



PROJECT FICHE FOR INVESTMENT MEASURE

Municipality	STARA ZAGORA
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1. Name of the investment measure

Green solutions for a space between apartment buildings in Zheleznik neighborhood for overcoming the “urban heat island” effect

2. Summary – short general description of the measure

The project envisages the implementation of combined measures – pavement replacement, greening, use of solar energy and rainwater to overcome the "urban thermal island" effect and creation of a favorable environment for recreation and social contacts during the hot summer days for the residents of a small area in Zheleznik neighborhood, Stara Zagora city.

3. Object and place

The object of intervention is a space between apartment buildings in Zheleznik neighborhood, including a parking lot and a garden with a children’s playground.

The object represents a space between apartment buildings in Zheleznik neighborhood, locked between residential buildings with administrative addresses: 31 Zagorka St., 33 Zagorka St. , 26 Starozagorsko Vastanie St. and 28 Starozagorsko Vastanie St. The space between the apartment buildings is a part of property 68850.501.530 of the cadastral map of Stara Zagora city, Zheleznik neighborhood, municipal private property, territory type - urbanized, Way of Lasting Use (WLU) - complex construction. The four residential buildings are constructed in sections with a height from 5 to 9 floors and a total of 8 entrances with a total number of occupied apartments 252. In the neighborhood, and in particular in the residential buildings close to the space between the apartment buildings live many young families with children who, due to the remoteness of the neighborhood from the main parks of the city, often use the available playgrounds.

The object of intervention has an area of about 1,500 sq. m. and is currently organized and used to park the personal automobiles of the residents and a concrete site on two levels with partially grassed sections. Availability of stand-alone trees, old metal children’s playground equipment: climber, swing and slide; street lighting and wooden benches. The automobiles are parked on a part of the asphalted alleys from the western and southern part of the site of the space between the apartment buildings. During the summer days the space is strongly heated by the sun and is therefore not actively used by the residents in the area. Woody vegetation is planted in the territories adjacent to the apartment buildings and it does not throw shadow on the playground and on the parking places for automobiles.





An additional motivation to choose exactly this site for the intervention is the fact, that among many other such places it is obvious that the citizens leaving here are taking care for the environment around their dwellings – planting flowers and lack of destroyed although very old and very minimal and destroyed by the weather park infrastructure. Another fact in support of the choice is that the checks in the registers show, that because of the relatively affordable prices of the dwellings here, most of the apartments are owned by young families with children.

The construction in the neighborhood is accomplished based on an orthogonal principle and there are more than 20 similar spaces between apartment buildings, where the climate change adaptation measures under the current pilot project can be replicated.

Photographs of the existing situation are attached - Annex 1.

4. Activities

The aim of the project is to overcome the "urban thermal island" effect and to convert the space between the apartment buildings into an attractive green space offering comfort during the hot waves, as well as into a place for socialization of the local community in the neighborhood.

The main activities related to the project implementation are:

1. Replacement of the concrete pavement on the places designated for the parking of the personal automobiles of the residents in the neighborhood with a breathing pavement with grass joint. All these are in bad condition, not being improved for more than 40 years.
2. Construction of green zones with an appropriate alley network. The existing concrete areas will be demounted and a new situation solution will be applied. The pavements that will be applied will be in light colors with grass joints, would flooring, natural stone plates, that will ensure minimal absorption of heat which to be released later.
3. Appropriate park furniture is envisaged to replace the old and damaged – benches, benches with pergolas, gazebo, trash baskets.
4. Shading of the site through planting of specialized vegetation – appropriate tree species with wide crowns and climbing plants, placed on an appropriate infrastructure (pergolas produced of natural materials) and in this way “green sheds” are built and “green walls”. When selecting the plant species the choice will be for such ones which are adapted to the local climate and alien and invasive species will be avoided.
5. Design of a sports/ fitness zone in the park and reconstruction of the existing children playground. The facilities, which will be mounted will be produced from natural materials, and the metal parts will be reduced to minimum and will be painted with reflecting paint. The pavement in these areas will be replaced by new breathing one from natural materials/ wood chops, sand, perforated armed cover for grass joint in relevance with the effective standards for such zones.
6. Planting of grass and greening with deration plants of the assigned places, including design of relevant space to place the containers for separate collection of waste.
7. Mounting of water fountain to serve the visitors with drinking water in the hot days.
8. Construction of mini system for collection of rainwater and construction of watering system for the maintenance of the vegetation with water collected through the drainage water. Drainage system is envisaged as well as an appropriate reservoir with filtration system to use the rainwater from the whole site.





