

R4.3 - Evaluation and assessment of accomplished and foreseen results of selected projects

Work Package 4

FINAL VERSION
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1. Introduction

Within the objective of increasing the share of renewable energy sources (RES-e Directive), hydropower (HP) is still considered to be the most important source in the European Alps. On the other hand, it is proven that HP water use creates serious environmental impacts. Hydropower production influences and affects the morphological character, the hydrological regime and consequently negatively affects the aquatic biota of the aquatic ecosystem, which in many cases leads to a deterioration of the ecological status of water bodies, contradictory to the objectives of the EU Water Framework Directive (WFD). These recognized conflicting issues have been addressed in various projects and activities across the Alps in the past years. Nevertheless, there is still a need to harmonize objectives of water resources management, hydropower production and aquatic ecosystem conservation, hereafter termed the **water-energy nexus**.

To provide an overview of past and present attempts on this matter and to propose future activities in the related fields for the European Alps, the project, **Alpine Space in Movement - targeted to water and energy capitalization (AIM)** was granted by the Alpine Space Programme (ASP). AIM capitalizes the achievements of the numerous ASP projects. Furthermore, on the basis of stakeholder discussions and the overview of relevant documents on EU, regional and local levels, the goal of the AIM project is to produce **guidelines for the ASP period 2014-2020**. The core issue is to define **needs related to strategic planning, cooperation among institutions/administrations and commonly agreed decision-making tools in the water-energy nexus**.

To support the elaboration of the above-mentioned guidelines for the ASP programming period 2014-2020 from the aspect of the water-energy nexus, the following activities/deliverables were proposed and approved within Work Package 4 of the AIM project:

- R4.1 Database and report on the ASR needs regarding “renewable energy, resource efficiency & ecosystem management” or “water-energy nexus”
- R4.2 Informative factsheet table of selected project results and achievements - with the most important tools & instruments available to stakeholders.
- **R4.3 Evaluation and assessment of accomplished and foreseen results of selected projects.**
- R4.4 Report on project results in terms of economic valorization of ecosystem services.
- R4.5 Database/report on weak points from the interconnection between selected project's results and ASR targets.

In order to elaborate the deliverable **R4.3 Evaluation and assessment of accomplished and foreseen results of selected projects**, results and outcomes of selected project were evaluated and assessed in relation to the topics of the water-energy nexus, which is presented in the following section.

2. Evaluation

To evaluate elaborated and foreseen results of the selected projects (some are in progress), the following topics were considered:

- **support of water and ecosystem management;**
- **support of renewable energy management (focus on hydropower);**
- **support to harmonize water/ecosystem and hydropower management;**

and additionally:

- *support for better stakeholder involvement;*
- *support of decision making.*

The evaluation and assessment of accomplished and foreseen results in the context of defined topics are provided in the Table File attached (*R4.3 – Evaluation and assessment of selected projects.xlsx*).

The following table offers information on how closely the selected projects are related to the water-energy nexus provided on the basis of the overview of available documents and results.

Table 1: Activities and outcomes of selected projects in connection with the topic of the water-energy nexus to support decision making and better stakeholder involvement

Project	water-energy nexus
AlpWaterScarce	Not directly focused on this issue. In general, when water uses are managed (one is also hydropower), environmental objectives/potential must also be considered (e.g. environmental flow).
ECONNECT	Not directly focused on this issue. It provides a basis for the negotiation/harmonization process from the nature preservation objectives position.
SHARE	Fully focused on this issue. Decision support system to merge river ecosystems services and hydropower requirements. Involvement in the process of common guidelines elaboration.
recharge.green	Focused on the harmonization of preservation and demand (one pilot case considers the improvement of ecological connectivity at water-retaining structures and the protection of the fish population). Results of ECONNECT are predicted to be upgraded.
SEAPAlps	Not focused on this issue, but it also provides the opportunity for local communities to re-evaluate national objectives from both sides.
SedAlp	Promotion of the enhancement of river ecosystems reducing the impacts of hydropower plants (balancing the implementation of EU Directives e.g. RES, Floods and WFD).

