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Abstract (for dissemination)	This report presents the first iteration of ICT for Water commercial developments and technology trends analysis. The objective of this report is to collect existing commercial developments and technology trends, and classify them taking in consideration topics and tags. Finally, a global analysis of information collected will be done. This information will be uploaded to the different platforms that will support the IWO during the project. In addition, this information will be updated in upcoming related deliverables D1.7 and D1.8, corresponding with the second and third update of this analysis.
Key words	ICT for Water, technology trends, commercial developments

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List of Acronyms

D1.3	Deliverable 1.3: Reports containing Literature reviews 1st release
D1.6	Deliverable 1.6: Reports containing Analysis of commercial developments and technology trends 1 st release
D1.7	Deliverable 1.7: Reports containing Analysis of commercial developments and technology trends 2 nd release
D1.8	Deliverable 1.8: Reports containing Analysis of commercial developments and technology trends 3 rd release
DSS	Decision Support Systems
EC	European Commission
EU	European Union
FP7	Seventh Framework Programme (2007-2013)
H2020	EU Framework Programme for Research and Innovation (2014-2020)
ICT	Information and Communications Technology
IWMR	Integrated Water Resources Management
MBR	Membrane bioreactor
NGO	Non-Governmental Organisation
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WDS	Water Supply and Distribution System
WHO	World Health Organization

Executive Summary

This report is part of WIDEST (www.widest.eu), a H2020 funded project – Coordination and Support Action (Ref. Number 642423). Deliverable “D1.6 Reports containing Analysis of commercial developments and technology trends 1st release” focuses on selecting the most relevant commercial developments and technology trends regarding ICT applied to the Water sector.

This report will prioritize technology trends fostered by the project members of the ICT4Water cluster, which represent all ICT for water related EU funded projects under FP7 and H2020 research programs. In addition, commercial developments led by these members will be analysed, selecting the most relevant ones. Commercial developments and technology trends relevant in the water sector regarding applied ICT will be taken in consideration in upcoming updates of this deliverable.

This release will provide first results regarding this task. This work will be completed in coming deliverables “D1.7 Reports containing Analysis of commercial developments and technology trends 2nd release” and “D1.8 Reports containing Analysis of commercial developments and technology trends 3rd release” in months 16 and 22 of the project. The ambition is to analyse the more commercial developments and technology trends possible before the end of the project.

Finally, all this information will be collected in the WIDEST IWO, and uploaded into existing similar tools on the network, thus assuring further exploitation of WIDEST efforts after the project ends.

To understand this document the following deliverables have to be read.

Number	Title	Description
D1.1	Report with IWO definition and implementation	This report focuses on the definition and implementation of the ICT for Water Observatory (IWO). The IWO defines a methodology to collect, analyse and publish in a knowledge base resources from relevant sources of information related to ICT for Water technologies. This report includes the objectives, methodologies, functionalities and structure the IWO is going to offer and support, conforming the inputs of the literature reviews and commercial developments and technology trends analysis.
D4.1	Methodology for Portfolio Development	The present document contains the proposed methodology to develop, execute and update the ICT for Water Management Technologies Portfolio including the contact strategy, the portfolio structure and the information interchange protocol. The portfolio will be developed as a knowledge management system using principles and methodologies inspired in collective intelligence in order to achieve the vision of a global ICT for Water Management Portfolio.

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1. Introduction

This deliverable contains a first version of a comprehensive review of commercial developments and technology trends within the ICT for Water community. The whole analysis consists of 3 deliverables: “D1.6 Reports containing Analysis of commercial developments and technology trends 1st release”, “D1.7 Reports containing Analysis of commercial developments and technology trends 2nd release” and “D1.8 Reports containing Analysis of commercial developments and technology trends 3rd release”. Each one of them updates and extends the existing previous ones. This report is the first of them, and focuses in technology trends and commercial developments which can be found inside the ICT4Water cluster (ICT4Water Cluster, 2015). The ICT4Water cluster is a hub of 15 sister projects funded by the EC under the 7FP and H2020 research programmes. The fifteen projects will be introduced later on this report.

The main facts to understand the application of ICT technologies can be summarized in understanding the following points:

- i. The existing gaps in the Water sector
- ii. The stakeholders involved
- iii. How can ICT technologies be used to help overtaking those gaps

Several reports regarding existing gaps and need in the water sector exist in the literature (European Commission, 2015), (Hervé-Bazin, 2010), (Mauree, Venkatesen; ITU, 2010) and (Tindale & Sagris, 2013). One of them, the “Emerging topics and technology roadmap for Information and Communication Technologies for Water Management” (European Commission, 2015) summarizes the gaps in:

- Efficient water use and reuse
- Reducing total cost of ownership for Water ICT
- Water-energy nexus
- Data sharing and privacy management
- Standardisation
- Decision Support Systems (DSS)
- Consumer awareness

Moreover, main stakeholders are identified and classified like follows:

- Water entities, including those that treat water and/or waste-water, water supply and distribution system (WDS) operators, etc.
- Governments and other types of policy-making or influential organisations, including:
 - Municipalities
 - Water authorities/regulators (i.e. River Basin Authorities...)
 - Environmental authorities
 - Non-Governmental Organisations (NGOs).

- Customers
 - Individual customers
 - Groups of customers (i.e. blocks of flats, suburbs, hotels, etc.)
 - Industry end-users
 - Agriculture end-users

At this time, despite having main gaps identified, and even having the necessary technology (or how to implement it), coordination and synergies among these different stakeholders must be previously improved. One of the major concerns is that each stakeholder in the water cycle is managing the corresponding stage as an isolated silo, thus complicating the coordination, the global optimisation and the better usage of the water resources.

As stated in D1.3 (Anzaldi, D1.3 Reports containing Literature reviews 1st release, 2015), ICTs are considered one of the most promising fields to deal with the current problems that humanity is facing related to water availability. On the one hand, developed countries are facing the ageing of its water distribution networks (Awwa, 2012) while try to improve security (Perelman & Ostfeld, 2012), energy minimization (United States Environmental Protection Agency, 2013) and sustainable usage (UNESCO, 2014). On the other hand, developing countries must improve the access to freshwater and sanitation facilities as the world has fallen short on the sanitation target (United Nations, 2013), leaving 2.4 billion without access to improved sanitation facilities (UNICEF; WHO, 2015).

ICT ranges a wide spectrum of fields, going from most essential communication techniques to high complex computational models, passing through satellite remote sensing, semantic sensor web, and Geographical Information Systems (GIS) among others. The aim of these technologies is to obtain information about water use, improve water management, to forecast the level of rivers and to identify new sources of fresh water that can be used wisely by water authorities. Moreover, due to the impact of climate change, historical data becomes less informative and less useful for forecasting. For that reason, a fast access to the current situation and conditions would become a crucial tool for decision-making.

As stated in (Mauree, Venkatesen; ITU, 2010), ICT provides a unique opportunity for water stakeholders to obtain information in near real time about a number of physical and environmental variables such as temperature, soil moisture levels, rainfall, and others through web enabled sensors and communication networks. These allow having accurate information about the situation at hand (without physically being there) for their forecasts and decisions. ICT is recognised as a strategic enabler in the process of developing innovative solutions to address the problems of water scarcities.

Additionally, the industry driven initiative ACQUEAU (which is part of the EUREKA¹ cluster) has identified the technological areas from nine water components of the water cycle. This identification has been done in its Blue Book (Hervé-Bazin, 2010), and its goal is to set out the major challenges and potential technological breakthroughs that could be expected from ACQUEAU within the short term (2015) and the long term (2030).

The aim of this Deliverable is to provide a review of the exiting commercial developments and technology trends within the ICT for Water community. To this end, a set of Tags and Topics have been identified to ease the classification of product or technology included in this Deliverable. On the one hand, Tags try to classify the different technologies within the ICT for Water. In a certain sense, Tags will identify “by means of which technology” the improvements are driven. On the other hand, Topics will set in “which water field” those improvements will contribute. Taking in consideration the last, tags and topics have been selected using as basis previous WIDEST efforts (Anzaldi, D1.1 ICT for Water Observatory, 2015) and (Haro, 2015). Hence, tags will be based on the keywords available on the commercial products descriptions, and/or the fields described in (Mauree, Venkatesen; ITU, 2010). Topics will be based on the Thematic Areas defined in “D4.1: Methodology for Portfolio Development”; Section “3.1.4 Final Portfolio Structure”; Table “6 WIDEST thematic areas and correspondences”. This table can be checked in Annex I: WIDEST Thematic Areas.

1. Drinking water production
2. Quality of water
3. Wastewater treatment (including recovery of resources)
4. Water reuse and recycling
5. Water-energy nexus
6. Water supply and distribution
7. Wastewater and storm water collection (including Flood risk management)
8. Water Scarcity and droughts
9. Sustainable development, Circular Economy & Ecosystem services
10. River Basin Management
11. Sea Water
12. Data management and Smart City services
13. Customer Relationship
14. Management of the water cycle in industry

Finally, the information collected will be stored in the IWO and later uploaded into existing water observatory tools and portals, thus assuring exploitation of results after the end of WIDEST project.

There are some extra considerations to consider before reading the collected information:

¹ URL: <http://www.eurekanetwork.org/>

1. Technology trends and product information is related to partner information on their corresponding websites.
2. When no specific information is found, project description has been taken as reference.

This report is structured as follows:

- **Section 1: Introduction** makes an introduction to this report and presents the rest of the chapters.
- **Section 2: ICT4Water cluster European Funded Projects** introduces the projects funded by the European Commission that are part of the ICT4Water cluster. For each projects, members of the consortium are analysed, assigning to them technology trends followed, and commercial ICT for Water solutions in their portfolio.
- **Section 3: Conclusions and Future Work** summarizes the state of the literature of the ICT in the Water community and state the future tasks to be done.
- **Section 4: References** provide the bibliography used to write this Deliverable.

2. ICT4Water cluster European Funded Projects

2.1 BlueSCities



Figure 1 BlueSCities logo

BlueSCities is a H2020 project that aims to develop the methodology for a coordinated approach to the integration of the water and waste sectors within the 'Smart Cities and Communities' EIP. It will identify synergies in accordance with the Smart City context and complement other priority areas such as energy, transport and ICT.

It will seek to contribute to the achievements of the 20-20-20 objectives. Placing emphasis on local solutions for global issues, the proposal seeks improved public engagement and enhanced decision-making processes at all political levels based on scientific knowledge and adequate social and economic awareness. BlueSCities will build on the hitherto successful implementation of the EIP Water Action Group, CITY BLUEPRINTS, which will provide the data required for a practicable planning cycle.

The necessary socio-technological tools will be produced. It will aim to improve exchange synergies between researchers and users, decision-makers and consumers, industry, SMEs and national and international authorities. In order to achieve this, the project will further review the current situation in 50 European cities employing its unique methods of analysis. It will produce detailed case studies of four specifically chosen municipalities/cities, and demonstrate a self-assessment baseline tool for water and waste in cities, which will enhance the implementation of European Smart City activities, to be published in the Blue City Atlas. It will, in a carefully planned step-by step process, collate data and formulate sufficient recommendations in order to produce an administrative methodology capable of eliminating cross sector barriers between water, waste and Smart City sectors to be described in a practical guidance document for the use of all relevant stakeholders. This will be supported by a programme of dissemination ensuring a wider public understanding of the nature of water and waste systems within the structures of European municipalities, regions and countries.