9. Upgrade of the existing garden lightening with solar energy saving lamps.

10. Construction of a solar charging station for charging of electronic devices – phones, tablets, etc.

11. Mounting of an electronic information board for the measuring of the temperature in real time. Ensuring of information through a QR code for the consequences of the climate change and the opportunities for adapting to them.

The scope of the object is marked with blue line at the illustration.

Expected result: The implementation of the Project will contribute to the reduction of the thermal stress and the heat island effect, regulation of the local climate and improvement of the capacity to decrease the impact on the climate after the increase of the greenery.

The facilities constructed under the project and the planted vegetation will be included for maintenance and management both as expenditure within the municipal budget and as a volume of activities in the municipality's list of the objects of the urban environment, not only for the five-year project sustainability period, but also for a longer time interval.

5. Threat, with regard to which adaptation is performed

The effect from the impact of the anthropogenic factor on Stara Zagora climate is significant. The microclimate specifics in Stara Zagora region are influenced by the area and density of the built-up territories, the modified surface, the transport and the population number.

The average multi-year air temperature in Stara Zagora is 12.9°C. The coldest month is January with an average monthly temperature of 1°C, and the warmest is July, when the average temperature reaches 30°C. Spring in the area is relatively cooler than autumn.

The global climate change processes exercise most significant effects on the microclimate of Stara Zagora city in terms of rising temperatures during the summer months.

To evaluate these aspects, data from the temperature measurements performed at various points in Stara Zagora city by the Automatic measuring stations for ambient air quality (AAQ) and by a Meteorological station of the National Institute of Meteorology and Hydrology (NIMH) are used.

During the last 10 years, for Stara Zagora city there has been a trend for an increase in the average annual temperature by 2 to 3 degrees, depending on the used information sources and the hottest year has been 2021. The number of days with average hourly temperatures higher than 35 degrees is increasing and the precipitation is decreasing during the summer. In 2021, 50 days with measured average hourly temperatures higher than 35 °C were recorded in the months of July and August, as well as 27 days with average 24-hour temperatures higher than 30 °C.

The main threat in terms of climate change for Stara Zagora city, targeted by the investment measure is an “urban heat island” which is formed as a result of the increase in the temperatures, especially during the summer, as well as of gaps in the urban planning of the built-up city territory.

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

The experience reported and described in the Report on good practices has been used to develop the pilot project:





1. Experience from the Pilot project for open space greening in Trnava, presented in the Western Norway Research Institute's Report on foreign experience and good practices.
2. Poland's experience from the "Catch the Rain" program in the city of Wroclaw, presented in the Western Norway Research Institute's Report on foreign experience and good practices.

7. Innovation:

For Stara Zagora city the innovation is expressed in the simultaneous application on the same terrain of measures for climate change adaptation and climate change mitigation, such as greening, greened corner for separate waste collection, solar panel for charging mobile electronic devices, replacement of old concrete and asphalt pavements with breathing cover with grass joints, rainwater collection.

8. Indicative budget of the project idea:

Indicative budget – BGN 460 000.00 (VAT included).

- Detailed design with drawings – 40 000 BGN VAT incl;
- Construction works – pavement of the parking, demounting of the old pavement, transportation, new pavement, new soil - 166 000 BGN VAT incl;
- Construction works for the functional zoning - demounting of the old pavement, transportation, new pavement, new soil, alley network, etc. - 85 000 BGN VAT incl.;
- Delivery and mounting for children playground facilities – 36 000 BGN VAT incl;
- Delivery and mounting of street fitness facilities – 30 000 BGN VAT incl;
- Delivery and mounting of park furniture (benches, pergolas, etc.) - 10 000 BGN VAT incl;
- Delivery and mounting of solar panels and lamps and reconstruction of park lightening – 10 000 BGN VAT incl;
- Delivery and mounting of of charging station with solar energy and information board – 8 000 BGN VAT incl;
- Greening, including establishment of green corner for the waste containers – 15 000 BGN VAT incl;
- Construction works for the watering system, drainage system and water reservoir – 60 000 BGN VAT incl.

