

Company: EDF

Project name: Restoring ecological continuity at the Beauvoir hydro powerplant

Project location: Isère, France

Please provide a short project description (5 lines) with link to any webpages which provide more detail:

The Beauvoir hydropower dam (3 turbines 13 MW each) is located on the Isère ~~river~~ River in the Alps near Grenoble. A fairly recent evolution of the French regulatory framework makes it mandatory to restore ecological continuity on this river by 2023. The project described below is the adaptation of an existing hydropower dam to develop a fish pass ~~solution~~ ~~of fish pass~~. We wish to highlight this project because of its strong innovative components notably:

- an extensive consultation process with many stakeholders involved at the early stages
- a comprehensive study to evaluate the cost and effectiveness of various technical solutions
- an innovative fish pass solution that resulted in a patent

1. What are the technologies involved in this project (hydro, wind, grids, hybrid projects [e.g., agrisolar])?

Existing hydropower dam to be adapted to comply with a new environmental regulation

2. How did you take into account the relevant biodiversity and environmental protection legislation in this project? During which phase of the project were these considerations analysed and integrated into the project? Did you anticipate concerns around biodiversity and environmental protection for this project, and if so, what did that process look like and during which phase of the project did this occur?

The specificity of this project is the need to adapt an existing structure following ~~a~~ reinforcement of the environmental legislation. The river on which the structure is located was classified in 2013 as level 2 by the French authorities, which entails an obligation for the operator to restore ecological continuity by 2023. The constraints of an existing structure (original design, no possibility of bypassing, operating constraints) are much more important compared to a new construction where the constraints related to biodiversity and environmental protection would have been integrated already from the design phase. Thus, the traditional solutions ~~s~~ of a fish pass could not necessarily be ~~adapted~~ ~~adopted~~ in this case or ~~were~~ ~~was~~ too expensive, therefore an ad hoc innovative solution had to be specifically developed.

For EDF, the key challenge is to find a solution to operate the hydroelectric dam in an optimal manner while respecting the new environmental obligations, i.e. the ecological continuity, in particular for the two target species: brown trout (Truite Fario) and river grayling (Ombre commun).

3. What makes this project innovative?

This project is innovative for three main reasons:

- an extensive consultation process with many stakeholders involved at early stages -see details question 4.

- an in-depth study to balance cost and effectiveness of various technical solutions. EDF mobilized its internal expertise and called on consulting firms to carry out a very comprehensive cost/effectiveness study (30 k€). The question was: what is the expected environmental efficiency and what gains can we expect in terms of ecological benefits compared to financial loss – both investment and potential loss of hydraulic production? Several technical solutions were studied to find optimum balance, the study resulted in an innovative solution that reduced project costs by 8 while maintaining equivalent ecological efficiency.
- The innovative fish pass that was developed for this specific project has been patented. Contrary to more traditional fish pass solutions, the innovation in this project is based on a floating device to capture fishes downstream of the dam and ~~then thanks to several equipments~~ ~~to~~ bring them up and release them a few kilometers upstream of the dam.

4. Did you collaborate with stakeholders outside of your company (authorities, local communities, NGOs, etc.) and if yes, with whom? Can you describe your experiences with these external stakeholders? Were you able to integrate community concerns into this project?

A large number of stakeholders were involved in this project from the very beginning, this collaboration resulted in a co-construction of the project and a collective evaluation of the innovative solution at various stages leading to the final realization. Among the stakeholders we can mention: are the Regional Directorate for Environment, Development and Housing (DREAL), the French Biodiversity Agency (OFB), the water agency (Agence de l'Eau), local authority in charge of river management, fishermen's federations, NGO France Nature Environnement.

5. How did data enable this project and what data did you collect? Of the collected data, what was provided to regulators and authorities as part of the permitting process?

Before starting the project, a large amount of data had been collected on the dam structure itself and on the aquatic environment: hydrology (description of water flows), water quality, fish monitoring data... As an example, a drone was also used to fly over the area to provide a precise description of the hydraulic flows around the dam.

To validate the innovative technical solution of a floating fish pass, a 1:6 scale model of the fish pass was built to mimic the reality as close as possible by reproducing the water flows and adding small fishes. The laboratory tests were conclusive because we were able to demonstrate the effective capture of small fishes.

6. Please describe the experiences surrounding the permitting process for this project, including any bottlenecks you faced:

The project is still on-going with a very tight schedule to meet the 2023 compliance date for ecological continuity. Representatives of the French government have given their agreement for intermediate steps to continue developing the project but not yet the final validation which put EDF and the project developers at financial risk.

2019: 1st study submitted to the French authorities to explain the specificity of the project ~~—~~ that the costs of conventional fish pass solutions is very high

2020: realization of the cost/efficiency study and research to develop a less expensive solution adapted to the issues at stake --> intermediate agreement from the French authorities to continue with the innovative solution

2021: development of the scale model and laboratory testing to provide reliable data. Preliminary study → intermediate agreement from the French authorities to continue with the innovative solution

2022: detailed study (in progress)

2023: construction to meet regulatory compliance for ecological continuity

7. Please describe any permitting bottlenecks this project faced specific to land use change:

No impact on the land use because the innovative floating solution is developed directly on the watercourse, no impact on the riverbanks

8. Did you receive public funding for this project? If so, please describe from which funding source (local, national, EU-level, international) and the application process you faced in attempting to secure this funding (including any special requirements conditional to the funding programme):

The project should receive public funding at French national level by the Water ~~Agency~~ Agency (Agence de l'eau) covering up to 40% of the project costs

9. Please choose at least **one** of the following questions to answer which is relevant to this project:

9. Does this project regenerate previously degraded natural habitats or ecosystems? If so, how was this achieved or how did your company integrate this restoration into the project?