2.1.1 Partners technology trends

Table 1 BlueSCities Technology trends by partner

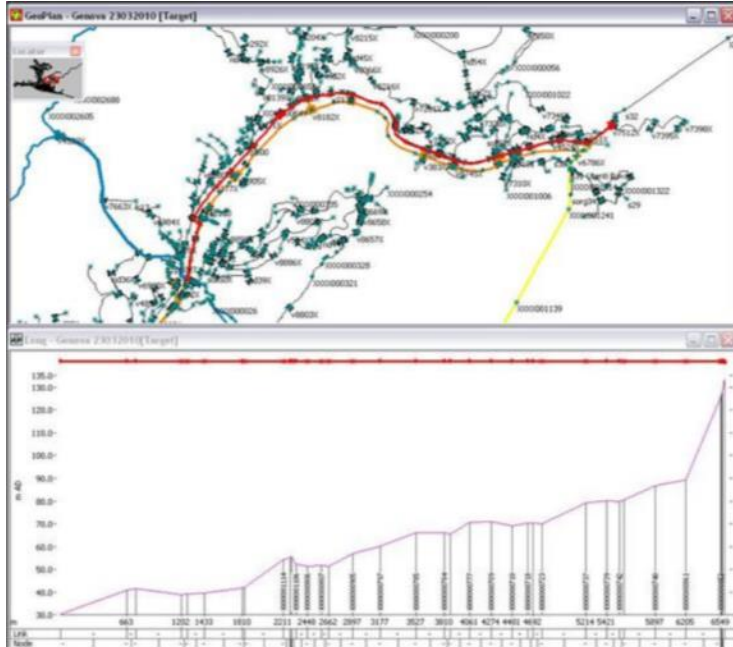
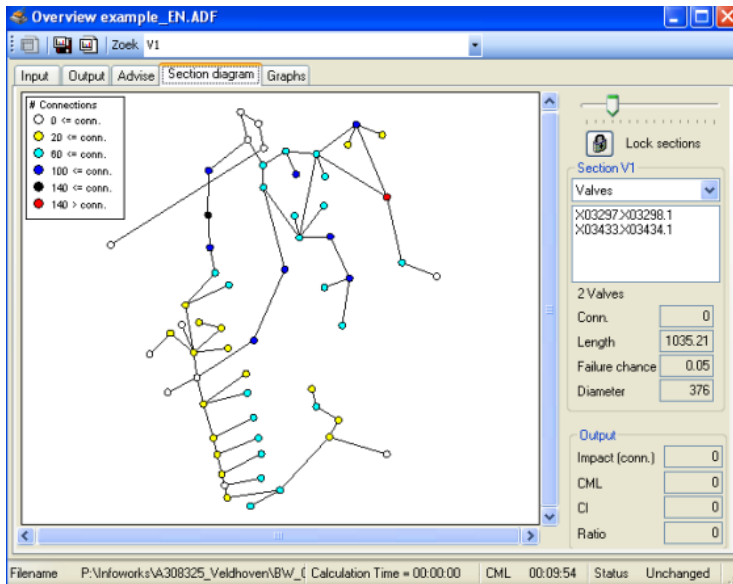
Partner	Type	Technologies trends / tags	Topics
De Montfort University	University	- Burst detection - Leakage management - MBR technology - Pressure management	- Quality of water - Water supply and distribution
Easton Water	Company	- Water supply risk assessment - Water management - Water quality	- Quality of water - Water supply and distribution - Data management and Smart City services
Eurecat-CTM	Research Centre	- Integrated water cycle management - Chemical risk in contaminated soils - Water treatment	- Quality of water - Water supply and distribution - Data management and Smart City services
Iren Acqua Gas	Company	- GIS - Network pressure simulation - Transient analysis in pipe - Water hammer in pipe network	- Water supply and distribution - Data management and Smart City services
KWR	Company	- Water quality - Water systems and technology - Knowledge management - Water treatment - Wastewater and reuse - Optimise distribution networks maintenance - Analysis of influence of external factors on the groundwater level - Time series analysis - Visualisation - Data management - Design of drinking water installation - Water demand simulation - Groundwater and surface water quality monitoring - Operational processes optimization	- Drinking water production - Quality of water - Wastewater treatment (including recovery of resources) - Water reuse and recycling - Water supply and distribution - Data management and Smart City services - Customer Relationship
NTUA	Research Centre	- Analysis and assessment of water resources - Hydrological processes modelling - Hydrological event forecasting - Water resources technology and	- Quality of water - Wastewater and storm water collection (including Flood risk management) - River Basin Management - Sea Water

Partner	Type	Technologies trends / tags	Topics
		- management - Quality of surface and subsurface waters, seas and coastal waters - Water treatment - Remote sensing - GIS	
REDINN	Company	ICT for Water consultancy	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City Services
Strane Innovation	Company	ICT for Water consultancy	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City Services
Joint Research Centre	Research Centre	EU Policy Advice	Data management and Smart City Services
TICASS	Company	Innovative Technologies for Environmental Control and Sustainable Development	Sustainable development, Circular Economy & Ecosystem services
University of Istanbul	University	- Drinking water consumption - Drinking water quality - Safe sanitation - Sufficient water to drink - Water management - Demand management - Wastewater treatment	- Quality of water - Wastewater treatment (including recovery of resources) - Water supply and distribution - Wastewater and storm water collection (including Flood risk management)
VTT	Research Centre	- Regulatory and integrative aspects in smart cities - Waste water and waste practices in cities	Data management and Smart City Services

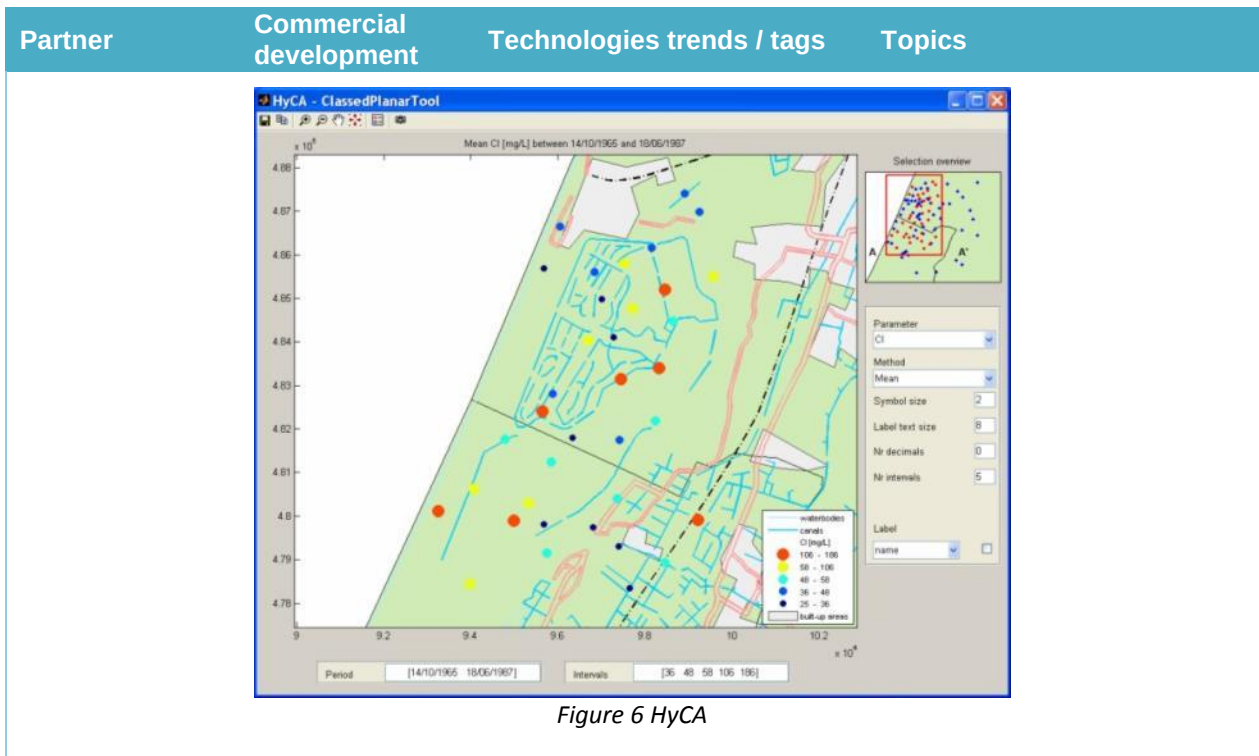
2.1.2 Partners commercial developments

Table 2 BlueSCities partners' commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
Iren Acqua Gas	GEOsim Office/Enterprise	- GIS - Network pressure simulation - Transient analysis in pipe network - Water hammer in pipe network	Water supply and distribution

Partner	Commercial development	Technologies trends / tags	Topics
		 Figure 2 GEOsim	
KWR	Cavlar	Optimise distribution networks maintenance	Water supply and distribution
		 Figure 3 Cavlar	
KWR	Menyanthes	- Analysis of influence of external factors on the groundwater level - Time series analysis - Visualisation - Data management	Data management and Smart City services

Partner	Commercial development	Technologies trends / tags	Topics
 Figure 4 Menyantes			
KWR	SIMDEUM	- Design of drinking water installation - Water quality - Water demand simulation	- Drinking water production - Quality of water
 Figure 5 SIMDEUM			
KWR	HyCA	- Groundwater and surface water quality monitoring - Data management - Operational processes optimization	- Quality of water - Data management and Smart City services



2.2 DAIAD



Figure 7 DAIAD logo

DAIAD is a research project funded by European Commission's 7th Framework Programme, and it is based on the principle that user awareness and self-induced behavioural change are the foundations for delivering sustainable changes in water consumption for society as whole. All research and technological activities in the project do not simply promote user awareness, but rather empower citizens to act as the catalyst for change.

In the DAIAD project, technologies that provide the missing data concerning water consumption are developed. The project delivers new, low cost/maintenance sensors for real-time and highly granular water consumption monitoring, decoupled from water metering. This enables users to proactively and voluntarily adopt water-monitoring sensors at low cost, and form a critical mass of consumers demanding similar services from water providers.

DAIAD provides simple and intuitive multimodal interfaces and knowledge delivery mediums to efficiently communicate knowledge concerning water consumption and actively promote sustainable consumption changes. These provide consumers with actionable knowledge and incentives to promote a sustainable lifestyle, interlinking their physical behaviour with timely information and stimuli. Such instruments do not only modify consumer change, but also maintain it over time. Further, in DAIAD is developed automatic knowledge management and analysis services for consumers and consumer groups that continuously analyse water consumption, identify patterns, provide recommendations, and offer incentives to strengthen sustainable consumption changes, both through self-motivation and social interaction.

DAIAD provides the required software tools with an open knowledge license, enabling users to self-adopt the produced technologies at a low cost. This creates and sustains a network effect with consumers becoming self-aware and introducing others in modified consumption behaviours. Further, this change in consumer behaviour also drives innovation in water metering and produces a demand for new products, value added services and business opportunities.

Finally, the DAIAD project produces educational and training material that can be applied by citizen associations, NGOs and water stakeholders, to inform the general population regarding water consumption, benefits from adopting a sustainable lifestyle, practical measures everyone can apply, and the technical means ICT can offer on a personal, community, and enterprise level.

