

SPAIN

Water use efficiency

Location

Alfaro, la Rioja

Programming period

2014 – 2020

Priority

P5 – Resource efficiency & climate

Measure

M16 - Cooperation

Funding (EUR)

Total budget 317 103

EAFRD 123 529

National/Regional 123 529

Private 70 045 (BOSOLA)

Project duration

2017 – 2019

Project promoter

Irrigation Community 'Las Planas', of Aldeanueva de Ebro.

Contact

comunidadregal@gmail.com

Website

www.bosola.es

Setting up a hybrid irrigation system using solar energy to reduce energy costs and CO₂ emissions.

Summary

In recent years in Spain, the price of electricity for irrigation communities has dramatically increased, e.g. by 1 250 % between 2008 and 2013. This has reduced the competitiveness of many farms. Additionally, it is estimated that conventional irrigation systems release more than 16 million tonnes of CO₂ per year due to the consumption of electricity produced from fossil fuels.



The Las Planas Irrigation Community, in Alfaro, La Rioja, located in northern Spain, set up a multidisciplinary innovation team to convert their old irrigation infrastructure into a hybrid system that would operate using energy from photovoltaic panels. The project involved technical activities to set up the hybrid irrigation system, testing and collecting data, as well as information dissemination and promotion activities.

Results

Within four months of operation, 84 981 m³ of water had been pumped using renewable energy. That was approximately 30 % of the total annual water consumption.

Comparing the data from irrigating with the hybrid system compared to the previous three years, it appeared that energy consumption had been reduced by 50 % during the irrigation months and by 18 times during the non-irrigation months.

Estimates show that there will be 117 tonnes of CO₂ emissions avoided per year.

Lessons & Recommendations

- ❑ Networking and cooperation were a key success factor. Realising this innovative system required the involvement of many different actors, including the local administration, service providers and educational institutions.

Project partners

FABER - contact email: javier@faber1900.com

IMEL - contact email: ruben@imel.es

UPM - contact email: navarte@ies-def.upm.es

CONSEJERÍA DE AGRICULTURA DE LA RIOJA -
contact email: jsoba@larioja.org

Context

Between 2008 and 2013, the price of electricity for irrigation communities in Spain dramatically increased by 1 250 % (source: FENACORE, September 2013). This increase in costs has reduced the competitiveness of many farms. It is also estimated that conventional irrigation systems release more than 16 million tonnes of CO₂ emissions per year due to the consumption of electricity produced using fossil fuels.

The Las Planas Irrigation Community in Alfaro, La Rioja, had an average annual energy consumption rate of 392 631 kW and pumped water consumption of 283 826 m³, which amounted to 1 383 kW consumed per m³ of water, according to irrigation data from 2010 to 2016. To this end, the BOSOLA multidisciplinary innovation team was created in order to develop a photovoltaic irrigation system for commercial use and promotion in the market.

Objectives

The objective of BOSOLA was to create a renewable and clean energy system for agricultural irrigation that would reduce the dependence on fossil fuels and the high associated costs.

Activities

BOSOLA was the first high power photovoltaic irrigation project in the region. Initiated by the Irrigation Community in La Rioja, the project was developed by the innovation team with support from the La Rioja Rural Development Programme 2014–2020. It was focused on the generation of electricity from photovoltaic panels to pump water for irrigation of agricultural crops.

Prior to the project, water was pumped from the main reservoirs that are fed by the Lodosa canal. They irrigated 246.24 hectares of vineyards, which are mostly drip irrigated. The Irrigation Community had high energy costs since it needed water to be supplied 24 hours a day in the months of maximum demand for irrigation. To reduce their energy costs, they opted to develop a hydraulically and electrically isolated hybrid system using photovoltaic panels for energy.

During the project, the hydraulic installations were adjusted by setting up a twin system to isolate the photovoltaic pumping and the hydraulic connections to the existing intake and impulse network. In addition, the electrical systems of the pumping station were updated.

The photovoltaic installation consists of 600 solar panels with a total power of 213 kWp, and they are distributed in ten rows with east-west orientation. A booth has been set up to control the photovoltaic system and other infrastructure.



The generated energy enables two pumps to drive 30 litres of water per second to an elevated raft of 70 000 m³ with a geometric drop of 225.6 metres. From there, the water is distributed by natural pressure to the 246 hectares of connected vineyards.

The project duration was 25 months. Applying for permits and completing all the necessary paperwork with the administration (basic projects, execution projects, productivity studies, trials) took six months. Another six months were dedicated to the installation and civil engineering of the photovoltaic and hydraulic systems. Data were collected for a 12-month period and the dissemination of results lasted one month.

The BOSOLA innovation team members were:

- the members of the Las Planas Irrigation Community of Aldeanueva de Ebro, who are the beneficiaries of the project;
- the Agricultural Infrastructures Service of the Ministry of Agriculture, Livestock and Environment of La Rioja, who offered technical support during the project;
- the electrical installations company Montajes Eléctricos Logroñeses (IMEL), who contributed their knowledge and experience in photovoltaic installations as well as irrigation and pumping facilities;
- the Solar Energy Institute of the Polytechnic University of Madrid, who drew on their experience in research projects, patents, papers and specialised publications in the sector to benefit the project; and
- the company Faber 1900 S.L.P., who offered expertise on agrarian infrastructure.

Main Results

After four months of operation, 84 981 m³ of water had been pumped using renewable energy. That was approximately 30 % of the total annual water consumption.

In the same period, the economic savings for the Irrigation Community were also substantial. Comparing the irrigation data after the project to those of the previous three years, it appears that the installation reduced energy consumption by 50 % during the irrigation months and by 18 times during the non-irrigation months.

The data collected show that the installation will be amortised in less than five years.

It is estimated that there will be 117 tonnes of CO₂ emissions mitigated per year.

This project will improve the competitiveness of many farmers due to reduced energy costs and will encourage new productive investments with a positive environmental impact.

Key lessons

Networking and cooperation were a key success factor. Realising this innovative system required the involvement of many different actors, including the administration, service providers and educational institutions.



Additional sources of information

<http://www.faber1900.com>

<http://www.imel.es>

<http://www.upm.es>

<https://www.larioja.org/agricultura/es>