activity is compliant.

The design idea is also in line with the “Green City Action Plan” of SM, “Vision for Sofia 2050”, “Integrated Development Plan of Sofia Municipality for the period 2021-2027” and responds to the recommended measures and good practices in “Examining good practices for the thermal islands in the territory of the City of Commerce”.

## 12. Synergic effect in relation to other implemented or planned projects in the urban area:

SM makes targeted efforts for the sustainable city development and provision of a good quality and favorable environment for the residents. Namely in this connection in 2015 the park, on whose territory the intervention site is located, was built. In addition to that, the intervention site is in a close proximity to multi-family residential buildings, kindergartens and schools, sports and recreational facilities. Through the implementation of the planned innovative activities the effect of the newly constructed park will be built on, while the separation of “cooled” zones in the urban areas for urban heat island effect reduction.





In addition, activities for urban environment improvement in the spaces between the blocks of flats are also carried out in the site vicinity.

A program with the relevant content will be developed, aimed at climate change adaptation in compliance with which information and training events should be carried out. In addition, some of the events, included in SM cultural calendar, will take place on the open shared stage.

### 13. Results from the consultation meeting

The consultation meeting of Sofia Municipality was held on 06.07.2022 from 3:00 – 5:00 p.m. at Vazrazhdane Complex in Vazrazhdane Park, Sofia. The meeting was opened by the Deputy Mayor of Sofia Municipality, Section “Green System, Ecology and Land Use“ and the Director of NTEF.

The meeting was attended by 24 participants from:

1. Sofia Municipality - Section “Green System, Ecology and Land Use“ in this number, Directorate “Green System”, Directorate “Climate, Energy and Air”
2. Municipal Enterprise (ME) “Parks and Kindergartens”
3. Vazrazhdane Regional Administration
4. University of Forestry - Sofia
5. NTEF
6. Consultants of NTEF

Following the submission of the conceptual design by an expert "Climate Action", a part of the Sofia Municipality team under the project, a discussion was held, during which unanimously expressed was the view that the selection of the intervention site was very appropriate for several reasons:

- The park is relatively new and developing and the visitors are looking for a shade;
- The location of the site is close to Zone B5, where there are many multi-family residential buildings and sealed areas;
- The pilot project can be expanded / replicated at other places in the park;
- The lack of shaded areas is felt in this part of the park.

Representatives of the University of Forestry expressed an opinion that similar discussions need to be held when designing such type of measures so as to avoid gaps related to their implementation. It was emphasized that there was a discrepancy between the theory taught at the universities and the practice. There was a discussion on the need for training of investors and for conducting of design competitions which could result in the retrieval of useful ideas. The need to use suitable (fast-growing) vegetation species was also commented.

The representatives of the district administration paid special attention to the high importance of using quality, sound and sustainable materials in the implementation.

The possibility of undertaking similar interventions on other sites in the capital was discussed. As appropriate sites for this purpose were listed Vazrazhdane Square, other



squares, areas around the National Palace of Culture, sites in Lyulin neighborhood, other parks.

### Summary

As a whole, the atmosphere of the meeting was extremely positive and constructive. The discussion was focused and fruitful - the focus was on climate change adaptation. The attendees unanimously supported the presented project idea.



### 14. Anything else, specific for this measure:

The envisaged intervention will be implemented as a pilot project, which should start to operate experimentally in the selected urban area gradually expanding and being replicated in other integrated areas for wide public use (public spaces and green areas) within the territories suffering from the urban heat island effect.

The measure will have synergic action and will also contribute to the air quality improvement through production of oxygen, capture of CO<sub>2</sub>, filtering of suspended particles.

Last but not least, the implementation of the activities will raise the public awareness of climate change and adaptation issues.