2.2.1 Partners technology trends

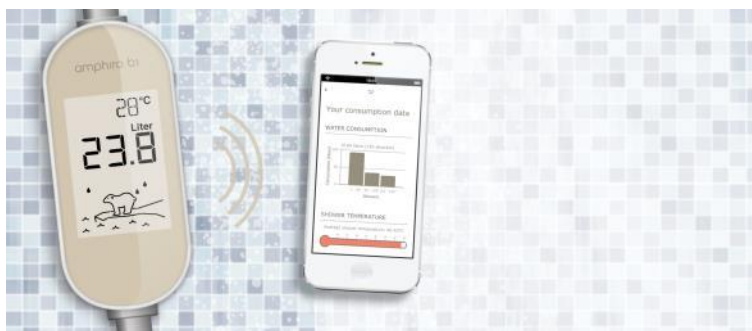
Table 3 DAIAD Technology trends by partner

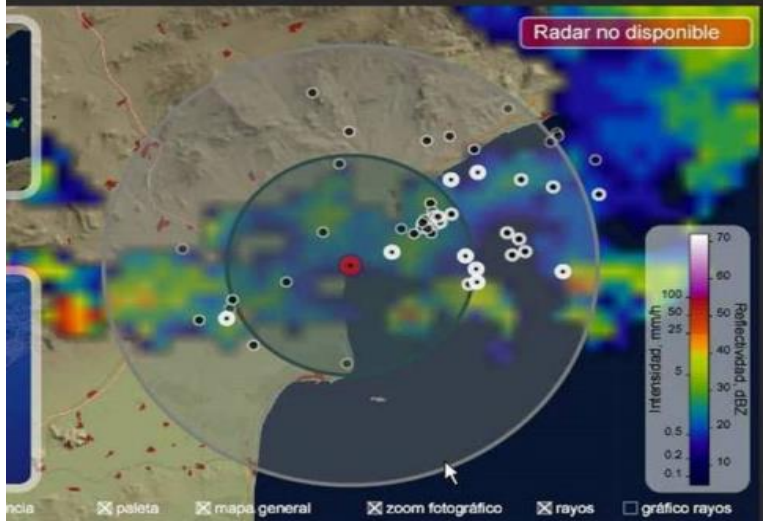
Partner	Type	Technologies trends / tags	Topics
Athena Research Centre	Research Centre	• Geospatial data • Spatiotemporal data • Open water management • Big Data • Open data	• Data management and Smart City services
Bamberg University	University	• Smart metering • Water consumption	• Sustainable development, Circular Economy & Ecosystem services • Data management and Smart City services
Amphiro AG	Company	• Smart metering • Water consumption	• Sustainable development, Circular Economy & Ecosystem services • Data management and Smart City services
Fraunhofer	Research Centre	• Water infrastructure systems • Smart technologies • Sustainable Water management • Water quality	• Drinking water production • Quality of water • Water supply and distribution • Sustainable development, Circular Economy &

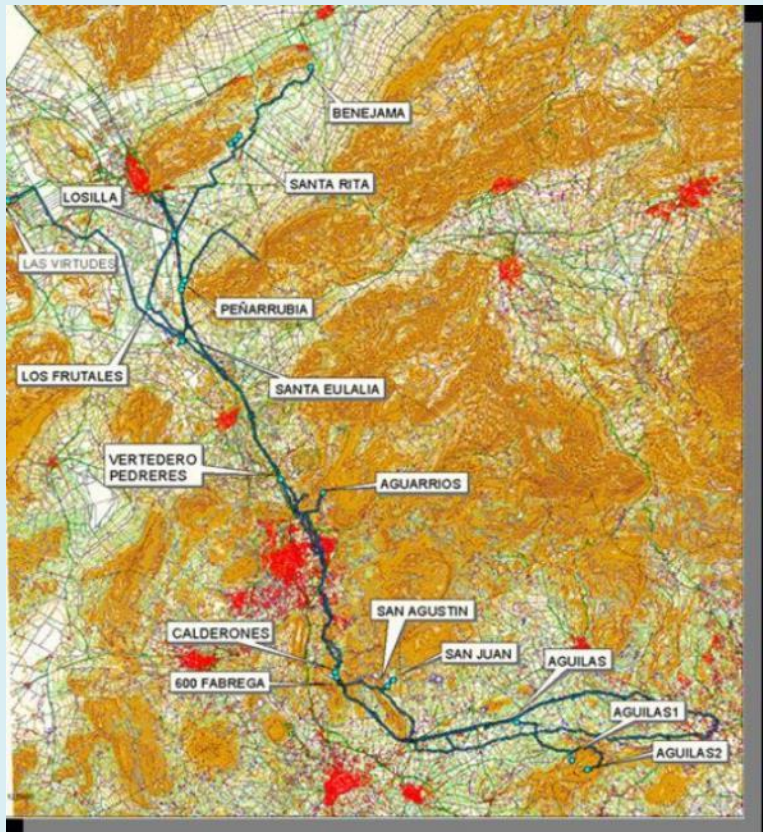
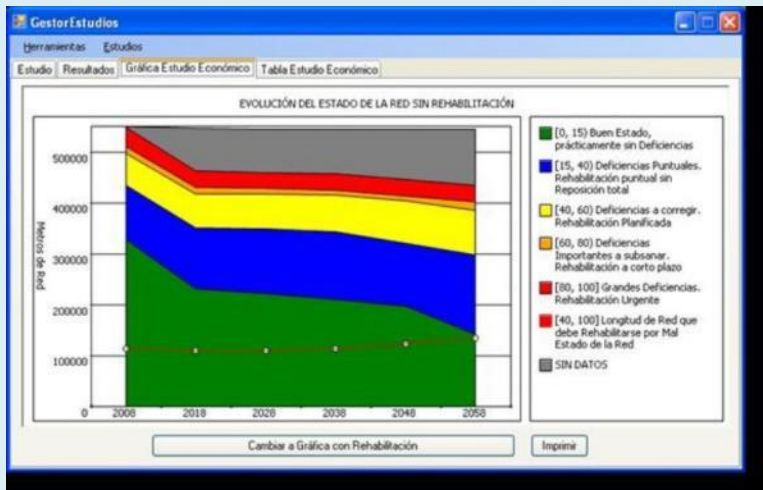
Partner	Type	Technologies trends / tags	Topics
		Drinking water supply protection	- Ecosystem services - Data management and Smart City services
WaterWise	Company	- Water management - Water quality	- Quality of water - Data management and Smart City services
Aguas de Alicante	Company	- Water management - Water quality	- Quality of water - Data management and Smart City services - Wastewater and storm water collection (including Flood risk management) - Sustainable development, Circular Economy & Ecosystem services - Water supply and distribution

2.2.2 Partners commercial developments

Table 4 DAIAD partners' commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
Amphiro AG	Amphiro b1	- Smart metering - Water consumption - Neighbourhood comparison	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
 Figure 8 Amphiro b1			
Aguas de Alicante	SIPAID	- Real time monitoring - Flooding alert - Rainfall monitoring	- Water supply and distribution - Wastewater and storm water collection (including Flood risk management)

Partner	Commercial development	Technologies trends / tags	Topics
		 Figure 9 SIPAID	
Aguas de Alicante	CAFCA	Carbon footprint in water cycle	Sustainable development, Circular Economy & Ecosystem services
Aguas de Alicante	COWAMA	- Bathing water quality - Drainage network modelling - Rainfall monitoring - Maritime wind simulation - Coastal background bathymetry	- Quality of water - Data management and Smart City services - Wastewater and storm water collection (including Flood risk management) - Sea Water
 Figure 10 COWAMA			
Aguas de Alicante	SONDEA	- Genetic algorithms - Groundwater exploitation optimization	Drinking water production

Partner	Commercial development	Technologies trends / tags	Topics
	 <i>Figure 11 SONDEA</i>		
Aguas de Alicante	METRESA	Pipeline depreciation	Water supply and distribution
	 <i>Figure 12 METRESA</i>		
Aguas de Alicante	SAED	Leak detection	Water supply and distribution

Partner	Commercial development	Technologies trends / tags	Topics
Aguas de Alicante	PRIFU	Leak detection	Water supply and distribution
Aguas de Alicante	GIS-PRELOG	Leak detection	Water supply and distribution

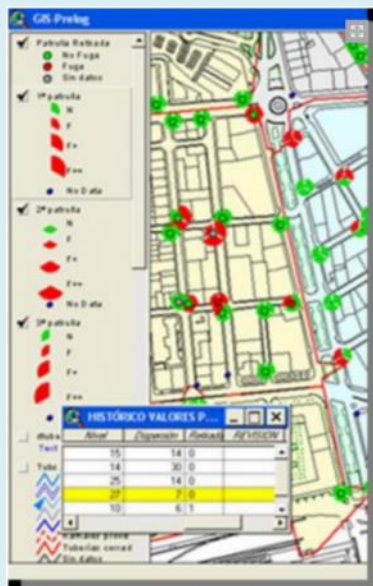


Figure 13 GIS-PRELOG

2.3 EFFINET



Figure 14 EFFINET logo

EFFINET is a project funded under the EU 7th Framework Program. EFFINET started in October 2012 and finished in 2015.

EFFINET project addresses three main management challenges in urban water system:

- Optimal operational control
- Real-time monitoring
- Demand forecasting and management

Real-time monitoring of water quantity and quality refers to the continuous detection and location of leakage and or water quality problems. It uses fault detection and diagnosis techniques. Demand forecasting and management is based on smart metering techniques. It includes detailed modelling of

consumption patterns as well as a service of communication to consumers. Real-time optimal control deals with operating the main flow and pressure actuators to meet demands using the most sustainable sources and minimizing electricity costs and is tackled using stochastic model predictive control techniques.

The EFFINET project proposes the integration in a cloud platform, of selected innovative ICT technologies of operational control, network monitoring, and demand forecasting and management for improving the efficiency in water and energy use of drinking water networks, developing:

- Model predictive control (MPC) techniques to operate water networks and tailored to meet demand, to comply with environmental resource usage constraints and water service dependability, and to make the least possible use of energy and cost.
- Real-time monitoring methodology to detect and locate leaks and water quality-breach events, based on the use of real-time sensor information and mathematical models.
- Demand forecasting and management methodology, based on the use of AMR and on consumer information technologies.

The project provides an integrated software platform and two real-life pilot demonstrations in Barcelona (Spain) and Limassol (Cyprus), respectively.

The partnership assembled to deliver the EFFINET project is a combination of key players in the field, leading ICT companies, business leaders, technology developers, water companies and top scientists in the field of water management, information and systems analysis and the social sciences.

