

## STUDY FOR SMALL HYDROPOWER PLANTS ON BÂRZAVA RIVER, AS LOCALLY ADAPTED SOLUTION FOR INVESTMENT IN RENEWABLE ENERGY AND PUBLIC UTILITIES INFRASTRUCTURE

### Goal of the project

Under the Romania – Serbia Cross-border Cooperation Program 2014-2020, the study is mainly concerned by the implementation of a small hydropower plant on Bârzava River in the town of Reșița as a local solution for renewable energy infrastructure for public utilities. The general objective is to ensure the right infrastructure for harnessing green hydro-energy under safety high-waters flow conditions on the river-course. Besides supplying the local power network supporting public areas lighting and operation, the project is concerned by the river-bed rearrangement as an urban friendly area.

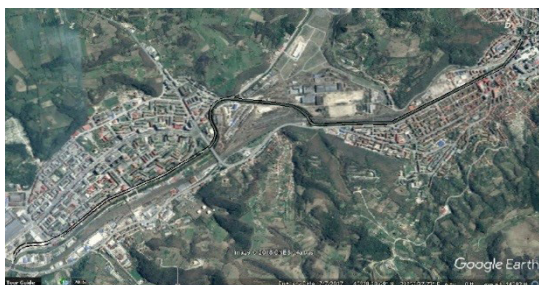
### Short description of the project

Following flow analysis under existing conditions, the project identifies two accomplishment scenarios from which the technical-economical optimum solution for the water arrangement is reached.

### Implementation period

March 1st, 2018 – May 31st, 2019

### Main activities



Analysis of the existing flow situation and deficiencies recognition: the river-channel discharge capacity on the specific sector (6042m, 180 segments) was established by numerical modeling under three flow levels (the usual mean multi-year, the dimensioning 5% overrunning probability and the special 1%).

Introduction and analysis of three scenarios in order to accomplish the objective: three similar SHPP of 2m<sup>3</sup>/s installed discharge under 2m head each producing a total of about 285MWh; two SHPP of 3m<sup>3</sup>/s installed discharge under 2m head each producing 324MWh; one SHPP installed for 3m<sup>3</sup>/s under 2m head and producing about 162MWh. The flow transition for each power harnessing scenario was numerically modeled and studied for all three enforced incoming flow hydrographs, various discharge capacities being considered at the retaining steps. As a consequence of the shorter affected sector and the lower maximum flow, the third scenario considering the water arrangement with one SHPP on the upstream part came out as prevalent.

### Results

The sharp numerical simulation pointed out the specific steady and time dependent flow parameters – water levels and velocities and discharge progress – for all designated scenarios with respect to arrangement configuration and incoming hydrographs. As analyzing the existing discharging conditions of the urban Bârzava River sector it resulted that the river course is able to transport even the special hydrograph, mentioning that some of the bridges, even if not over-flooded, would go under pressure.

Specific river works – silt removal and river-bed recalibration – would need to be performed in order to ensure even the special safety running.

### Applicability and transferability of the results

With the redevelopment of the urban section of the watercourse, it is possible to exploit this non-polluting energy resource in order to satisfy a part of the public consumption. For the moment, the technical part of the study was disseminated through a scientific paper published in the specialized journal Hidraulica Bucharest (ISSN 1453-7303).

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Reșița Municipality

### Research team

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