

Optimizing water for food and energy in the Durance valley

In partnership with the OECD Studies on Water: Stakeholder Engagement for Inclusive Water Governance

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Organisation: Electricité de France

Country: France

Level of government: Central government

Sector: Environmental protection, Social protection

Type:

Launched in: 2003

Overall development time: 1 year(s)

Link to the innovation's website

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Description

The Durance valley is host to a major dam and reservoir comprised of 32 hydropower plants producing over 6 billion kWh of renewable energy, supplying drinking water and water for industrial purposes to the entire region, and irrigating 150 000 hectares of farmland.

In 2003, a Water Saving Convention was signed between Électricité de France (EDF) and the two main irrigators in the Durance valley to improve water efficiency and allocation through better local stakeholder engagement. The objective was to optimise water allocation between energy generation and irrigation, and to develop appropriate incentives for water savings to restore financial margins and to answer future water demands.

EDF assessed the monetary value of water savings resulting from reduced abstraction for agricultural irrigation in Durance valley, to implement the water reductions and reimburse farmers accordingly allowing optimisation of other multi-purpose uses of water, and in this particular case, to increase the environmental flow, optimise hydro generation, and relax the constraints for management of the reservoir.

Why the innovation was developed

- To improve water efficiency through better stakeholder engagement, and to better cope during times of drought by having more water stored in the reservoir.
- To improve water allocation, and allowing irrigators to benefit by being remunerated by EDF based on their own water savings.
- Make water savings a lever of reduction of the quantitative imbalance of the basins in water deficit, with the Water Agency receiving a return of a part of the volumes saved.
- The overall aim was to optimize water allocation between energy generation and irrigation and to develop appropriate incentives for water savings in order to restore financial margins, and answer to future water demand from other users.
- The value used for water was the energy cost (€/KWh) based on current and future prices in France and linked to the energy productivity (m3/KWh) and the volume of water used (m3) by the hydropower plant.
- The main business case argument for the valuation study was to clearly demonstrate the benefits of optimizing water uses for each party, and to define the level of remuneration for these savings.
- The savings of water realized are identified by the main actors of this basin as one of the main measures of adaptation to climate change.
- Water institutions at sub-national level (river basin organisations, state agencies, regional water authorities)
- Agricultural actors

Results

Efficiency

- The results showed that in addition to simply the volume of water saved, a key benefit was the timing of the water savings because the saved water could be used to generate more electricity during peak periods of electricity demand when electricity prices are higher. Both parties come out ahead, with a third winner being ecosystems as around 84% of the water savings are used for ecological purposes.
 - This project indeed allows EDF to a better energy optimization and to contribute to a better environment. The integrated management of the multi-purpose water use along Durance-Verdon rivers allows, thanks to the big reservoirs and to the canal of Durance which acts in the heart of the territory as a feeder artery, to concretize the solidarity between downstream users (savings) and upstream ones (needs). This solidarity requires the construction of a consensus with all the actors which go beyond the only signers of the agreement.
 - Cost-saving: 100 million cubic meters of water (per year) have been saved and an additional 20 to 25 Mm3 will be with new Convention.
 - Sustainability/resilience: The 25-year period of the Agreement and the 9-year period of the Convention is the illustration of the long-term view. As mentioned, the overall aim is to optimize water allocation between users, and answer to future water demand and anticipate the climate change effect.
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Effectiveness

- Acceptability/ownership of stakeholders involved: A financial incentive was key to accept and involve stakeholders.
 - Capacity development: This project has changed the way of operating the canals and the water management of these irrigators. It also obliged them to think more globally to better coordinate the water management of the others canals and therefore to work more closely with the other irrigators.
 - Broader economic development: The results of these savings impacted the socio-economic activities at the Durance scale, not only locally, due to the transfer of the water saved to water-stress areas.
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Service quality

Responsiveness:

- The level of engagement is high because of the financial incentive. To balance the water saving efforts, EDF has a commitment to remunerate the partners for their savings.
- The deal was so effective that a first additional agreement was signed in 2006 to increase the savings target from 44 to 65 and then to 90 million cubic meters (reference to the 90's consumption). This led to a reduction in agricultural consumption of water from 325 million cubic meters to 235 million cubic meters today.
- The new Convention plans the economy from 20 to 25 millions additional cubic meters. Its main driver is a significant annual remuneration based on the achievement of defined objectives. It allows the irrigators to revise freely their objectives every year with a perfect knowledge of the economic consequences of their choices.