2.3.1 Partners technology trends

Table 5 EFFINET Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
Aqualogy	Company	• Water management systems • Revenue management • Water quality • Environmental control • Knowledge management • Infrastructure maintenance	• Drinking water production • Quality of water • Wastewater treatment (including recovery of resources) • Water supply and distribution • Data management and Smart City services • Customer Relationship
CETaqua	Research Centre	• Sustainability • Water Quality • Water treatment • Alternative Water Resources • Information Technologies • Water Economy • Asset management	• Quality of water • Wastewater treatment (including recovery of resources) • Water-energy nexus • Water supply and distribution • Sustainable development,

Partner	Type	Technologies trends / tags	Topics
		• Energy • Decision support systems • Real time monitoring • Advanced irrigation systems • Demand management	Circular Economy & Ecosystem services • Data management and Smart City services • Management of the water cycle in industry
CSIC	Research Centre	• Operational predictive optimal control of water transport network • Leak detection • Smart sensors • Simulation and optimization of water supply network • Sewage network overflow optimization • Predictive control for drinking water networks	• Water supply and distribution • Data management and Smart City services
IMTL	Research Centre	• Model predictive control • Numerical optimization • Hybrid systems • Systems identification and machine learning	• Water supply and distribution • Data management and Smart City services
University of Cyprus	University	• Intelligent monitoring and control • Intelligent management of Water Systems	• Water supply and distribution • Data management and Smart City services
Aigües de Barcelona	Company	• Water distribution • Sewage services • Wastewater treatment • Bath water management • Water reuse and recycling • Water quality	• Drinking water production • Quality of water • Wastewater treatment (including recovery of resources) • Water reuse and recycling • Water supply and distribution • Data management and Smart City services • Customer Relationship
WBL	Company	• Drinking water distribution • Leakage control	• Drinking water production • Quality of water • Water supply and distribution • Data management and Smart City services • Customer Relationship
GEMALTO	Company	• Digital security • M2M ecosystem • Wireless networks communication	• Water supply and distribution • Data management and Smart City services
SignalGeneriX	Company	• Core signal processing algorithms • Telecommunication networks	• Water supply and distribution • Data management and Smart City services

Partner	Type	Technologies trends / tags	Topics
		Wireless sensors	

2.3.2 Partners commercial developments

Table 6 EFFINET partners' commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
Aqualogy	iBeach	Beaches status	- Data management and Smart City services - Sea Water

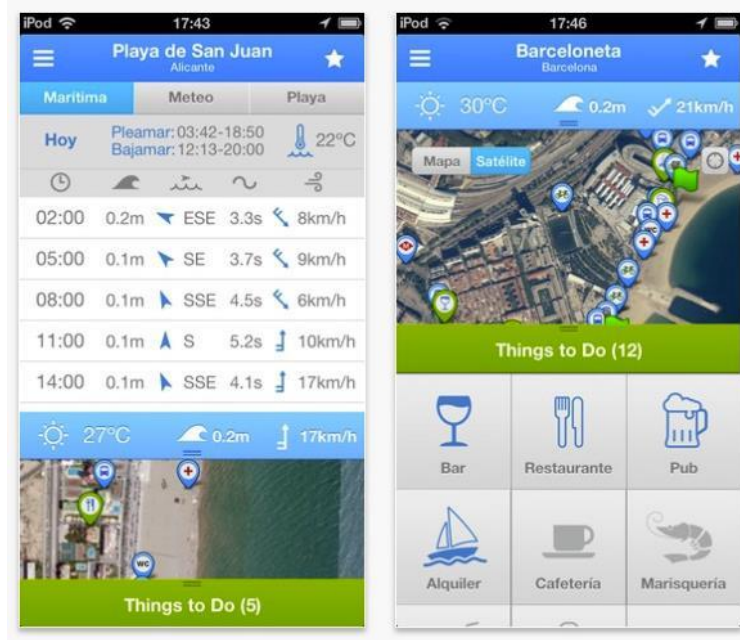


Figure 15 iBeach

Aqualogy	idroloc	Leak detection	Water supply and distribution
Aqualogy	imeter	Smart metering	Water supply and distribution
Aqualogy	aquapred	- Irregular consumption detection - Fraud detection	- Water supply and distribution - Data management and Smart City services - Customer Relationship
Aqualogy	AquaCIS	- Billing Cycle - Customer service - Work Order management - Asset Management - GIS - Measurement - Smart metering	- Water supply and distribution - Data management and Smart City services - Customer Relationship

Partner	Commercial development	Technologies trends / tags	Topics
 <i>Figure 16 AquaCIS</i>			
Aqualogy	Aquadvanced	- Operation cost reduction - Water quality monitoring - Water and energy consumption optimization	- Quality of water - Water-energy nexus - Water supply and distribution - Data management and Smart City services

Partner	Commercial development	Technologies trends / tags	Topics
 <i>Figure 17 Aquadvanced</i>			
SignalGeneriX	Wisense	• Robust communication between wireless sensors • Aggregation of sensor network data • Fully customizable web interface • Monitoring platform • Notifications and alerts	• Water supply and distribution • Data management and Smart City services
 <i>Figure 18 Wisense</i>			

2.4 FREEWAT



Figure 19 FREEWAT logo

FREEWAT is a HORIZON 2020 project financed by the EU Commission under the call WATER INNOVATION: BOOSTING ITS VALUE FOR EUROPE. FREEWAT main result will be an open source and public domain GIS integrated modelling environment for the simulation of water quantity and quality in surface water and groundwater with an integrated water management and planning module.

FREEWAT aims at promoting water resource management by simplifying the application of the Water Framework Directive and other EU water related Directives.

Specific objectives of the FREEWAT project are:

- to coordinate previous EU and national funded research to integrate existing software modules for water management in a single environment into the GIS based FREEWAT;
- to support the FREEWAT application in an innovative participatory approach gathering technical staff and relevant stakeholders (in primis policy and decision makers) in designing scenarios for the proper application of water policies.

The open source characteristics of the platform allow considering this an initiative "*ad includendum*", as further research institutions, private developers etc. may contribute to the platform development.

The core of the FREEWAT platform will be the SID&GRID framework (GIS integrated physically based distributed numerical hydrological model based on a modified version of MODFLOW) in its version ported to the QGIS desktop. Capabilities to be integrated in FREEWAT are:

- a dedicated module for water management and planning;
- a whole module for calibration, uncertainty and sensitivity analysis;
- a module for solute transport in the unsaturated zone;
- a module for crop growth and yield and water requirements in agriculture;
- tools for dealing with groundwater quality issues;
- tools for the analysis, interpretation and visualization of hydrogeological data.

Through creating a common environment among water research/professionals, policy makers and implementers, FREEWAT main impact will be on enhancing science- and participatory approach and evidence-based decision making in water resource management, hence producing relevant and appropriate outcomes for policy implementation. The Consortium is constituted by partners from various water sectors from 10 EU countries, plus Turkey and Ukraine. Synergies with the UNESCO HOPE

initiative on free and open source software in water management greatly boost the value of the project. Large stakeholders' involvement is thought to guarantee results dissemination and exploitation.

2.4.1 Partners technology trends

Table 7 FREEWAT Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
Scuola Superiore Sant'Anna	University	- Open source software - Water resource management - Agricultural water management - Groundwater quality	- Quality of water - Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Paragon Europe	Company	- Project management - Green society and economy - Fund management - Financial advisory	Data management and Smart City services
IDAEEA-CSIC	Research Centre	- Hydrogeochemistry - Surface Hydrology and Erosion - Groundwater	River Basin Management
Erciyes Universitesi	University	- Environmental modelling - Environmental Management - Climate Change and Impacts on Water Resources - Environmental Change Detection and Remote Sensing - Wetland hydrology and wetland management - Natural Resource Economics	- Water-energy nexus - Water Scarcity and droughts - Sustainable development, Circular Economy & Ecosystem services
Institut za Ekološki Inženiring	Company	- Wastewater treatment - Sewage - Drinking water supply - Management of water resources and land use	- Drinking water production - Quality of water - Wastewater treatment (including recovery of resources) - Water supply and distribution - Data management and Smart City services - Management of the water cycle in industry
International Groundwater Resources Assessment Centre	University	- Groundwater Assessment - Groundwater Monitoring - Groundwater Governance - Transboundary Groundwater - Managed Aquifer	- Water supply and distribution - Sustainable development, Circular Economy & Ecosystem services - River Basin Management

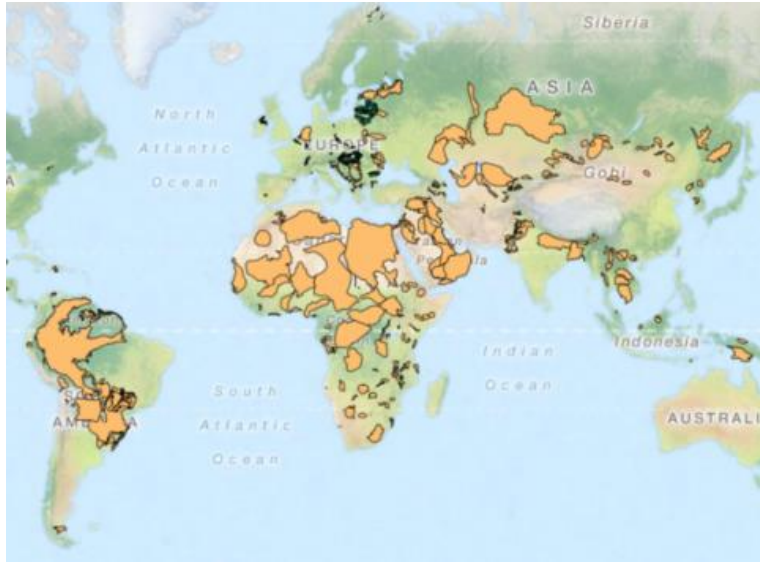
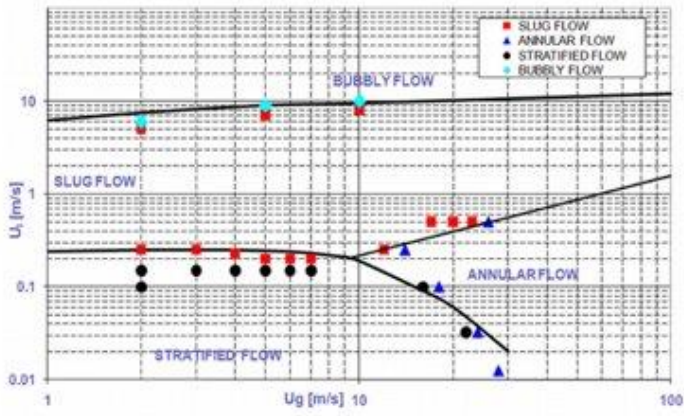
Partner	Type	Technologies trends / tags	Topics
		- Recharge - Information & Knowledge Management	- Data management and Smart City services - Management of the water cycle in industry
Metcenias	Research Centre	- Climate change - Sustainable resources - Water resources management - Flooding protection	- Wastewater and storm water collection (including Flood risk management) - Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
National Institute of Hydrology and water management Bucharest (NIHWM)	Governmental	- Hydrology - Hydrogeology - Water management	- River Basin Management - Data management and Smart City services - Sustainable development, Circular Economy & Ecosystem services
National Technical University of Athens Asset Management and Development Corporation, Greece (NTUA-AMDC)	Company	- Environmental technology - Energy - Marine technology	- River Basin Management - Data management and Smart City services - Sustainable development, Circular Economy & Ecosystem services
Oslandia	Company	Open source GIS	Data management and Smart City services
Regione Toscana	Governmental	- Water distribution - Sewage services - Wastewater treatment - Bath water management - Water reuse and recycling - Water quality	- Drinking water production - Quality of water - Wastewater treatment (including recovery of resources) - Water reuse and recycling - Water supply and distribution - Data management and Smart City services - Customer Relationship
Taras Shevchenko National University of Kyiv	University	- Physical geography - Geoecology - Meteorology and Climatology - Hydrology and Hydro-ecology - Geodesy and Cartography	- Water Scarcity and droughts - Sustainable development, Circular Economy & Ecosystem services
TEA Sistemi SpA	Company	- Flow assurance - Risk analysis - Process equipment - Multiphase flow metering	- Water supply and distribution - Wastewater and storm water collection (including Flood risk management) - Data management and

