



Alpine Resources

**Use, valorisation and management
from local to macro-regional scale**



Conference Proceedings

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*Edited by Anna Giorgi, Axel Borsdorf,
Günter Köck and Thomas Scheurer*

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Sustainable use of water, energy and landscape in the Alps

Viviana Ferrario
University of Venice, Italy

Contributions:

- *Is it possible to develop renewable energies in the Alps while preserving landscapes, biodiversity and ecosystem services?*

Erica Zangrando, Francesca Miotello, Veneto Region and Recharge.green project

- *Masking vs. integrating: Some elements for a critical reading of hydropower development “through landscape”*

Benedetta Castiglioni, University of Padova

The aim of this workshop was to explore the relationship between hydropower development and landscape transformation in the Alps. Over the last ten years, renewable energy (RE) development has become a driving force of landscape change in Europe. Despite their acknowledged contribution to sustainable development, “renewables” are not ipso facto “sustainable”; on the contrary, renewable energies can have negative impacts and create both environmental and social conflicts. Landscape is often at the heart of these conflicts, both as an asset to protect and as a resource to use. This paradox is particularly strong in the Alps, where considerable energy resources and outstanding landscapes with high tourism value exist side by side.

This workshop aims to present and compare the results of two recent studies about energy and land-

scape in the Eastern Alps. The Piave River Basin is one of the key study areas in both studies.

The Piave River Basin

The Piave River Basin extends from the Dolomites to the Adriatic Sea, traversing the Alpine and Prealpine mountain areas where the hydroelectric potential of the main river and its largest tributaries has been exploited since the end of the 19th century. Today, the Piave is one of the most exploited rivers in Europe: over 80% of its water flows outside its natural river bed. The river basin hosts one of the largest hydropower systems in Italy, with 12 large artificial lakes with a total water capacity of 156 million cubic metres. Together, 25 hydroelectric plants produce an average of 2200 GWh of energy annually. Electricity is collected and transported through a high voltage power transmission line (220 KV) that connects the Veneto Plain with Austria.

In the 2000s, new European policies in favour of renewable energy (in particular, Directive 2001/77/EC) pushed for the rapid and intense development of small-scale hydropower plants on minor rivers. As municipalities try to become energetically and financially self-sufficient, both private companies and public administrations have become promoters of new plants. Unfortunately, the small scale of the plants and their scattered distribution does not

correspond with a negligible environmental impact. Small hydropower projects can have a serious impact on natural habitats and landscapes because they take water away from long sections of rivers and streams. Because of this, local environmental associations are contesting small hydropower plants, calling into question their social, cultural, ecological and even economic sustainability.

As in many other parts of the Alps, RE does not yet offer a solution for developing sustainable landscapes in the Piave River Basin. Is it possible to sustainably develop small hydropower projects? How can landscapes be used to manage this trade-off?

The “Recharge.green” project: Reconciling renewable energy production and nature in the Alps

The European project “Recharge.green: Reconciling renewable energy production and nature in the Alps”, developed in the frame of the Alpine Space program, became operational in October 2012 and will run until mid-2015. The goal of the project is to analyse impacts of renewable energy production on biodiversity in the Alpine region and to find solutions for minimizing them.

The growing demand for renewable energy (RE) is increasing the pressure on Alpine environments. It strongly impacts land use patterns, ecological connectivity and biodiversity. The project’s core objective is to develop tools and an integrated strategy for renewable energy production, sustainable land use, and the conservation of biodiversity and soil across the Alpine region. It will valorise Alpine biodiversity, land use patterns and related ecosystem services, and model the carrying capacity of Alpine ecosystems with respect to all aspects of RE production and consumption. This information will support the implementation of relevant EU Directives.

In this context, the Veneto Region is developing a dialogue with stakeholders in two pilot areas of the Piave River Basin to collect feedback regarding evaluations produced by other partners. Interviews with local experts have already revealed the ambiguity of hydropower development at the community level, which has both positive and negative socio-economic impacts. This project will develop a shared scenario that will be presented to policy makers and local communities. Local guidelines will be developed as a framework for a valley-scale energy plan.

