

ENVIRONMENTAL AND RESOURCE COSTS INTERNALIZATION IN THE DRINKING WATER SYSTEM. COMPENSATION OF IMPACTS ON BIODIVERSITY AND WATER CONSERVATION IN THE BRENTA RIVER WATERSHED.

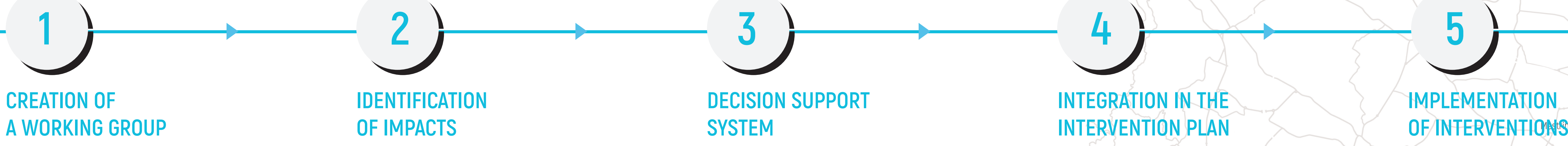
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SETTING THE SCENE

The study area is the Natura 2000 Site «Grave e Zone Umide del Brenta», located in the Veneto Region, in North-Eastern Italy. The site plays a key role in the drinking water supply, being one of the most important sources at regional level, with a potential withdrawal of more than 2500 liters per seconds. High water abstraction from the aquifer, anthropization, high use of the site for recreational purposes and lack of governance represent a risk, on the one hand for water quality and conservation, and on the other one for biodiversity. To solve these problems, the LIFE Brenta 2030 project was launched in 2019, co-financed by the European Commission, aimed at establishing an innovative Payment for Ecosystem Services (PES) for the protection of biodiversity and water conservation while solving lack of management through the implementation of a system of good governance of the Natura 2000 site. The innovative financing scheme applies Article 9 of the EU Water Framework Directive (WFD, 2000/60/EC) and the “polluters/users pay” principle, allowing the internalization of the Environmental and Resource Costs (ERCs) of drinking water consumption within the tariff system of the drinking water system.

This poster shows the logical process followed for putting in place the innovative mechanism.

METHODOLOGY



Creation of a Working Group of experts from academic sector and local water boards: the different skills and competencies, and a multidisciplinary approach allow to deal with the complexity of the mechanism. The working group is composed of experts from:

- University of Padova
- Environmental consulting company (Etifor SRL)
- Drinking water board (Consiglio di Bacino Brenta)
- Local multiutility (Etra SPA)

The impacts of the drinking water system are identified and quantified in the drinking water safeguard zone, i.e. areas around the wells where a certain level of protection is imposed. The impacts focus on:

- habitats and biodiversity (e.g. loss of wetlands);
- the future availability of the water resource (e.g. lowering of the groundwater level);
- the recreational use of the Natura 2000 site (e.g. bathing ban in the Brenta river);
- land use (e.g. restrictions on agriculture).