Partner	Type	Technologies trends / tags	Topics
			Smart City services
Technischen Universität Darmstadt	University	Hydrogeology	Sustainable development, Circular Economy & Ecosystem services
UNESCO	Research Centre	- Hydrological science for policy relevant advice - Sustainable development - Water resources assessment and management - Environmental sustainability	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
University of Applied Sciences and Arts of Southern Switzerland	University	- Geology - Geomatics - Hydrogeology - Hydrology	- Water Scarcity and droughts - River Basin Management - Sustainable development, Circular Economy & Ecosystem services
University of Bremen	University	- Geology - Hydrogeology - Hydrology	- Water Scarcity and droughts - River Basin Management - Sustainable development, Circular Economy & Ecosystem services
University of Tartu	University	- Geology - Hydrogeology - Hydrology	- Water Scarcity and droughts - River Basin Management - Sustainable development, Circular Economy & Ecosystem services
Zeta Amaltea s.l.	Company	- Hydrological resources management - Climate risk - Water planning - Integrated Water Resources Management - Risk analysis tools	- Quality of water - Water supply and distribution - Wastewater and storm water collection (including Flood risk management) - Water Scarcity and droughts - Data management and Smart City services

2.4.2 Partners commercial developments

Table 8 FREEWAT partners' commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
International Groundwater Resources Assessment Centre	GGIS	Groundwater related information and knowledge portal	- River Basin Management - Data management and Smart City services - Sustainable development, Circular Economy &

Partner	Commercial development	Technologies trends / tags	Topics
			Ecosystem services
 Figure 20 GGIS			
TEA Sistemi SpA	MAST	- Simulation of gas-liquid-liquid flow and flow pattern transitions - Water module available	Water supply and distribution
 Figure 21 MAST			

2.5 ICeWater



Figure 22 ICeWater logo

ICeWater project is a European Union's 7th Framework Programme project aimed at increase the stability of freshwater supply to citizens in urban areas by adjusting the water supply to the actual consumption, while minimizing energy consumption through smart-grid integration and water spillage through leak detection.

ICeWater uses wireless sensor networks for water flow monitoring and it provides a decision support system for the water utilities so that supply and demand patterns can be matched in real-time. As an additional benefit, leakage can be predicted with statistical methods so that water network damages can be mended even before they occur (fix-before-break).

ICeWater uses wireless sensors of various types to provide real-time monitoring of water supply and demand. Based on the sensor data, decision support systems facilitate optimization of the water grid network operation (pumping schedules, pressure etc.). The demand management and consumption information is accessible online to the relevant actors in the water supply chain (including consumers) and allows dynamic pricing schemes with nudge pricing to motivate behavioural change in customers causing critical consumption patterns. Services for asset management, such as predicting deterioration, leakage detection and leakage localization functionalities, reduces water waste. New networking concepts (protocols, management of virtualized network resources) are required for better information flow, network resources management and sharing in a service oriented architecture (SOA).

The information gathered with these services allows a better understanding of the consumers. It also allows improving the effectiveness of the water resource management, together with new metering and pricing schemes.

2.5.1 Partners technology trends

Table 9 ICeWater Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
Siemens	Company	- Intelligent sensors - Leakage detection	- Water supply and distribution - Data management and Smart City services
Toshiba	Company	- Advanced metering infrastructures - Monitoring - Water management	- Water supply and distribution - Data management and Smart City services

Partner	Type	Technologies trends / tags	Topics
		solutions	
Consorzio Milano Ricerche	Research Centre	• Data analysis • Sensor networks • Machine learning • Knowledge and information sharing architectures • Monitoring and control systems • Smart Water Grids	• Water supply and distribution • Data management and Smart City services
Italdata S.p.A.	Company	• Ubiquitous computing • RFID • Control system for smart grids	• Water supply and distribution • Data management and Smart City services
Metropolitana Milanese S.p.A.	Company	• Water services • Sewage treatment • Water distribution infrastructure	• Water supply and distribution • Data management and Smart City services • Wastewater and storm water collection (including Flood risk management) • Wastewater treatment (including recovery of resources) • Drinking water production • Sustainable development, Circular Economy & Ecosystem services • Quality of water
UNESCO-IHE	Research Centre	• Safe Drinking Water & Sanitation • Water-Related Hazards & Climate Change • Water & Ecosystems Quality • Water Management & Governance • Water, Food & Energy Security • Information & Knowledge Systems	• Quality of water • Water treatment (including recovery of resources) • Water supply and distribution • Wastewater and storm water collection (including Flood risk management) • Water Scarcity and droughts • Sustainable development, Circular Economy & Ecosystem services • Data management and Smart City services
SC Aquatim SA	Company	• Drinking and industrial water catchment and treatment • Water and sewerage public networks operation and maintenance • Domestic, industrial, rainwater and waste	• Drinking water production • Quality of water • Wastewater treatment (including recovery of resources) • Water supply and distribution • Data management and

Partner	Type	Technologies trends / tags	Topics
		waters collecting Transportation and treatment, design and approval of the water and sewerage networks extension	Smart City services - Customer Relationship - Management of the water cycle in industry
Institute of Communication and Computer Systems (ICCS)	Research Centre	- Advanced and secure communication networks - Sensorial devices	- Water supply and distribution - Data management and Smart City services
K&S GmbH Projektmanagement GmbH	Company	- Technological management - Consultancy - Project management	Data management and Smart City services

2.5.2 Partners commercial developments

Table 10 ICeWater partners commercial developments

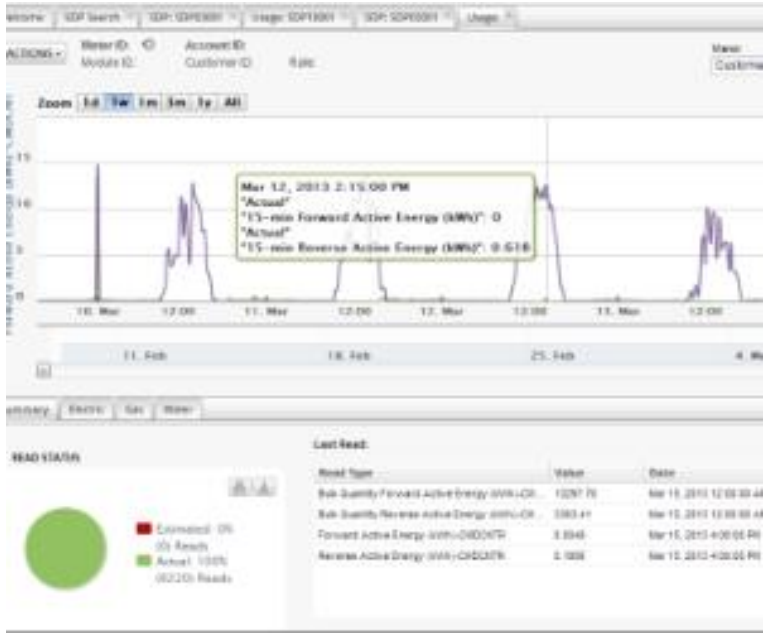
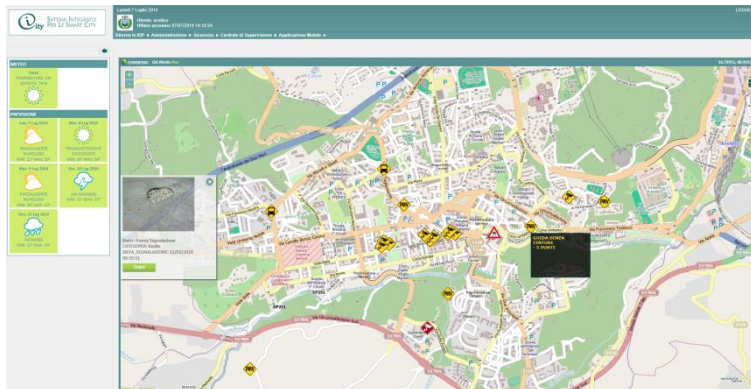
Partner	Commercial development	Technologies trends / tags	Topics
Toshiba	Gridstream	- Network operation control - Profiles and tariffs - Smart metering	
			
Italdata S.p.A.	iCity	- Data acquisition - Human as a sensor - Smart sensors - Big data analytics - Correlation engine - Decision support system	- Water supply and distribution - Data management and Smart City services

Figure 23 Gridstream

Partner	Commercial development	Technologies trends / tags	Topics
			 <i>Figure 24 iCity</i>

2.6 ISS-EWATUS



Figure 25 ISS-EWATUS logo

The ISS-EWATUS project has received funding from the European Union's 7th Framework Programme for research, technological development and demonstration. The general approach used by ISS-EWATUS is to recognise and then exploit the untapped water-saving potential in the EU. Its goal is to increase the awareness of all water stakeholders and problems at all levels, ISS-EWATUS is intended to focus on household and urban water-saving potentials respectively.

The ISS-EWATUS project is an interdisciplinary effort of specialists from water management and ICT research respectively to develop an intelligent Integrated Support System for Efficient WATER USage and resources management (ISS-EWATUS). The project develops several innovative ICT methods aiming to exploit the untapped water-saving potential in EU. The overall goal is achieved by developing an innovative, multi-factor system capable to optimize water management and reduce water usage.

At household level:

a) an information system for gathering data about water usage is planned to increase the awareness of water consumption; the data is interpreted and presented to household consumers in an understandable way using mobile devices (smartphones, tablets),

b) a household Decision Support System (DSS) is developed for mobile devices to reduce water consumption. Recommendations regarding water-saving devices and behaviour are produced,

c) a social-media platform is developed to reinforce water-saving behaviour of consumers via the social interactions among users (and between consumers and experts of water-saving techniques).

At urban level:

a) an innovative decision support system for reducing leaks in the water delivery system is built based on the dynamic modifications of pumping schedules to reduce leakages at municipal level,

b) an adaptive pricing policy is developed as the economic instrument to induce water-saving behaviour and reduce peaks in water and energy distribution loads.

Being validated at two differently characterized locations, the ISS-EWATUS is sufficiently flexible to be exploited in any EU location. Appropriate training, manuals and dissemination gives people across EU an efficient tool for water conservation. The solutions of ISS-EWATUS for households are available on the mobile applications portals. The rest of solutions are offered to water management companies in EU.

