NESOI
EU ISLANDS FACILITY

Public Irrigation Service
Decarbonization Energy Plan for the
Island of Tenerife

DEWITEN

TENERIFE

"The DEWITEN project will analyse the potential of hydraulic microturbines for usage in the Tenerife Island's irrigation water piping system."

This project is supported by the EU Islands Facility NESOI.
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DEWITEN

The European Islands Facility NESOI aims to unlock the potential of EU islands to become the locomotives of European Energy Transition. To do so, NESOI aims to mobilize more than €100 Million of investment in sustainable energy projects to give EU islands the opportunity to implement energy technologies and innovative approaches, in a cost-competitive way. NESOI has selected 56 such projects across the European Union and provide them with financial resources and technical support.

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ABOUT
THE PROJECT

Project Promoter BALTEN — Entidad Pública Empresarial Local Balsas de Tenerife (BALTEN)

Stakeholders
- BALTEN
- Tenerife Waters Island Council
- Municipalities of the Island of Tenerife Irrigation communities

Country Spain | **Sector** Hydro | **PROJECT VALUE** 48,7 M€

DESCRIPTION

The Island of Tenerife aspires to be the first of the Canary islands to investigate the islands energy potential. There is a lot of excess pressure in the water supply network on mountainous islands such as Tenerife. The project will evaluate the potential for taking advantage of this energy, which is innovative and a great opportunity to reduce the primary energy consumption and associated GHG emissions.

AIM OF THE PROJECT

- Conduct energy audits of all BALTEN infrastructures
- Study the feasibility of photovoltaic and small wind potential on the island
- Investigate the potential of microturbines for the BALTEN irrigation water piping system
- Study the feasibility of sustainable mobility of service vehicles fleet

FUTURE STEPS

The project impacts the whole island and its 31 municipalities, 16 jobs will be created and a renewable share of 54.79% will be achieved with benefits on the local grid. The project will set a great example for other mountainous islands in warm climates for the decarbonization of the irrigation service and the integration of renewable energy in general.

HOW THE EU ISLANDS FACILITY NESOI
SUPPORTS THE PROJECT

1. **Energy audit of company facility, feasibility analysis for sustainable mobility, energy efficiency and renewable energy production (solar, wind and hydro)**
2. **Risk and vulnerability assessment and identification of available mitigation strategies**
3. **Identification of measures to reach the defined objectives and key project sizing drivers**
4. **Mapping of the main financial instruments available to finance the identified actions**
5. **Action plan and monitoring system, allocation of responsibilities for its implementation**
6. **Support in participatory processes and drafting of the decarbonization strategy**

New Energy Solutions Optimised for Islands
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***Public Irrigation Service Decarbonization Energy Plan for the Island of Tenerife* - Interview**

INTERVIEW WITH

Moisés Romero, Exploitation Technician at BALTEN

Q: How was the project initially designed?

A:. The energy expenses correspond to 30% of the irrigation water management expenses of the islands of Tenerife. However, since irrigation is an essential service, it must be maintained no matter the economic or environmental difficulties. With DEWITEN, we wanted to design a plan to completely decarbonize the irrigation service. For this, energy audits, the use of fleets of electric vehicles and the integration of renewable energy based on solar, wind, mini-hydraulic was investigated.

Q: What are the challenges of the project? How does NESOI help overcome them?

A: The main challenge is to keep the price of the irrigation service reasonable throughout the island. The cost of installing wind power and chargers for electric mobility is substantial and, therefore, these technologies have the longest pay-back time based on this study. In any case, the designed system must ensure service, even despite possible network breakdowns. NESOI has helped with both sustainability and economic studies, in addition to helping us hire external consultants.

Q: What are the next steps of the project?

A: The results within NESOI will become separate small projects focused on establishing a PV plant, wind power plant, electric mobility network, etc.. One of the pilot projects that is being evaluated now is on floating photovoltaics. When final projects are formulated and the necessary funding obtained, we will carry them out little by little. These types of initiatives can be replicated in other areas/islands through Europe.
Our final aim is to achieve 100% of decarbonization on the island. Going forward, we need further technical support for the plant and charger facilities and additional funding for the decarbonization of islands, as well as external consultants to be able to handle all the necessary funds.