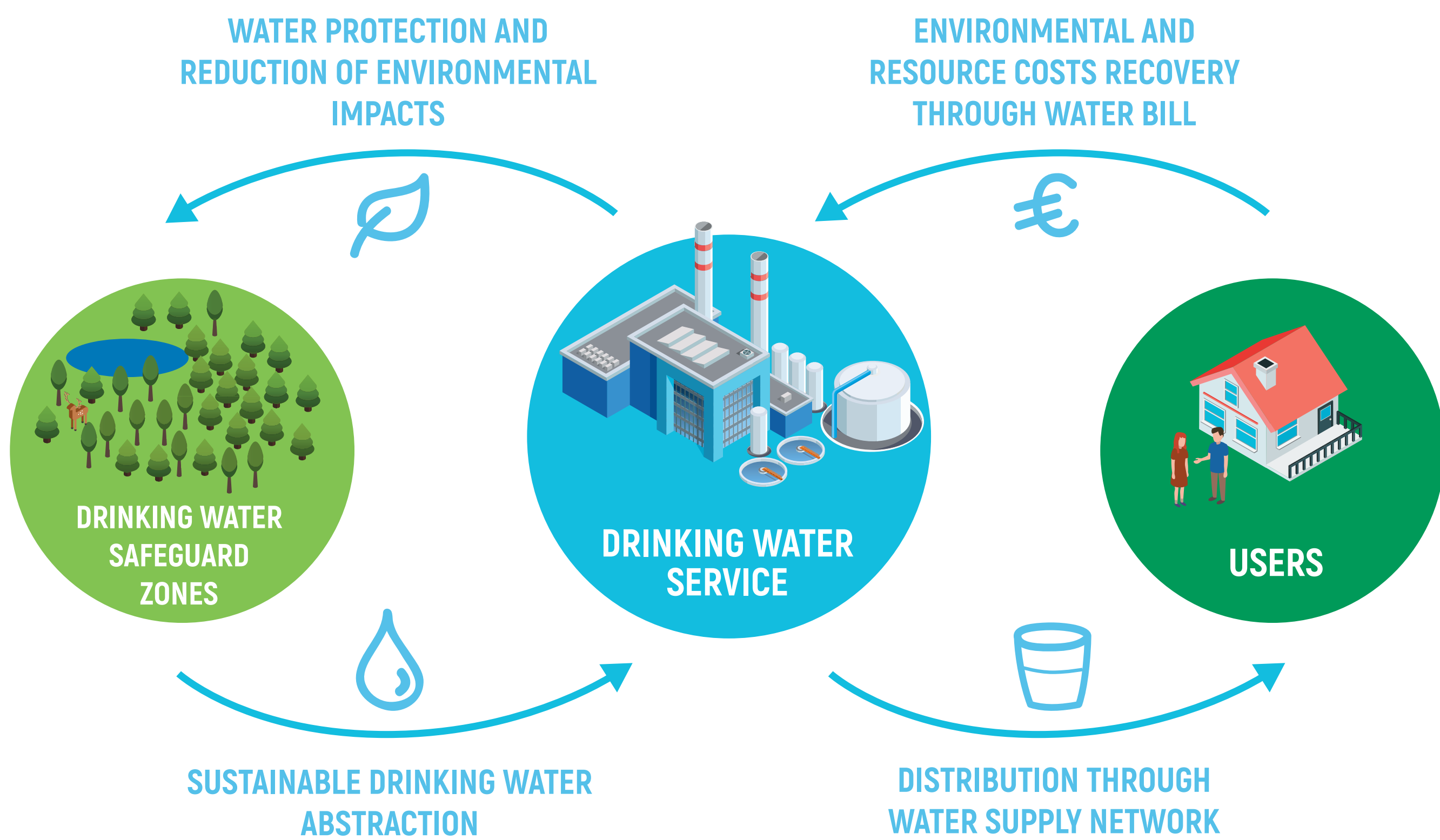
Possible measures to reduce, compensate or mitigate the environmental impacts of the water withdrawal are identified, in line with the provisions of European and national legislation. The cost and efficiency of each intervention are quantified, and through a Decision Support System (DSS) in GIS format, the areas where to implement the measures are identified in order to maximize socio-environmental benefits and according to cost efficiency. Subsequently, the priority interventions, their extension and location are identified, as well as the quantification of the cost of implementation and the benefits provided.

The identified types of measures are then included in the investment plan of the local drinking water board (Piano d'Ambito), and, once approved by the national authority (ARERA), can be implemented. After two years from the realization of the interventions, their cost will be covered by the ERC element of the water tariff.

The drinking water board entrusts the implementation of the works to the local multiutility (the operating arm of the drinking water service), who carries out interventions following priorities and localizations given by the DSS, in order to compensate the impacts of the drinking water system and to ensure a sustainable management of the watershed.

DRINKING WATER SYSTEM AS A PERFECT EXAMPLE OF CIRCULAR ECONOMY

The process of recovering ERC costs through the water bill is the missing step to ensure the circularity of the drinking water system. In fact, the drinking water system replicates the natural water cycle and aims to reintroduce the water into the environment in the same state in which it was withdrawn. ERC recovery can finally close the cycle and ensure the internalization of all environmental externalities produced by drinking water consumption, so that not only water is reintroduced in the same state in which it was withdrawn, but also the environment suffers no damage from such activity. Thanks to the application of the ERC financing scheme, the impacts of the drinking water consumption can be mitigated, eliminated or compensated ensuring the sustainability of the system according to the WFD's principle: “polluters/users pay”.