2.6.1 Partners technology trends

Table 11 ISS-EWATUS Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
University of Silesia	University	- Water saving - Decision Support System - Pricing Policy	- Water-energy nexus - Sustainable development, Circular Economy & Ecosystem services - Customer Relationship
Institute for Ecology of Industrial Areas	Research Centre	- Development of spatial information systems - Environmental technologies - Municipal waste management - Integrated water protection - Health risk assessment as a result of environmental pollution	- Quality of water - Wastewater treatment (including recovery of resources) - Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Municipal Water Company of Sosnowiec	Company	- Drinking water network - Quality of water - Drainage - Pumping stations - Sewerage	- Water supply and distribution - Data management and Smart City services - Wastewater and storm water collection (including Flood risk management) - Wastewater treatment (including recovery of resources) - Drinking water production - Sustainable development, Circular Economy &

Partner	Type	Technologies trends / tags	Topics
			- Ecosystem services - Quality of water
Loughborough University	University	- Integrated support system - Efficient water usage	- Data management and Smart City services - Sustainable development, Circular Economy & Ecosystem services - Quality of water
Brunel University	University	- Social networks - Open technologies	- Customer relationship - Data management and Smart City services
University Pablo de Olavide Seville	University	- Integrated support system - Efficient water usage	- Data management and Smart City services - Sustainable development, Circular Economy & Ecosystem services - Quality of water
Centre for Research and Technology Hellas	Research Centre	- Integrated Water Resource Management - Decision support system - Efficient water usage	- Data management and Smart City services - Sustainable development, Circular Economy & Ecosystem services - Quality of water
Municipal Water Company of Skiathos	Company	- Management of water supply and sewerage - Drainage, sewage pumping stations - Wastewater treatment plants - Billing for water supply and sewerage	- Water supply and distribution - Data management and Smart City services - Wastewater and storm water collection (including Flood risk management) - Wastewater treatment (including recovery of resources) - Drinking water production - Sustainable development, Circular Economy & Ecosystem services - Quality of water
Dotsoft S.A.	Company	- Content management - Web portals - Data collections and dissemination - Wireless networks	Data management and Smart City services

2.6.2 Partners commercial developments

No specific commercial software development applied to water domain has been found at the moment.

2.7 iWIDGET



Figure 26 iWIDGET logo

iWIDGET is a European Commission project aimed at improved water efficiencies through the use of novel ICT technologies for integrated supply-demand side management. It is a project funded under the EU 7th Framework Programme, which started in November 2012 and finished in 2015.

iWIDGET's focus is a more integrated approach to water resources management and the project contributes to delivering a sustainable, low-carbon society, helping progress towards the Europe 2020 targets on Climate and Energy. This approach is developed by researching, developing, demonstrating and evaluating a fully integrated ICT-based system of techniques and technologies, which encourages and enables householders and water suppliers to understand and manage down their demand and minimize wastage in the supply chain.

The Project is being led by Prof. Dragan Savić, Founder and Co-director of the Centre for Water Systems at the University of Exeter.

The partnership assembled to deliver the iWIDGET project is a combination of all the key players in the field, leading ICT companies, business leaders, technology developers, standardization organizations, water companies and top scientists in the field of water management, information and systems analysis and the social sciences. See Project Partners page and Partner Responsibilities page for more details.

Together the iWIDGET consortium brings to the table a clear understanding of the market, the technological state-of-the-art with respect to hardware and software, new research and development in data mining, analytics, decision support, scenario modelling, data management, standards interfaces, visualization, water conservation modelling and social simulation. The project also obtains input from householders through two case studies and input from the broader water industry through its Advisory Panel.

2.7.1 Partners technology trends

Table 12 iWIDGET Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
University of Exeter	University	- Decision support system - Demand management	- Sustainable development, Circular Economy & Ecosystem services - Data management and

Partner	Type	Technologies trends / tags	Topics
			- Smart City services - Customer Relationship
HR Wallingford	Company	- Open MI interface - DSS component linking - Climate change - Dams and reservoirs - Drainage infrastructure - Emergency planning - Flood forecasting - Flood risk assessment - Flood risk management - River infrastructure - Water resources	- Wastewater treatment (including recovery of resources) - Water supply and distribution - Wastewater and storm water collection (including Flood risk management) - River Basin Management - Data management and Smart City services
IBM	Company	- Decision support system - Daily operations planning	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
LNEC	Research Centre	- Water and energy - Infrastructure asset management - Water quality, treatment and reuse - Reliability, safety and resilience of urban water systems	- Quality of water - Water reuse and recycling - Water-energy nexus - Water supply and distribution - Data management and Smart City services
National Technical University of Athens	Research Centre	- Analysis and assessment of water resources - Hydrological processes modelling - Hydrological event forecasting - Water resources technology and management - Quality of surface and subsurface waters, seas and coastal waters - Water treatment - Remote sensing - GIS	- Quality of water - Wastewater and storm water collection (including Flood risk management) - River Basin Management - Sea Water
SAP AG	Company	- Business research - Business models	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
SMS Plc	Company	- Business plan - System integration - Communication system - Domestic metering - Environmental services	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
AGD	Company	- Network events detection - Work order management	Water supply and distribution

Partner	Type	Technologies trends / tags	Topics
			Data management and Smart City services
WaterWise	Company	- Water management - Water quality	- Quality of water - Data management and Smart City services

2.7.2 Partners commercial developments

Table 13 iWIDGET partners commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
AGS	WorkWise	- Network events detection - Work order management	- Water supply and distribution - Data management and Smart City services

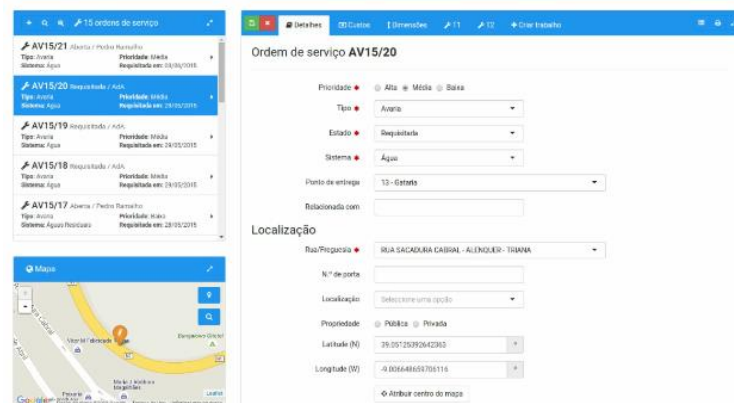


Figure 27 WorkWise

2.8 KINDRA



Figure 28 KINDRA logo

The KINDRA project (Knowledge Inventory for hydrogeology research) is funded by the European Commission's HORIZON2020 Framework Programme. The overall objective of the project is to take stock of Europe's contemporary practical and scientific knowledge of hydrogeology research and innovation with the help of an inventory of research results, activities, projects and programmes, and then use the inventory to identify critical research challenges and gaps, with a view to avoiding

overlaps. This approach takes into account the implementation of the Water Framework Directive and latest innovation areas within integrated water resources management, allowing at EU scale the future correct management and policy development of groundwater. The project started on 1 January 2015 and lasts for 36 months; work is divided into five work packages.

2.8.1 Partners technology trends

Table 14 KINDRA Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
Sapienza University of Rome	University	- Groundwater - Geology - Hydrogeology	- River Basin Management - Sustainable development, Circular Economy & Ecosystem services
European Federation of Geologists	Non for profit organisation	- EU policies environmental protection - Professionalism ethics	Sustainable development, Circular Economy & Ecosystem services
REDIAM	Government	- Spatial referenced environmental information integration - Standardization - Environmental maps - Georeferenced orthophotographs - GIS	Data management and Smart City services
La Palma Research Centre	Research Centre	- Earth systems & resources - Geology - Minerals	Sustainable development, Circular Economy & Ecosystem services
University of Miskolc	University	Hydrogeology	- River Basin Management - Sustainable development, Circular Economy & Ecosystem services
Geological Survey of Denmark and Greenland	Research Centre	- Hydrology - Water and groundwater - Water quality - Water resources quantification	Sustainable development, Circular Economy & Ecosystem services

2.8.2 Partners commercial developments

Table 15 KINDRA partners commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
REDIAM	Visualizador básico Servicios OGC Rediam	- GIS - Map & data visualization	Data management and Smart City services

Partner	Commercial development	Technologies trends / tags	Topics
			 Figure 29 Visor Genérico

2.9 Smarth2O



Figure 30 Smarth2O logo

The Smarth2O is a project funded under the EU 7th Framework Programme and develops an ICT platform for improving the management of urban and peri-urban water demand thanks to the integrated use of smart meters, social computation, and dynamic water pricing, based on advanced models of consumer behaviour.

Water consumers are people whose behaviour depends on a variety of motivations and social and individual drivers and triggers. For this reason, it is necessary to develop a framework able to consider both the technical and the social sides of the problem, and able to promote the active engagement of the consumers with the shared objective of saving water and energy. The Smarth2O project aims to provide water utilities, municipalities and citizens, with an ICT-enabled platform to design, develop and implement better water management practices and policies, leading to a reduction in water consumption, without compromising the quality of life, and to an increase in resource security.

The project is led by SUPSI (University of Applied Sciences of Southern Switzerland) which is supported by seven partners, from academia and industry.

The mission of the Smarth2O project is to develop an ICT platform to:

- Understand and model the consumers' current behaviour, based on historical and real-time water usage data

- Predict how the consumer behaviour can be influenced by various water demand management policies: water savings campaigns, social awareness campaigns, to dynamic water pricing schemes
- Raise the awareness of water consumers on their current water usage habits and their lifestyle implications and to stimulate them to reduce water use

The SmartH2O ICT infrastructure enables water managers to close the loop between actual water consumption levels and desired targets, using information about how the consumers adapt their behaviour to new situations: new regulations, new water prices, and appeals to water savings. This feedback allows to aptly revising the water demand management policies, enabling to maximize the water and energy saving goals.

2.9.1 Partners technology trends

Table 16 SmartH2O Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
University of Applied Science of Southern Switzerland	University	• Data mining • Machine learning • Classification • Modelling and simulation of environmental systems	• Sustainable development, Circular Economy & Ecosystem services • Data management and Smart City services • Customer Relationship
Politecnico di Milano	University	• Social awareness • Water saving	• Sustainable development, Circular Economy & Ecosystem services • Data management and Smart City services • Customer Relationship
University of Manchester	University	• Economic analysis • Econometric analysis • Demand analysis • Dynamic prices mechanisms • Smart meters • Social media	• Sustainable development, Circular Economy & Ecosystem services • Data management and Smart City services • Customer Relationship
Universitat Politècnica de València	University	• Residential water use modelling • Energy consumption at household level modelling • Water conservation	• Water energy nexus • Sustainable development, Circular Economy & Ecosystem services • Data management and Smart City services • Customer Relationship
Set Mobile Srl	Company	• Mobile technologies • Cloud computing • Cloud processing	• Data management and Smart City services • Customer Relationship
European Institute for Participatory Media	Non-profit organization	• Promotion, research and development of next generation media ecosystems	• Data management and Smart City services • Customer Relationship

Partner	Type	Technologies trends / tags	Topics
		- Content and media creation - Delivery and utilization based on real-life needs	
Thames Water Utilities	Company	Business development	- Drinking water production - Quality of Water - Wastewater treatment (including recovery of resources) - Water reuse and recycling - Water energy nexus - Data management and Smart City services - Customer Relationship - Management of the water cycle in industry
SES	Company	Hydroelectric	- Water energy nexus - Data management and Smart City services
Empresa Mixta Valenciana de Aguas S.A.	Company	- Integral water cycle - Water quality	- Quality of water - Water energy nexus - Water supply and distribution - Data management and Smart City services - Customer Relationship
MoonSubmarine	Company	- Game and graphic design - Social awareness	- Data management and Smart City services - Customer Relationship

2.9.2 Partners commercial developments

Table 17 SmartH2O partners commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
Thames Water Utilities	Water Energy Calculator	- Social awareness - Water saving	- Water energy nexus - Data management and Smart City services - Customer Relationship

Partner	Commercial development	Technologies trends / tags	Topics
			 <i>Figure 31 Water Energy Calculator</i>

2.10 UrbanWater



Figure 32 UrbanWater logo

The UrbanWater is an EU 7th Framework Programme project that incorporates weather prediction and surface water reserves (e.g. reservoirs) data, household consumption data, and includes water distribution data, including on pressure and leakages, and additional information and statistics coming from other sources. The platform incorporates advanced metering solutions, real-time consumption data and new data management technologies with real-time demand forecasting capability, consumption analysis, decision support systems, adaptive pricing and user empowerment solutions. The platform remains open to ensure interoperability with energy and water management schemes and further enhance collaboration between key partners from outside of the consortium.