9. Project readiness:

The project is developed as a conceptual design. Following the approval of the conceptual design, preparation of the preliminary design is pending.

10. Procurement mode:

Opened procedure pursuant to PPA for engineering – design, CIW, delivery, author's supervision.





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

The proposed activities are in accordance with:

1. Plan for integrated development of Stara Zagora Municipality for the period 2021 - 2027 - Part VII, indicative list of the important projects for Stara Zagora municipality;
2. Program for environmental protection of the Stara Zagora municipality with a period of duration 2021 - 2027 - Action plan to achieve Specific strategic goal 6 - "Improve the management and increase the area of the green system on the territory of the municipality".

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

The project idea builds on and expands the implemented in the neighborhood projects for introduction of energy efficiency measures in two of the apartment buildings and targets the upgrading of the space between the apartment buildings, as well as the upgrading solution can be replicated for other spaces between apartment buildings.

13. Results from the consultation meeting

The meeting was held on 14 July 2022 at 11:00 a.m. in Hall No 2 of the Stara Zagora Municipality. *Participants in the meeting were* the deputy mayor in charge of Transport, Cleaning Services and Environment, representatives of the Stara Zagora Municipal Council, of the Agency for Regional Economic Development, the Regional Inspectorate for Environment and Water - Stara Zagora, the chief architect of the municipality of Stara Zagora, representatives of the Investments and EU Projects Directorate and the Transport, Cleaning Services and Environment Directorate of the Stara Zagora municipal administration, the members of project expert team from the Stara Zagora municipality – 34 participants total.

Opinions, positions and suggestions presented:

- A question was brought up about the method of reporting the effect of implementation of the measure and suggestions were made for indicators for reporting on the project implementation – to measure the temperature at the place of implemented measures and another one in the neighborhood without adaptation measures put in place, and also to measure the attendance of the site before and after the intervention;
- According to opinions expressed, the project is very good and should be implemented to demonstrate the fulfilment of similar measures; The construction of "passive buildings" through the use of suitable insulation materials is a good measure that should be widely used;
- The business also applies measures to mitigate climate change - increasing the energy efficiency of production, using solar energy, etc., which can be promoted within this project;
- A proposal was made for the reuse of treated water from urban treatment plants for irrigation of green areas and gardens, which requires changes in national legislation;
- To maintain the green vegetation planted under the project it is necessary to involve the citizens living in the area - a possible way to attract them is to apply the practice of fostering - "Foster a Garden";
- Concern was expressed about possible dissatisfaction on the part of the citizens when the project is multiplied in other similar spots in the city, where the residents of the areas would like to use the inter-block spaces solely for parking lots, regardless of their purpose designated by the detailed spatial plan;





- Significant effects of climate change mitigation and adaptation measures can be seen when they are implemented on a regular basis and on a larger scale by various entities;
- The Regional Economic Development Agency in Stara Zagora has pledged its support for the promotion of green solutions in the city, incl. under this pilot project through the European information network "Europe Direct";
- A recommendation was made to develop a Municipal Strategy for Adaptation to Climate Change;
- The topic of choosing a location for the implementation of adaptation measures was also discussed, and arguments were given for the choice made - presence of many young families with children; willingness of citizens to protect and maintain vegetation; possibility to combine many measures in one place.

Summary: The participants were very active and agreed with the opinion that the concept and the included measures are feasible, will have the necessary effect and will contribute to the fulfilment of the main objective of the project.



14. Anything else, specific for this measure:

Additional benefits:

The implementation of the Project will contribute to the reduction of heat stress and the heat island effect, the regulation of the local climate and the improvement of the capacity for reducing the impact on the climate following the increase of the greenery. A positive impact on the ambient air quality in the area is also expected. The renovated **site** will be visited by more people even during the hot summer days and will establish itself as a pleasant place for social contacts of the residents in the area.

The place of implementation of this measure is in an area where the residents in are active with regard to maintaining the aesthetics of the territory - planted and maintained flowers and young saplings are available in separated gardens. This circumstance is particularly important for the project sustainability and for the education of the younger generation in good practices related to the implementation of small individual steps for solving global environmental problems.



The development in the neighborhood is accomplished based on an orthogonal principle and more than 20 similar spaces between apartment buildings have been separated, in which the climate change adaptation measures under the current pilot project can be implemented.



Picture 1 Cadastral map view

