

Hidden and Untapped Hydropower Opportunities **in Existing Infrastructures**

Task 4 - Portfolio of research and Innovation on-going projects in the context of Hidden Hydropower opportunities

Catalogue of Opportunities

1. Untapped in existing hydropower schemes

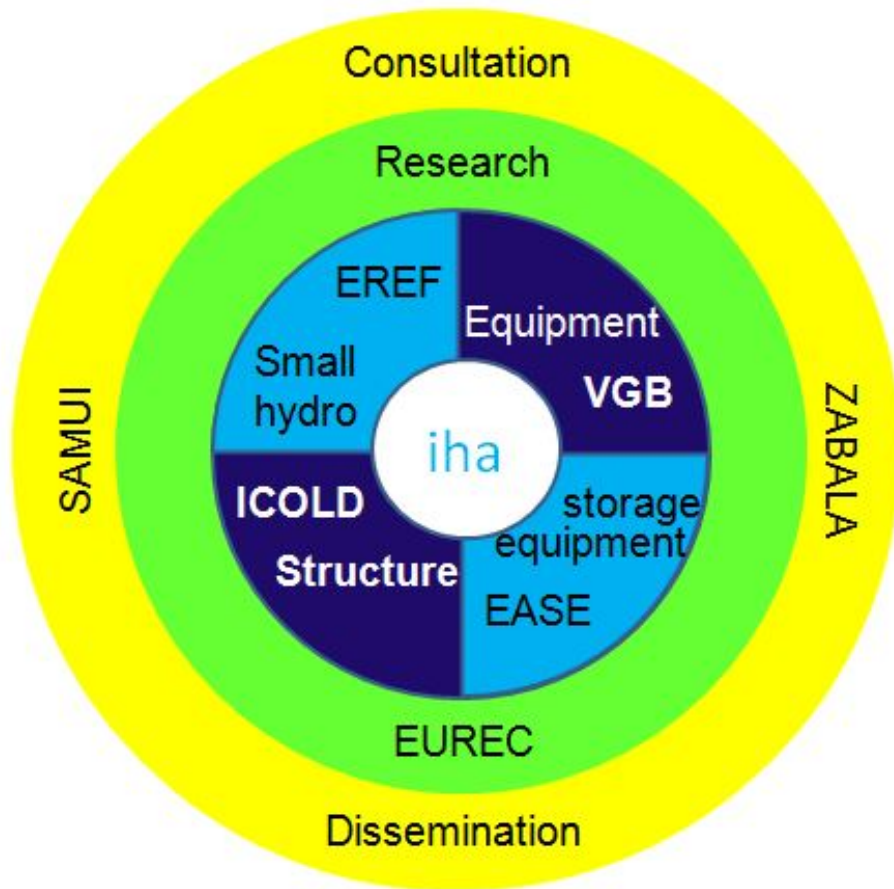
- Reduction of head losses in existing waterways (pressure and shafts, penstocks) **+P+E**
- Use of storage in waterway systems **+P+Flexibility**
- Dam heightening **+E+Flexibility**
- Increase of installed capacity in RoR **+P+E**
- Increase of installed capacity in SPP by adding new parallel waterway system & powerhouse **+P+Flexibility**
- New electro-mechanical equipment and digitalization (inflow forecast) **+E+Flexibility**

2. Hidden hydro in water infrastructures **+P+E**

- Water supply networks
- Waster sanitation networks (before and after treatment plants)
- Irrigation channels
- Non powered dams (irrigation, drinking water supply, flood retention basins, artificial snow basins)
- Ship locks

H2020 objectives for Hydropower: Hydropower Europe Forum

The forum will produce a **synthesis of expected research developments and research needs** for the coming decades in a **Strategic Industrial Roadmap (SIR)** and **Research and Innovation Agenda (RIA)** in the hydropower sector, targeting an **energy system with high flexibility and renewable share.**”



The consultation process

How the
Hydropower Europe
Forum is working
to approach the

VISION

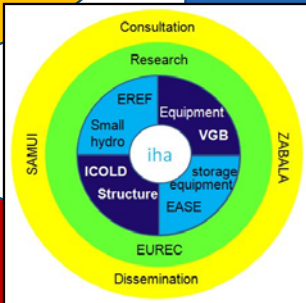
“Hydropower as a
catalyst for the
energy transition in
Europe”?



Approach of Hydropower Europe Forum - the RIA and the SIR

R&I
Priorities

RIA
Recommandations



Barriers

SIR
Steps to new
hydro deployment



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Research Themes (according preliminary version of RIA of Hydropower Europe)

- | | |
|--|--------------------------|
| Innovative concepts of hydropower infrastructure adaptation and tapping hidden hydro | Priority 8.1 ± 0.57 |
| Improvement of equipment operation at minimum load | Priority 7.9 ± 0.97 |
| Developing a seamless, integrated and knowledge-based system from components and system conditions, as well as resources to optimize revenue generation from energy and flexibility markets | Priority 7.6 ± 0.64 |
| Integration of weather and flow forecast with production plans, flood reduction risks, environmental flows and other water uses and making optimization and ensembles operational | Priority 8.1 ± 0.81 |
| Development, testing and industrialization of innovative smooth non-metallic repairing techniques for penstock, gates, using polymers, resins, etc. | Priority 7.90 ± 0.79 |
| Development of near-superconductive materials and innovative insulation materials that are carbon based | Priority 6.50 ± 0.25 |
| Development of geomembranes with friction reducing surface morphologies + Development of equipment which allows fast application of such geomembranes in existing tunnels (i.e. 1 to 2 km per week) | Priority 6.1 ± 0.58 |
| Pilot projects validating and exploiting innovative solutions for hidden hydro at existing water infrastructures like drinking and waste-water networks, ship locks, irrigation canals, tailrace channels of large hydropower plants | Priority 8.1 ± 0.65 |