In brief, the project integrates high quality and already proven solutions for data management and billing systems, with innovative models for forecasting water supply availability, predicting customers' demand and detecting leakages. It develops spatial tools based on strong knowledge from previous developments in the field of supporting distributors and authorities in decision-making. Furthermore, the project develops innovative solutions to empower customers and efficiently integrate them in the UrbanWater platform.

- The scientific and technologic challenges identified in the project as key enablers to develop new technological solutions to efficiently manage water are:

- To estimate water demand in urban areas in order to efficiently manage water supply chains.
- To reduce waste of water and economic losses associated to leakages in the urban water distribution network.
- To smoothen daily water demand daily peaks in order to allow distributors to save costs related to the urban water distribution networks' management.
- To guarantee efficient and secure computational data management on the base of smart grids' recent and upcoming deployments in Europe.
- To reduce operating and maintenance costs associated with water metering and billing in urban areas.
- To incentivise urban households to reduce current consumption and soften the current European water demand peaks, side-by-side with decreasing their own water expenditures.
- To build effective partnerships and develop innovation synergies between equipment providers, ICT companies and water distributors.

2.10.1 Partners technology trends

Table 18 UrbanWater Technology trends by partner

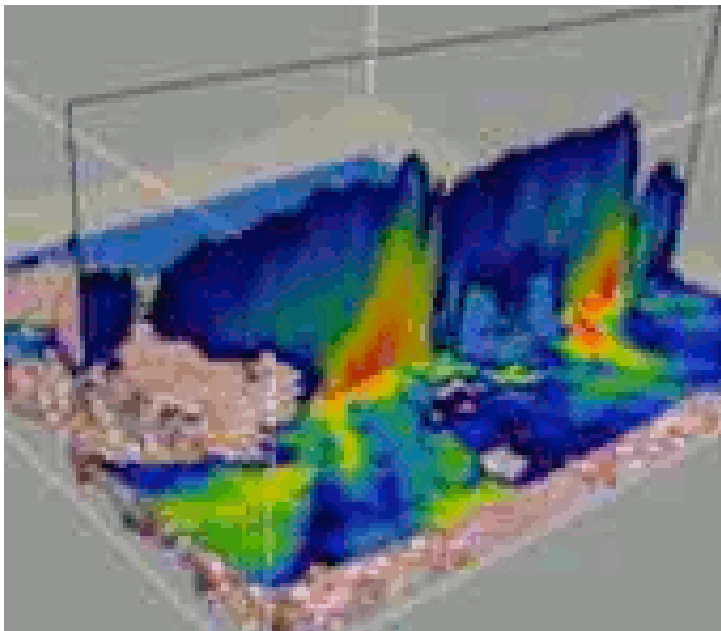
Partner	Type	Technologies trends / tags	Topics
Ateknea Solutions	Research Centre	• Business advice • Analogical and digital electronic design • Wireless communications • Simulation and animation software • Machine learning • Artificial Intelligence • Natural Language Processing	• Water supply and distribution • Data management and Smart City services
FCC Aqualia	Company	• Integral water cycle management • Design and construction of water infrastructure • Waste water treatment plants • Desalination plants • Security of supply	• Quality of water • Wastewater treatment (including recovery of resources) • Water supply and distribution • Data management and Smart City services • Management in the water cycle in industry
Sagemcom Group	Company	• Broadband • Smart grid and metering	• Water supply and distribution
HYDS	Company	• Meteorological services • Hydrological products • Forecasting products • Thunderstorm detection	• Wastewater and storm water collection (including Flood risk management) • Water Scarcity and droughts
University of Zagreb	University	• System identification and control	• Water supply and distribution

Partner	Type	Technologies trends / tags	Topics
		- Adaptive pricing in water supply systems - Smart grids control - Intelligent control - Distributed control	- Data management and Smart City services - Management in the water cycle in industry
Red Skies Software	Company	- Data management - Security frameworks	Data management and Smart City services
Orga Systems	Company	Billing solutions	Data management and Smart City services
Serious Games Interactive	Company	- Simulations - Virtual worlds - Serious game	Customer Relationship
Aqualogus Engenharia e Ambiente	Company	- Planning of water resources - Water supply systems and wastewater treatment and drainage - Hydro-agricultural schemes - Hydro-power schemes - Drainage works and flood control - Environmental monitoring and assessment	- Quality of water - Wastewater treatment (including recovery of resources) - Water-energy nexus - Water supply and distribution - Data management and Smart City services - Management of the water cycle in industry
Tavira verde	Company	- Water quality - Sanitation	- Quality of water - Wastewater treatment (including recovery of resources) - Water supply and distribution - Data management and Smart City services
Ovod	Company	Domestic meters	Data management and Smart City services

2.10.2 Partners commercial developments

Table 19 UrbanWater partners commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
HYDS	ADMET	- Radar data processing - Meteorological products - Forecasting products - Hydrometeorological products - Thunderstorm detection - Dual polarization products	- Wastewater and storm water collection (including Flood risk management) - Water Scarcity and droughts

Partner	Commercial development	Technologies trends / tags	Topics
		 <i>Figure 33 ADMET</i>	
HYDS	HiWat	• Data integration and data management • Quantitative precipitation estimation • Quantitative precipitation forecasting • Hydrometeorological products • Hydrological modelling • Alert generator • State-of-the-art visualization application	• Wastewater and storm water collection (including Flood risk management) • Water Scarcity and droughts

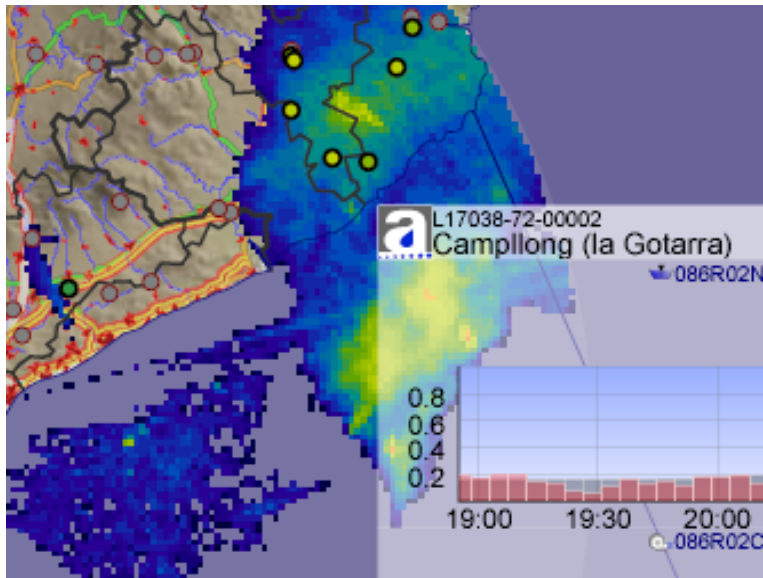
Partner	Commercial development	Technologies trends / tags	Topics
			

Figure 34 HiWat

2.11 WaterInnEU



Figure 35 WaterInnEU logo

The WaterInnEU project is an European Union's Horizon 2020 research and innovation programme, which primary vision is to create a marketplace to enhance the exploitation of EU funded ICT models, tools, protocols and policy briefs related to water and to establish suitable conditions for new market opportunities based on these offerings.

This project is addressing the lack of use and applicability of the research outcomes in the water management market from a different point of view and is offering an innovative and commercially driven solution. The new perspective comes from the assumption that the lack of application is not only due to the lack of knowledge and awareness about the outcomes and the results of the research projects about water, but also to the lack of an appropriate and credible vehicle for accessing these solutions in a form that best fits the needs of the stakeholders and the associated supply chain.

This means a framework where the outputs of the research can reach the potential users (mainly managers and water administrations) in an applied and useful way, providing a practical and deployable solution that meets their needs and addresses their priority problems - what they need are solutions, not

tools. The potential participants and beneficiaries of this project include both end users and practitioners, and other key stakeholders with an active role to play in the regulation and management of water systems and services.

The real marketplace is composed of the market actors (mainly project responsible persons, water companies and river basin managers) and the market activities (demonstrations, workshops, networking, negotiations) and the support of a virtual web based marketplace.

The proposed framework is a marketplace in which SMEs and companies are the ones who transform offerings into a service, and goods will be offered as well as required services.

The users (river basin district managers) want a service that allows them to find the solution to their needs (mainly, follow the EU directives and act as public servants to the benefit of the citizens). The solution is called the “marketplace as a service” (MaaS). The marketplace adds the missing link to the situation: the companies that are able to provide services to the users based in EU funded project results.

2.11.1 Partners technology trends

Table 20 WaterInnEU Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
Centre for Ecological Research and Forestry Applications	Research Centre	- Climate change - Water demand - Sustainable management - Wastewater - Water quality and environmental inspection	- Quality of water - Wastewater treatment (including recovery of resources) - Water supply and distribution - Sustainable development, Circular Economy & Ecosystem services
Technische Universiteit Delft	University	- Water management - Hydrology - Water resources management	- Water supply and distribution - Data management and Smart City services
Randbee SRL	Company	- Smart Cities applications - Geospatial and Data analysis - Environmental Science	- Water supply and distribution - Data management and Smart City services
Adelphi Research GGMBH	Company	- Policy analysis - Strategy consulting - Sustainable management of water resources - Water supply - Integrated water resource management	- Water-energy nexus - Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
52° North Initiative for Geospatial Open Source Software	Company	- Sensor Web - Geoprocessing - Real-time sensor data	Data management and Smart City services

Partner	Type	Technologies trends / tags	Topics
GmbH		- management - Geostatistical analysis - Linked data - Metadata	
Orion Innovations	Company	Policy advise	Sustainable development, Circular Economy & Ecosystem services
Antea Belgium NV	Company	- Ecology - Numerical models - Energy - Environmental impact and policy - Environmental management - Water quality modelling - Groundwater studies - Sewer system modelling - Urban planning	- Quality of water - Wastewater treatment (including recovery of resources) - Water energy nexus - Water supply and distribution - Sustainable development, Circular Economy & Ecosystem services
Global Water Partnership Central and Eastern Europe	Company	- Sustainable development - Sustainable management of water resources - Integrated Water Resources Management	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services

2.11.2 Partners commercial developments

No specific commercial software development applied to water domain has been found at the moment.

