

EXPECTED OUTCOMES

- Improve the energy efficiency (kWh/m³) by an average of 10 - 15% while reducing the operational costs (€/m³) of the irrigation systems.
- Provide success cases to help overcome the current barriers that prevent the water users to access the interactive energy market.
- Create market opportunities for WEAM4i innovations inside and outside Europe.

Find further information and updates on the project and its tool at:
www.weam4i.eu, or contact us at info@weam4i.eu



Knowledge grows



Water & Energy Advanced Management For Irrigation



www.weam4i.eu



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WEAM4i AT A GLANCE

PROJECT TYPE:

Water innovation demonstration project

PROGRAMME:

7th EU Framework Programme (FP7)

DURATION:

42 months (2013-2017)

TOTAL COST AND EU FUNDING:

7,6M € (EU contribution: 5,2 M€)

DEMONSTRATION SITES:

- Germany: Landwirtschaftskammer Niedersachsen (LWK) Chamber of Agriculture of Lower Saxony.
- Portugal: The Associação de Beneficiarios da Obra de Rega de Odivelasa and AB do Roxo,
- Spain: Comunidad General de Regantes del Canal de Bardenas.

PROJECT COORDINATORS:

- METEOSIM SL, ES
- ADASA, ES

PROJECT PARTNERS:

- HISPATEC, ES
- Aquagri ACE, PT
- FENACORE, ES
- FENAREG, PT
- ELEAF, NL
- LWK Niedersachsen, DE
- LGRain GmbH, DE
- UT SEMIDE, FR
- ECLAREON, DE
- Comunidad General de Regantes del Canal de Bardenas, ES
- Hydrologic Research, NL
- Ingenieurburo Schulz + Von der Ohe, DE
- CSIC, ES
- CREAMA, ES
- YARA ZIM PLANT, DE

Germany

The demo site in Germany is located in Lower Saxony and is characterized by:

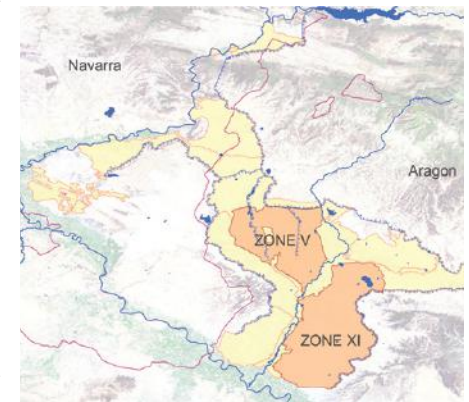
- Size: ca. 300.000 ha of irrigated land,
- Water energy consumption (ground water pumps): 0,5 - 0,8 kWh/m³
- Energy cost: 0,2 €/kWh (average) corresponding to 96 €/ha/year
- Main Crops: potatoes, sugar beets, grain, corn, onions, vegetables
- Type of irrigation: High pressure gun spray-jet on reel wagon (95%)



Spain

The demo site in Spain is located in Comunidad General de Regantes del Canal de Bardenas (CGB) (81000 ha). The pilot areas are Monte-Saso (Comunidad V) and Sector XII (Comunidad XII) and are characterized by:

- Size: 1,482 ha of irrigated land
- Water & energy consumption:
 - Monte-Saso (1222 ha): 0.21 kWh/m³
 - Sector XII (260 ha): 0.16 kWh/m³
- Energy costs:
 - Monte-Saso: 0.13 €/kWh,
 - Sector XII: 0.09 €/kWh
- Main Crops: Alfalfa, corn, winter cereal (wheat, barley), sunflower, vegetable and fruits
- Type of irrigation: 80% flooding system and 20 % pressurized system – dripping and sprinkling



INNOVATIVE FACTOR

Water-Energy-Food (WEF) Nexus in irrigation operations: The WEAM4i ICT platform and Decision Support System tools represent an innovative application of the WEF Nexus concept in a 5 days horizon, balancing resource efficiency and food production with daily/hourly resolution.

New business model approach: The application farming. The WEAM4i ICT platform will provide weather, remote sensing and energy Information as a Service (IaaS) to the users, but also hosting services for local Small and Medium Enterprises (SMES) and agronomic advisors that will be willing to deploy their own applications in the platform.