The project was launched to comply with new environmental requirements to be met on the dam: the obligation to restore ecological continuity on this part of the Isere river by 2023. The implementation of the innovative fish pass responds to this challenge by ensuring again the possibility for the targeted fish species to migrate upstream. And the possibility for EDF ~~du~~to carry on hydropower production on this dam.

11. OR

12. Does this project protect or provide alternative, undisturbed, comparable habitats for protected species? If so, how is this achieved or how did your company integrate this protection into this project?

13. OR

14. If a previous project was found to be environmentally detrimental and your company was able to course correct to not only mitigate, but reverse the negative effects, how was this achieved?

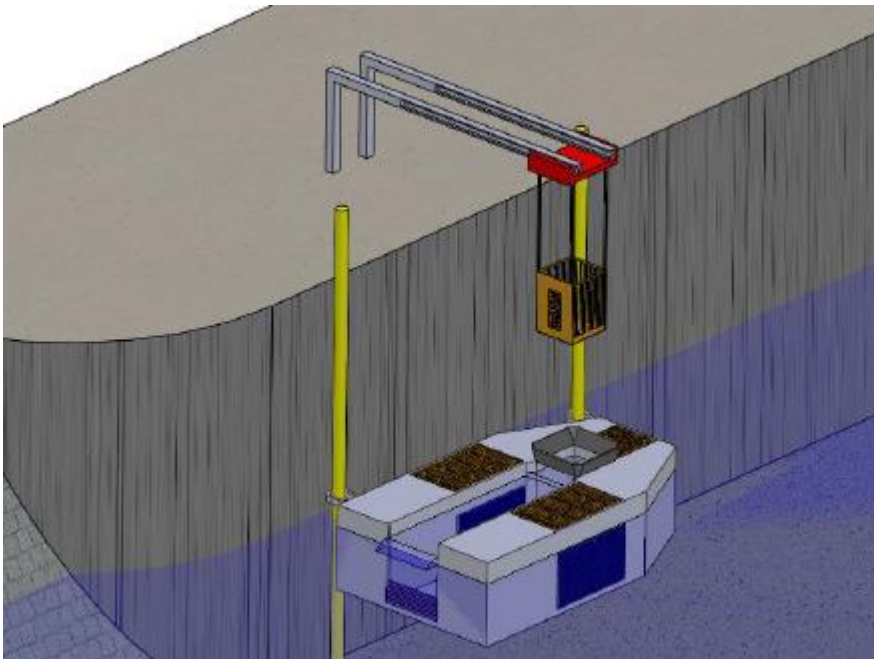
15. OR

16. Did this project take into account effects on soil composition or the GHG impacts of land use change? If so, does this project comply with existing regulations around maintaining soil quality or land use, or does this project go beyond what is required? If so, what did you do in excess of the existing regulations?

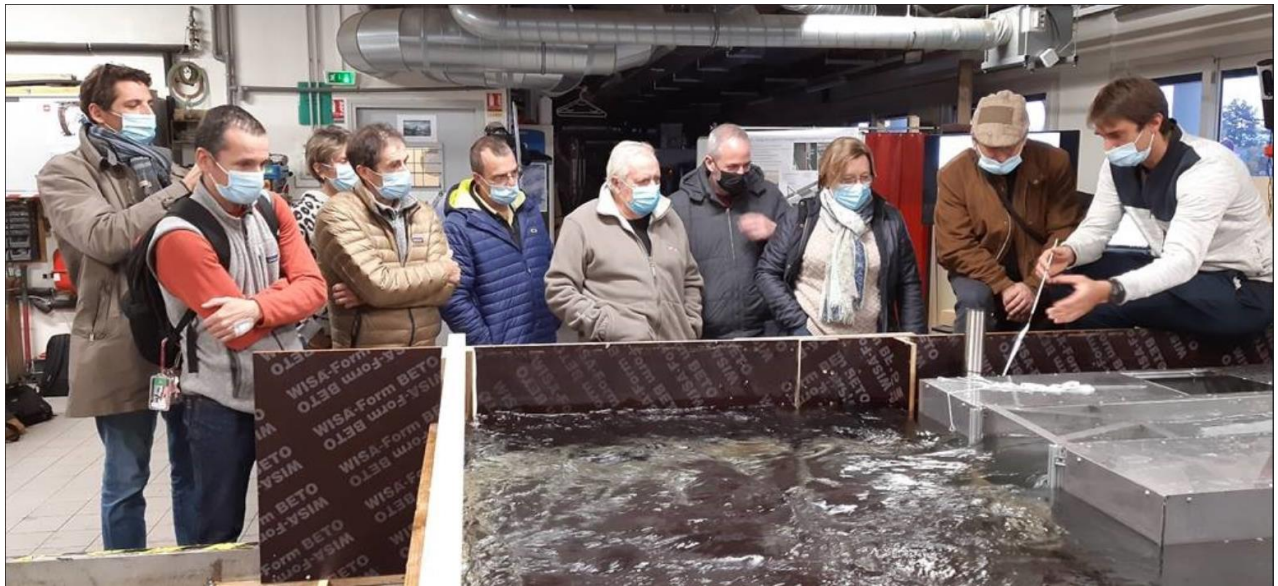
17. Photos (if available):



Picture 1 : Beauvoir hydro powerplant



Picture 2: Innovative design of the floating fishing pass (may have restricted access depending on the publication)



Picture 3: exchange meeting with stakeholders around the 1:6 scale model of the fish pass