

**CO: University POLITEHNICA of Bucharest**  
**P1: INCDIE ICPE-CA**  
**P2: Smart Mechanics SRL**

## Hydrokinetic eco - Power System for ultra low head water streams HyPER Workshop

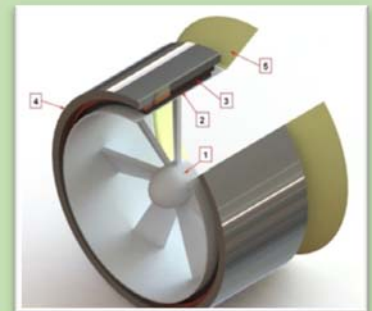
**RESEARCH PROJECT** no. 478 PED/2020, Project code: PN-III-P2-2.1-PED-2019-3247 (UEFISCDI)

**PROJECT MANAGEMENT:** Diana Maria BUCUR (CO - UPB), Florentina BUNEA (P1 - ICPE-CA), Ion FUIOREA (P2 - SM)

**RESEARCH AREA:** Energy, environment and climate changes

### PROJECT OBJECTIVE

This project proposes a power energy technology that will generate power by using the kinetic energy of ultra-low head water streams, without damaging the existing ecosystem. The technical concept of **HyPER** is based on the combination of the classical elements: hydraulic turbine and permanent magnets generator, with a positive environmental impact, studied in a novel, compact assembly. The developed experimental model consisting in: hydrokinetic turbine with a shrouded axial runner, shaftless-coupled in the same casing with a permanent magnets generator and equipped with a flow mixing diffuser is tested in laboratory conditions to validate the technology.



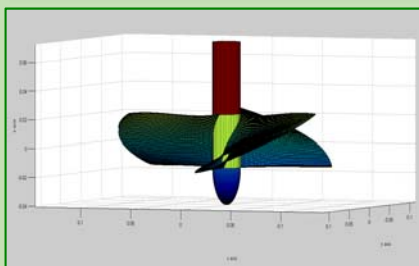
HyPER system conceptual model  
1 – shrouded turbine runner,  
2 – permanent magnets ring rotor, 3 – stator winding,  
4 – casing, 5 – flow mixing diffuser.

### PROJECT ACTIVITIES

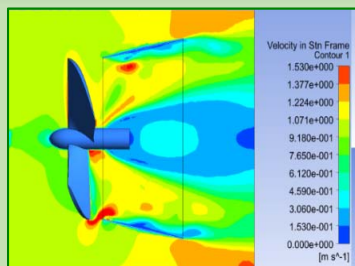
**Stage 1** –Design and optimization of the HyPER experimental model (hydrokinetic turbine, flow mixing diffuser and permanent magnets generator) using numerical simulations.

**Stage 2** –Manufacture (3D printing) of the HyPER experimental model of (hydrokinetic turbine, flow mixing diffuser and permanent magnets generator)

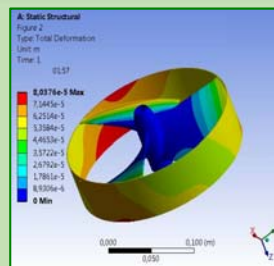
**Stage 3** - Validation in laboratory environment of the HyPER energy production technology.



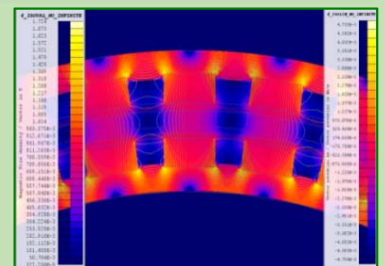
Numerical design of the turbine runner



Flow simulation analysis



Structural analysis (FEA)



Magnetic induction simulation



Laboratory experimental set-up



Experimental test of the turbine runner



Laboratory validation of the HyPER technology

**21<sup>th</sup> of October 2022**  
**University POLITHNICA of Bucharest (Room Ela 217b)**

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