Ultimate objective:

Save costs and resources while increasing the crop production by providing the best irrigation advice to the users



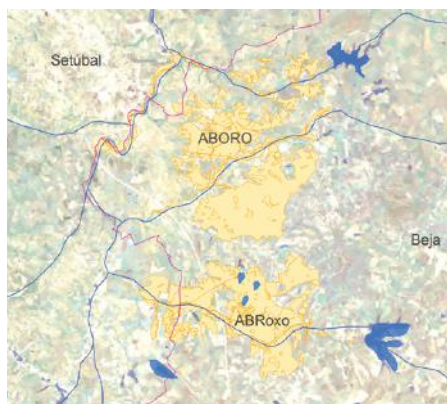
An irrigation field of WEAM4i demo site (Portugal) and the sensors

DEMONSTRATION SITES

Portugal

The demo site in Portugal is located in ABORO: The Associação de Beneficiarios da Obra de Rega de Odivelas and ABRXO: The Associação de Beneficiários do Roxo and are characterized by:

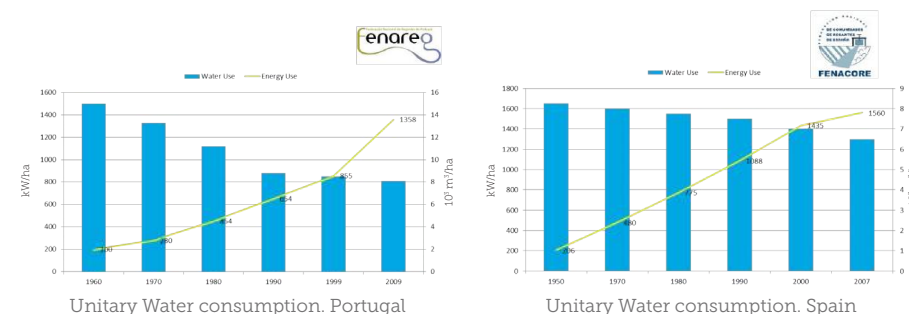
- Size: total for both 17.362 ha of irrigated land.
- Water energy consumption: 0.3404 kWh/m³ (average)
- Energy costs: 0.1 €/kWh (average)
- Main Crops: Olives, maize, rice, pasture, sunflower, almonds
- Type of irrigation: Drip, sprinkler and pivot systems



OVERVIEW



The agriculture sector is accountable for around 30% of the total water consumption in Europe, but reaches up to 70% of total water consumption in several European southern countries. In the recent years, important water savings have been achieved without taking care of energy aspects, resulting in a significant increase in energy consumption. Irrigation in agriculture reaches up to 3% of total national electrical power consumption in countries like Spain. Thus, the new challenge for the irrigation sector is to minimize the energy costs while producing the maximum crop per drop.



PROJECT OBJECTIVES

- Demonstrate an innovative water & energy smart grid for irrigation: matching demand-side management with available energy offer (including renewable).
- Demonstrate innovative techniques for resource efficiency at local level: saving water and energy (m³/kWh) in the local irrigation systems.
- Develop an innovative integration approach: an ICT/cloud platform based on Service Oriented Architecture (SOA) for weather forecast and remote sensing data services & applications.