THE IMPACT

ON LOCAL COMMUNITY

1 Local Economy

The estimated impact on the local economy is the creation of a total of 16 jobs. The competitiveness of local companies specialised in energy efficiency and renewable energy solutions also will increase and have an important effect.

2 Social Acceptance

BALTEN has both private and public clients. The key stakeholders are invited to participate in the Energy Audits and Feasibility Studies reports. Their vision and comments will be considered.

DEWITEN

Public Irrigation Service Decarbonization Energy Plan for the Island of Tenerife – Technical Data

FOCUS ON
POTENTIAL OF MICROTURBINES ON ISLANDS

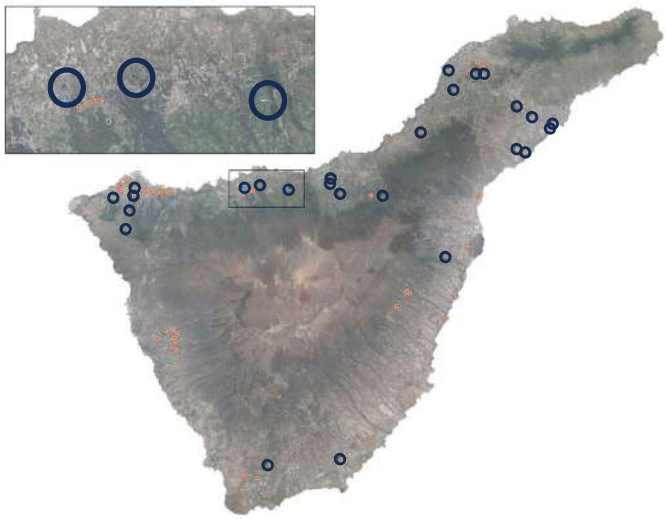
Microhydropower or microturbines can be simple and consistent forms or renewable energy in places where there is flowing water.

The BALTEN irrigation system is an extensive network composed of 20 ponds, 23 tanks, and a total of 1.500 kilometers of pipelines. A total of 73 potential sites for microturbines were identified and a shortlist of these facilities was then made based on the closeness of the electricity consumption. The potential sites corresponded to the following types.

Inflows storage ponds that have historically relied on the excess groundwater during winters. However, the groundwater resources are declining, and nowadays regenerated water is being pumped from lower elevations to the inflow ponds. Therefore, inflow ponds do not make sense for electricity generation, since the water first needs to be pumped into these ponds

Outlets storage ponds usually have a maximum water level of 14 meters. However, it is also necessary to maintain downstream pressure for the irrigation network. Thus, the maximum height difference between where the water enters into the microturbine system and where it leaves it (i.e. potential head) is about 8-9 meters.

Pressure reducing valve sites were **in** most cases beyond 500 m from the point of electricity consumption. Additionally, there was no flow or pressure information available for the study and further measurement is needed.



Potential sites for microturbines, where electricity consumption is within 500 m noted with black circles (Documents sent to NESOI)

Balsa Valle de San Lorenzo reservoir (Documents sent to NESOI)

KEY NUMBERS
OF THE PROJECT

- **212 MWh** — Amount of electrical energy saved each year
- **21.5 ktCO$_2$eq** — Amount of CO_2 emissions avoided per year
- **26 GWh** — Electricity production based on RES per year
- **9.3 years** — Pay-back time

REPLICABILITY
IN OTHER ISLANDS

The project is replicable and scalable on other islands, as well as on mainland, where irrigation water networks exist. Some solutions may need to be adapted to specific conditions such as difference in height for mountainous islands or specific wind potential conditions.

Picture on cover - San Antonio - Reservoir associated with the first floating photovoltaic solar plant in Canary Islands, Picture provided by BALTEN
Picture in introduction - Estación de Bombeo SC - Installation of solar PV in a main Pumping Station (Finished), Picture provided by BALTEN

RINA
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