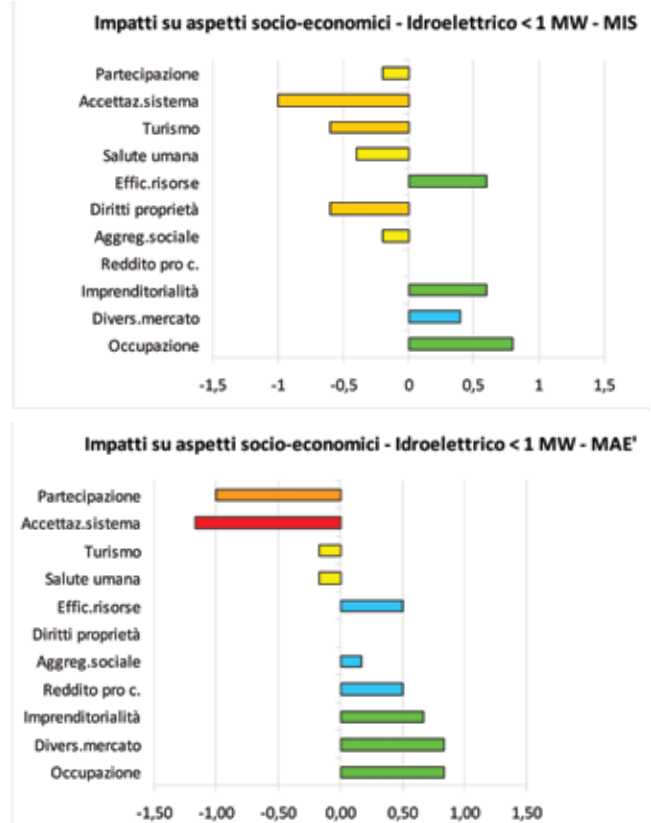


Figure 1. Positive and negative socio-economic impacts of two small hydro-power pilot projects in the Piave River Basin, as reported by experts (from the project “Recharge.green”, 2014)

Using landscape to make the invisible visible

The international research project “Ressources paysagères et ressources énergétiques dans les montagnes sud-européennes: Histoire, comparaison, expérimentation” was financed in 2012 by the French Ministry of Culture. The project involves scientists from different disciplines and countries and focuses on hydropower in southern European mountains in France, Italy, Spain and Switzerland. Now the centre of the renewable energy debate, hydropower played a fundamental role in shaping the economies of these countries during the 20th century.

The objective of the project is to propose an integrated approach to hydropower development that considers multiple perspectives and needs, from economic development and tourism to environmental protection. Ideally, this “integrated” approach should help us consider energy transition in a more constructive way and develop energy projects that are less sectorially driven. To this end, is it possible to better understand the relationship between the territory and energy production/consumption? A multiscale reading of the spatiotemporal pat-

Sustainability questions				Conflicts			
	Environmental sustainability	Economic sustainability	Social sustainability		Environmental conflicts	Economic conflicts	Social Conflicts
Hydropower exploitation of the Piave river basin	Renewable energies as an answer to global change vs Ecological and geomorphologic stability of the rivers due to the changes in the local water stream	Income of companies: local companies or larger outsider companies? Public or private companies? Public funds? Advantages and/or disadvantages due to the change in the land use and in the development/deterioration of other economic activities (agriculture, forestry, tourism, ...)	Insiders vs outsiders Power (democracy? power of money? participation?) Cultural models in looking at the mountains and at the exploitation of its resources (value of naturalness, myth of "development", myth of sustainability, ...)	Hydropower exploitation of the Piave river basin	Renewable energies as an answer to global change vs Ecological and geomorphologic stability of the rivers due to the changes in the local water stream	Income of companies: local companies or larger outsider companies? Public or private companies? Public funds? Advantages and/or disadvantages due to the change in the land use and in the development/deterioration of other economic activities (agriculture, forestry, tourism, ...)	Insiders vs outsiders Power (democracy? power of money? participation?) Cultural models in looking at the mountains and at the exploitation of its resources (value of naturalness, myth of "development", myth of sustainability, ...)

Figure 2. Inconsistencies and conflicts of large/small hydropower development during the 20th century (from the project "Ressources energetiques, ressources paysageres", 2014)

terms of hydropower "through the landscape" highlights the relationships and conflicts in the different uses of Alpine resources, both within the Alps and between Alpine and peri-Alpine metropolitan regions. This helps the user address the three components of sustainable hydropower development (*economic* development, *social* development and *environmental* protection) and to identify inconsistencies and conflicts between these elements.

Inconsistencies and conflicts are often masked by/in/through the landscape. Masking is used as a "conflict avoidance" strategy because it prevents the public from becoming directly aware of the consequences of the exploitation. However, conflicts can be overcome using the logic of integration. Integrating is the opposite of masking: it needs to clarify all the questions and take into consideration all the values, risks and opportunities that concern the different stakeholders and the general public. Integration is a strategy for finding ways to avoid new territorial conflicts and for hopefully solving – at least partially – old ones. To do that, it is first necessary to remove the mask: this becomes possible if we use landscape as a tool to make visible what is invisible.



Figure 3. A highly contested hydropower plant in the Piave River Basin, being masked by a natural stone dam.

In other words, it is important to explicitly recognize the different values at stake and the diverse meanings expressed by the different stakeholders.

People have a role and landscapes are a tool

The following points emerged from the discussion:

- It is necessary to redefine indicators to better understand hydropower impacts. These should take into account social acceptance of the project, as well as environmental and economic indicators. People have an important role in defining the acceptability of different renewable energy options.
- Renewable energy projects need to be integrated in the territory. Energy development must be part of a territorial project, not of a sectorial plan. Energy production should be designed in cooperation with tourism development, agro-pastoral activities, settlement design, etc.
- Landscape is not something to be protected by masking impacts and conflicts, but a tool for revealing inconsistencies inherent in hydropower development. Landscapes can help people visualize the relationships between energy and the territory, and oblige stakeholders to explicitly identify values and meanings they attribute to the territory itself.

Landscapes provide useful insights for a more aware, broader-based, landscape-sensitive development of sustainable renewable energies.