Development

Design

EDF is the promoter, and its interest is to optimise hydro generation and relax the constraints for the reservoir management in the perspective of answering to future water demands from other users.

EDF benefits from having more water available throughout the year, thereby being able to benefit from more hydropower generation and from the added flexibility of being able to generate electricity at peak periods of the day throughout the year when energy prices are higher.

Testing

- No methods were used to test the innovation.
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Implementation

Tools used:

- In France, since 1964, the water management has been lead at the river basin scale by six water agencies. The Rhone-Mediterranean and Corsica Water Agency is a French public body regulated by the Ministry for Ecology, Energy, Sustained Development and Spatial Planning. Its role is to help elected representatives and local communities, economic stakeholders and inhabitants use water resources rationally and fight against the pollution and deterioration of aquatic environments.
- As part of the national and European water management policies (mainly Water Framework Directive), the Water Agency implements the guidelines defined by the Rhone-Mediterranean and Corsica Basin Committees, which like genuine “water parliaments” bring together the representatives of the water stakeholders from these major river basins.
- Integrated management of the water resource for the whole basin generally satisfies the different uses and environmental requirements the majority of time. However, tensions arise at times when the availability of water is limited. Such situations are becoming more frequent due to climate change and population growth.

Resources used:

- EDF provided the funding for the program.
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Challenges and solutions

- Logistical expenses: More than 20 meetings with more than 15 stakeholders, one economic study with different scenarios, and the iterative process of writing the Convention.
- Delays: around three years for the first Convention, the same for the second one.
- Conflicts: It is necessary to clearly define beforehand the modalities of payment between the irrigators and EDF, and to avoid conflicts between them.
- The most important parameter is to give perspective to the stakeholders on the long-term, to accompany them on the financing of the investments to be realized to generate savings of water, to monitor that these operations, such as the modernization of a canal, generate a real and fast profit to the different stakeholders.
- It is also important to avoid locking them into a commitment which would deprive them definitively of a part of the rights of water. It is necessary to demonstrate the long-term interest for the community to undertake in this way to anticipate the effects of the climatic change on the water resource and demand.
- And finally, it is useful to set up a local and relevant governance at different scales to be efficient and coherent between the different objectives and targets. In this case, the savings are defined and contracted at the local level between EDF and a irrigator, the use of these savings is decided at the basin level by the Water Agency.

Lessons Learned

Lessons Learned

- The new convention and the development of the “contracts of canals” show all the interest of this approach. Several irrigators have already let us know their wish to benefit from this type of contract. However, it is a long-term process because the obstacles are numerous.
 - If the concept is very attractive because it is based on a payment for the returned service, it is necessary to adapt it to the specific context of every partner and to create with them the conditions which will allow a commitment in the duration.
 - The savings of water requires first of all to modernize the irrigation (by gravity) to make it more efficient without modifying the food service per hectare. It is the first condition of the acceptability.
 - The evolution towards other modes of irrigation is also another possible way, but it also requires financing and cannot be necessarily economically viable.
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Conditions for success

- Financial incentive is the key issue. The second one is raising awareness on the usefulness of saving water and demonstrate the relevancy of such approach.
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Other information

This experience can be easily replicated in any multipurpose hydro scheme where irrigation and energy production are the main users of the water in the reservoir.

This case study has been used and detailed for the WBCSD's Water Valuation Project with a focus on the economic valuation. See website www.wbcd.org

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