BUILDING BLOCKS

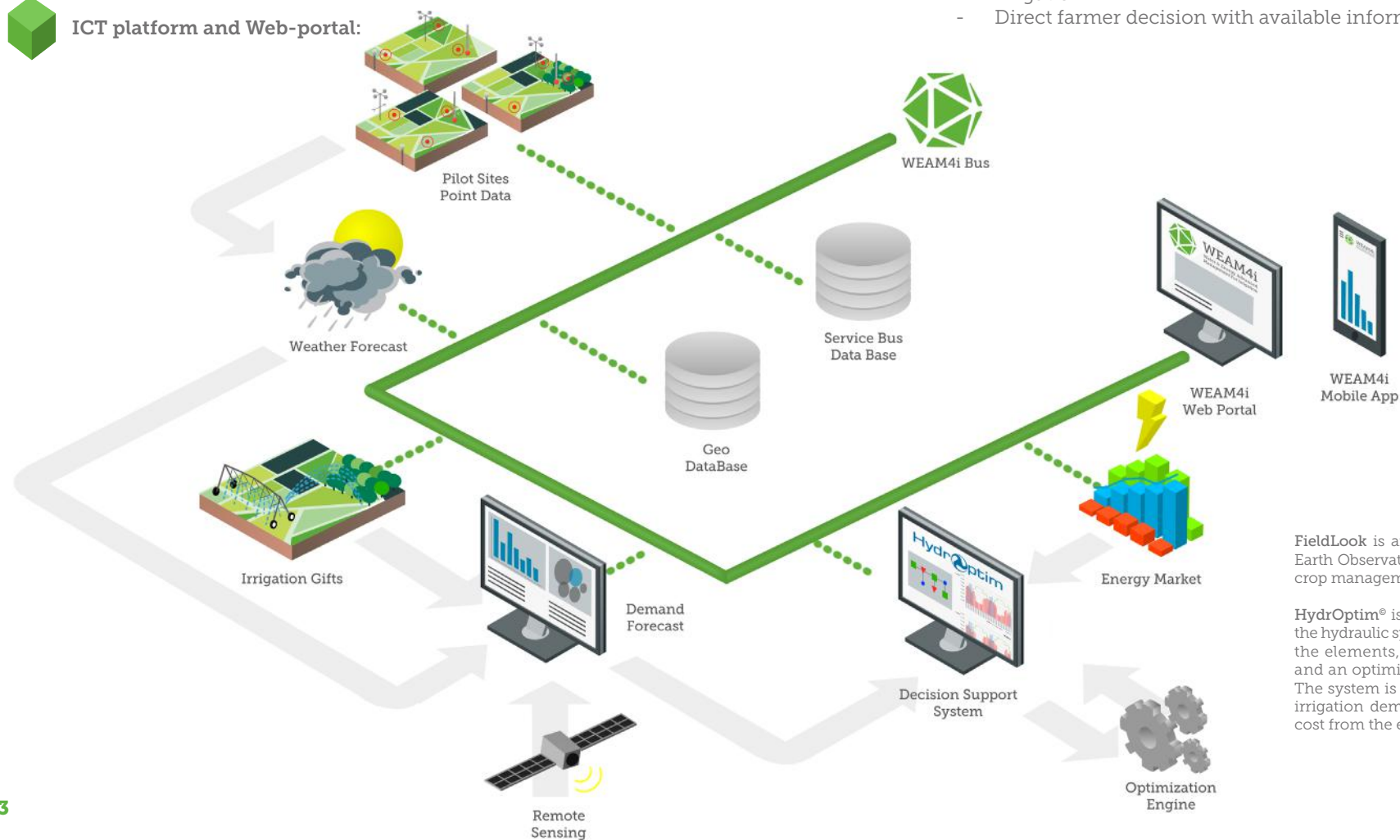


Resource efficiency at local level:

- Leaf sensors and soil water status for improved irrigation scheduling protocols.
- Alternative power systems for low pressure irrigation systems.
- High pressure system optimization (GPS based pump steering algorithms) for improving water and energy use efficiency.
- Genetic Algorithms for improving water and energy use efficiency.



ICT platform and Web-portal:



Decision Support System:

- Forecasting:
 - Water demand forecasting: Water needs per field for the next 5 days based on FieldLook®
 - Energy Market: Energy prices in Day-ahead market . +4 days forecast.
- Strategical management: Based on HydrOptim®.
- Demand management:
 - Application of Genetic Algorithms and/or HydrOptim® for automated irrigation.
 - Direct farmer decision with available information through Web portal.

FieldLook is an ICT Application Platform that uses Earth Observation to monitor crops for growers and crop management advisors.

HydrOptim® is an ICT application which comprises the hydraulic system topology, the control model of the elements, the cost function to be minimized and an optimization engine.

The system is fed with two main inputs: the water irrigation demand forecast and the hourly energy cost from the energy market.