The only analysed project which directly dealt with the water-energy nexus is SHARE. The project's ambition was to fully support decision making as well as better stakeholder involvement in the process of harmonization of hydropower implementation and environmental objectives. The projects AlpWaterScarce, recharge.green and SedAlp are somehow addressing the nexus, but the main topics are different. Similar conclusions can be made when the available results (report, guideline, tool, method, etc.) of each project are reviewed in terms of being connected to the relevant topics (aquatic ecosystems, HP production and the water-energy nexus). Therefore, the following figure shows the ratio between total available results and the number of results relevant to discussed topics for each project. Scores for each topic range from 0 (no result is relevant to the selected topic) to 1 (all available results are relevant to the selected topic).

The final column (together) for each project gives a summation score (from 0 to 3).

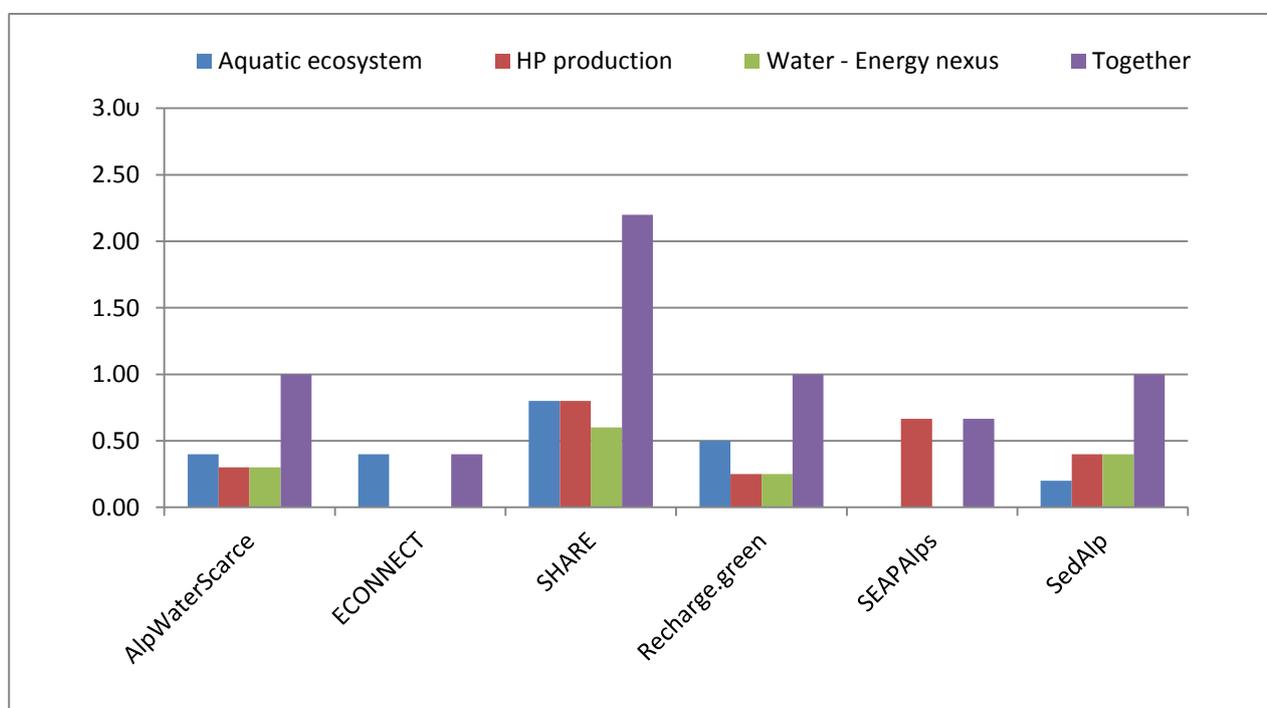


Fig.1: Overview of selected projects with regard to aquatic ecosystems, HP production and the water – energy nexus

The following table presents the results of each project supporting the analysis and decision making in the water-energy nexus. The ECONNECT and SEAPAlps projects are excluded, since there are no final results to support the topic (see previous figure). Since the recharge.green and SedAlp projects are still ongoing (until mid-2015), the results are not available yet and thus cannot be addressed in more detail.

Table 2: Overview of the results of the projects directly related to the water-energy nexus

Project	Type of result	Title	Short description
AlpWaterScarce	Recommendations	Water Resources Management and Water Scarcity in the Alps Recommendations for Water Resources Managers and Policy-makers	It is recommended that integrated planning for the sustainable use of water resources should be a priority, where renewable energy and ecological objectives must also be considered. Long-term partnerships should be established with experts (including public and private consultants). Data sharing and integration should be promoted (across different sectors, regions, etc.).