EXAMPLE OF INTERVENTION TO COMPENSATE DRINKING WATER ABSTRACTION IMPACTS:

Forest Infiltration Areas
Forest Infiltration Area (FIA) is a method to recharge groundwater aquifers by surface waters during non-irrigation months. This area is covered by local trees or shrubs, and their roots facilitate the infiltration of water into the ground.

This system has multiple co-benefits:

- Recharges the aquifer
- Enhances water quality
- Increases biodiversity
- Captures CO₂
- Increases the recreational value of Brenta river

The benefit from FIA thanks to a Payment for Ecosystem Services (PES) mechanism: part of ERC revenue can be allocated to farmers who convert agricultural land into FIA for ecosystem services provided. Owners can also benefit from the sale of timber. To fully compensate the drinking water abstraction in the Brenta river area, 60 hectares of FIA is needed. A single hectare in fact can provide a water infiltration of 1 million m³/year.

LESSONS LEARNED

The strong partnership and the working group significantly help to achieve the sustainability challenge of the water sector. The success of the entire process of ERC recovery necessarily requires the involvement of all the actors of the drinking water supply chain: the Drinking Water Authority (political body that approves the tariff proposal) the multi-utility (operational arm of the Drinking Water Authority, in charge of implement compensation measures) and any other companies that purchase or distribute drinking water. The involvement of the latter is functional to recover the ERC also from users outside the geographic area of application of the water tariff approved by the Drinking Water Authority. All users of the resource must contribute to the compensation of the environmental impacts caused in the water abstraction area according to the “polluter/user pays” principle.

- The different levels of regulation in the field of ERC are not always harmonized, and it could be difficult to identify the right methodology for the implementation of art. 9 of WFD: while the WFD defines the “polluters/users pay” principle in general terms, the Italian regulations have different approaches in defining what can be considered as an environmental and resource cost. Ministerial Decree 39/2015 establishes the criteria for the definition of ERCs, and makes it possible to identify a wide range of actions aimed at restoring, reducing or containing the damage produced by water uses. Otherwise, the national authority (ARERA) resolution 580/2019/R/idr – which defines the cost components of the water tariff at national level – recognizes as the environmental cost only the expenses related to sewage treatment, and as the cost of the resource the expenses for the construction of new abstraction and purification infrastructures, making the field of application of the ERC very limited, especially in relation to actions to compensate the impacts on biodiversity and ecosystems.
- The ERC internalization process should also be extended to the other water sectors (e.g. agricultural water use). Only in this way it would be possible to correctly attribute the costs of environmental protection to those who benefit from the use of water resources and to fully

implement the principle of “full cost recovery” outlined in the WFD. The process of internalizing environmental costs also for the other water sectors (reclamation consortia, bottling companies, hydroelectric sector etc.) requires a regulatory scheme at regional level, where the responsibility for defining the charges reside. Only through the application of the ERC to all the different water uses is it possible to fully implement the principle of “full cost recovery” outlined in the WFD, and to share equally the costs for the sustainable management of the water resource at the basin level.

- The LIFE Brenta 2030 project helps the integration of the water basin plan (Piano d'Ambito) within the context of Natura 2000 site «Grave e zone umide del Brenta». This innovative approach lays the foundations for the integration of the different territorial management plans, and allows a process of creating an effective governance that is able to integrate anthropogenic needs with a correct management of protected sites.
- At the European scale the drinking water sector makes annual investments for 45 billion euros on average for the construction of drinking water supply infrastructures and waste water treatment plants. The internalization, even partial, of the ERC, could generate a constant and very consistent source for the protection of water resources and connected ecosystems. It is estimated that even just 1% of the total annual investments made by the drinking water sector could represent an amount equal to the current annual budget of the LIFE Program, the main European fund for the protection of the environment and climate change mitigation and adaptation.
- The internalization of environmental costs in the public economy sectors (water, energy, waste) therefore represents a concrete opportunity to increase the effectiveness of environmental taxes, which too often are not used for mitigation and compensation purposes, but contribute to general taxation.

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