	Informatics simulation model/platform	Early Warning System for the Piave Catchment (Province of Veneto, Italy)	HP and agriculture management should be harmonized with requirements on the environmental flow. The results of the early warning system improve management and decision making. With regard to results interpretation, the stakeholder awareness and communication should be improved.
SHARE	Handbook	A problem solving approach for sustainable management of hydropower and river ecosystems in the Alps	It provides a framework to harmonize both objectives. It also supports better stakeholder involvement and more harmonized decision making.
	Software	SESAMO-SHARE	SESAMO is a tool developed to support decision making in the field of harmonization of water/ecosystem and hydropower objectives as well as better stakeholder involvement in the related sectors.
	Software	CASiMiR	Assessment of habitat conditions along the river channel and bank areas under different discharges with a specific module for evaluation of economic effects for hydropower production.
	Software	VapldroAste	A tool, which can support assessment of the residual HP Potential. In the content of evaluation of residual HP potential, an environmental flow value, according to national regulations, can be considered. The results can be included in the evaluation of overall HP suitability assessment with consideration of ecological parameters.
recharge.green	Method/model	Decision Support System (DSS) for renewable energy deployment	Under elaboration. One case study (Germany) deals with the harmonization of aquatic ecosystem and hydropower issues.
SedAlp	Reports	Technical monography, policy recommendations and management recommendations on sustainable sediment management	Under elaboration. Promotion of the enhancement of river ecosystems reducing the impacts of hydropower plants (balancing the implementation of EU Directives, e.g. RES, Floods and WFD).
	Guidelines	Guidelines for technical support of sediment management	Under elaboration. Guidelines for the identification of morphological impacts related to existing and new hydropower plants and support to the gravel extraction management.

On the basis of the analysed project results, some common conclusions can be drawn, including the results availability, tools applicability and overall project efficiency. The comments provided can also improve management and tool development within the foreseen tasks of the on-going projects:

- Tools depend on specific software or operating systems and should therefore be updated periodically to be applicable after the end of the projects. Otherwise they will be unusable after the end of the project. It is necessary to put more effort in more detailed technical, procedural and methodological documentation. This will support eventual interested stakeholders to develop or to adapt the existing and establish their own tools, based on best practice examples.
- Some online tools are not fully established or have restricted access although the project is over – this issue should be better managed within the new ASP period 2014+.
- The web pages and the pilot case areas as well as e.g. the connection to the early warning system and their documentation should be made available (i.e. for AlpWaterScarce).
- In some cases, the developed and applied tools/methods do not reach the targeted stakeholders; some targeted stakeholders are not even familiar with the name of the tool.
- Expert support in the process of tool/method development and their introduction to decision makers usually works well, but final decisions by decision makers (with stakeholders' agreement) are more difficult to reach during the project period. Activities that are not finished during the project conclude at the end of the project. Thus, long term data collection and management has to be foreseen and established also after the end of the project ⁽¹⁾.
- If the model/tool/method or guidance deals with water or aquatic ecosystem evaluation, it should reference and set the data which is needed for evaluation of the ecological status according to the WFD or at least explain why it is not considered.

(1) Water management takes place in an area of conflict between water demand from different users, in combination with demographic development, availability of resources, legal regulations, and ecological aspects. Climate change further affects these parameters, increasing the uncertainty of predictions regarding the availability of water resources in the future. Although Alp-Water-Scarce began raising the awareness of water scarcity as a matter of concern for the water-rich Alps, a necessary step to initiate adaptation processes, short-term crisis management, is still more common than long-term planning. One reason for this might be the lack of long-term data enabling detailed modelling approaches at the regional level; another is that past water scarcity problems in the Alps have only affected small, distinct areas for short time periods. The large-scale implementation of early warning systems as decision support tools still remains a challenging task, as does the continued development of such instruments. Nevertheless, the theoretical concepts developed are explained and published and these innovations can be transferred to other regions. The establishment of an "Alpine Water Management Committee" consisting of water managers, researchers and representatives from various sectors should be considered in order to emphasize the policy relevance of this topic, which can only be handled in a transalpine approach. Project results should feed in DG Env "Blueprint on water" 2012 and IPCC.



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