2.12 Wat€rnomics



Figure 36 Wat€rnomics logo

WATERNOMICS is a project funded under the EU 7th Framework Programme and its main goal is to provide personalized and actionable information about water consumption and water availability to individual households, companies and cities in an intuitive and effective manner at a time-scale relevant for decision making. Access to this information increases end-user awareness and improve the quality of the decisions from decision makers regarding water management and water government. WATERNOMICS accomplishes this by:

- Combining water usage related information from various sources and domains to offer water information services to end-users (see Fig. 1)

- Making water usage related information accessible across devices and locations
- Supporting personalised interaction with water information services (see Fig. 1)
- Conducting knowledge transfer from energy management systems to water management systems
- Enabling sharing of water information services across communities of users
- Showing that generic water information services can be used in a variety of environments, geological, environmental and social
- Enabling open (collaborative) business models and flexible pricing mechanisms that are responsive to both demand and climate/environmental conditions (e.g. drought periods)

WATERNOMICS uses both new and state of the art sensors and water meters to provide new services (applications) and add new features like leakage detection, fault detection and water awareness games. These services are bundled into the WATERNOMICS Water Information Services Platform, or short name, WATERNOMICS Platform. This software platform is able to integrate (convergence layer) on top of existing water infrastructures or be employed using dedicated sensors fielded using the project methodology for water management system design.

2.12.1 Partners technology trends

Table 21 WATERNOMICS Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
National University of Ireland Galway	University	• Semantic Web • Sensors and Sensor Web • Social network analysis • Decision Support and Optimization • Environmental engineering • Offshore and coastal engineering	• Sustainable development, Circular Economy & Ecosystem services • Data management and Smart City services • Customer Relationship • Sea water
Ultra4	Company	• Software design • Knowledge management • Water management system	• Data management and Smart City services
UNESCO-IHE	Research Centre	• Safe Drinking Water & Sanitation • Water-Related Hazards & Climate Change • Water & Ecosystems Quality • Water Management & Governance • Water, Food & Energy Security • Information & Knowledge Systems	• Quality of water • Water treatment (including recovery of resources) • Water supply and distribution • Wastewater and storm water collection (including Flood risk management) • Water Scarcity and droughts • Sustainable development, Circular Economy &

Partner	Type	Technologies trends / tags	Topics
			- Ecosystem services - Data management and Smart City services
Technische Universiteit Delft	University	- Water management - Hydrology - Water resources management	- Water supply and distribution - Data management and Smart City services
BM-Change	Company	- Innovation consultancy - Business model innovation - Business concept design	Sustainable development, Circular Economy & Ecosystem services
R2M Solution s.r.l.	Company	- Innovation management - Risk management - Intellectual Property Management - Semantic web data mining - Knowledge management	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Società Esercizi Aeroportuali Spa	Company	Infrastructures management and maintenance	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Thermi (Municipal Water and Sewerage Municipal)	Company	- Waste water treatment - Security of supply - Drinking water supply and distribution	- Quality of water - Wastewater treatment (including recovery of resources) - Water supply and distribution - Data management and Smart City services - Management in the water cycle in industry
VTEC Engineering BV	Company	- Monitoring - Efficient control of drinking water systems - Sensors - Data mining	- Quality of water - Water supply and distribution - Data management and Smart City services

2.12.2 Partners commercial developments

Table 22 WATERNOMICS partners commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
Ultra4	Water Management System	- Store a whole set of parameters - Information related to water usage, uses of water, resources of water, water suppliers as well as water services - Basic methodological approaches for water cost	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services - Management of the water cycle in industry

Partner	Commercial development	Technologies trends / tags	Topics
		calculation - Financial cost (operating cost, on-going maintenance cost, capital expenses necessary for ongoing operation costs, administrative cost, etc.) - Natural resource costs (costs that arise in order to replace the overpumping of certain water bodies with water originating from alternated sources) - Environmental costs (costs to restore polluted water to its original quality, costs of treatments to re-use waste water and other possible costs that are related to water quality) - Flexible reporting based on chart diagrams	

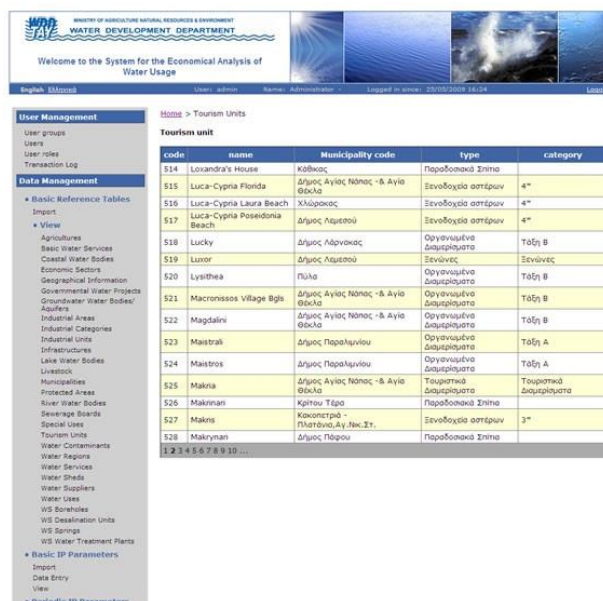


Figure 37 Water Management System

2.13 WatERP



Figure 38 WatERP logo

WatERP is a project funded under the EU 7th Framework Programme and its main goal is to develop a web-based “Open Management Platform” (OMP) supported by real-time knowledge on water supply and demand, enabling the entire water distribution system to be viewed in an integrated and customized way. The OMP provides to the user-inferred information regarding water supplies, flows, water consumption patterns, water losses, distribution efficiency, and water supply and demand forecasts, within a web-based unified framework. This information is stored in a Water Data Warehouse making use of semantics and common language and open standards (such as WaterML 2.0) which is defined in the ontology developed to ensure interoperability and maximize usability. In addition, external linkages to costs, energy factors, control systems, data acquisition systems, external models, forecasting systems and new data sources are made possible for easy integration into the system.

The main purpose of this information interaction and processing is to improve the matching between supply and demand. To achieve this final goal, a Decision Support System (DSS) tool supports coordination of actions throughout the entire water supply distribution chain, prioritization of water uses, distribution efficiency improvements, and water, energy and cost savings. A Demand Management System (DMS) analyses socioeconomical drivers and policies to improve demand management. The project outcomes have been tested and validated in two pilots representative of different European water problems (water scarcity - water abundance) with clearly distinct objectives (optimize water resources management - improve water energy efficiency).

Water can be saved through infrastructure investment; improved coordination; or behavioural change-measures with different costs & time scales.

While 40% water savings could be achieved from technological improvements, this value is the sum of a series of different actions. Based on water resources management experience, it can be roughly estimated that improving coordination among actors could lead to water savings between 5 and 8%, with smart metering providing an additional 8 to 10%.

WatERP technological solution gives response to the coordination among actors building a smart water solution.

2.13.1 Partners technology trends

Table 23 WatERP Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
Eurecat	Research Centre	- Water demand management - Pumping scheduling - Decision Support System - Optimization - Machine learning	- Water reuse and recycling - Water-energy nexus - Water supply and distribution - Data management and Smart City services

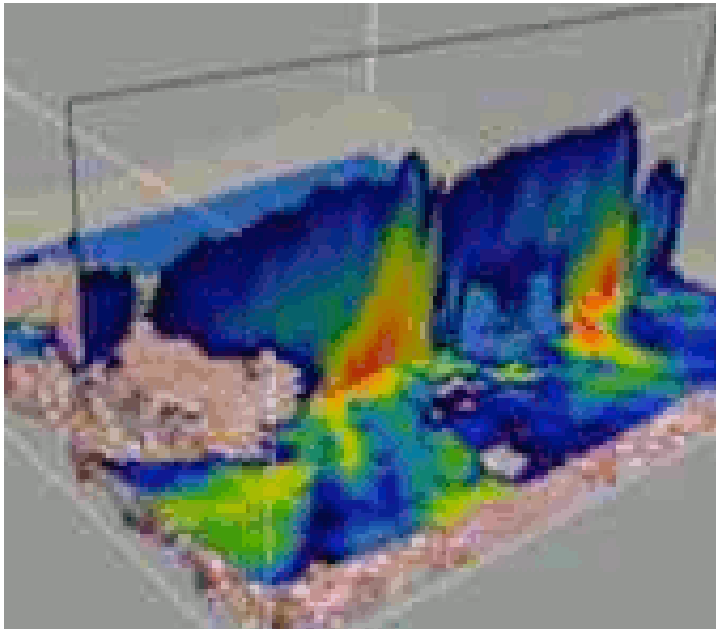
Partner	Type	Technologies trends / tags	Topics
		- Standardization - Semantic Web - Water reuse and recycle - Risk analysis - Water management cost analysis - Water quality - Flood risk assessment - Irrigation management - Water supply and distribution	
Inclam	Company	- Hydrology and hydraulics - Planning and studies - Risks management - Purification - Desalination - Sanitation - Hydraulic works - Information systems - Control networks - Decision Support systems - Early warning systems	- Quality of water - Wastewater treatment (including recovery of resources) - Water supply and distribution - Wastewater and storm water collection (including Flood risk management) - Data management and Smart City services
Disy	Company	- Spatial reporting - Geographic information - Business intelligence systems - Open standards	Data management and Smart City services
ACA	Company	- Water cycle governing policies - Data management - Observations Data Model - Waste water treatment - Security of supply - Drinking water supply and distribution	- Quality of water - Wastewater treatment (including recovery of resources) - Water supply and distribution - Data management and Smart City services - Management in the water cycle in industry
Staffordshire University	University	- Energy efficient systems - Intelligence & security systems	Data management and Smart City services
Institute of Communication and Computer Systems (ICCS)	Research Centre	- Advanced and secure communication networks - Sensorial devices	- Water supply and distribution - Data management and Smart City services
HYDS	Company	- Meteorological services - Hydrological products - Forecasting products - Thunderstorm detection	- Wastewater and storm water collection (including Flood risk management) - Water Scarcity and droughts
DVGW-Technologiezentrum Wasser	Research Centre	- Water chemistry - Water technology - Microbiology - Corrosion	- Quality of water - Wastewater treatment (including recovery of resources)

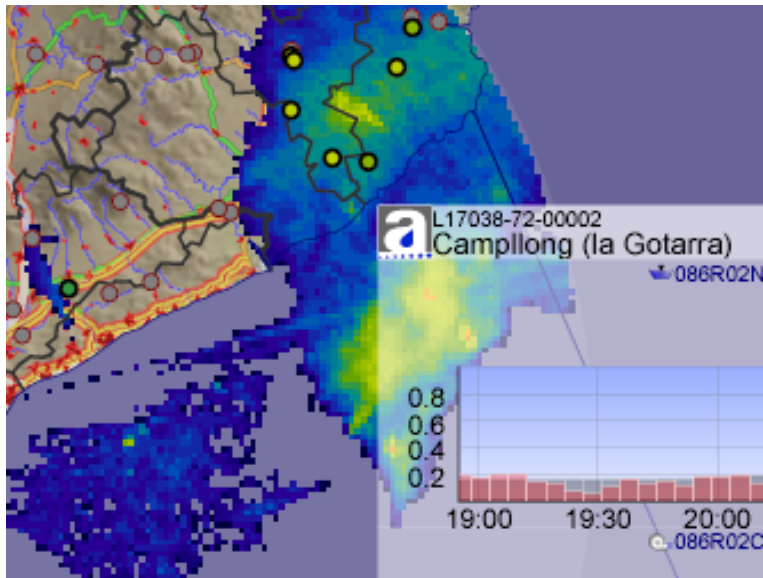
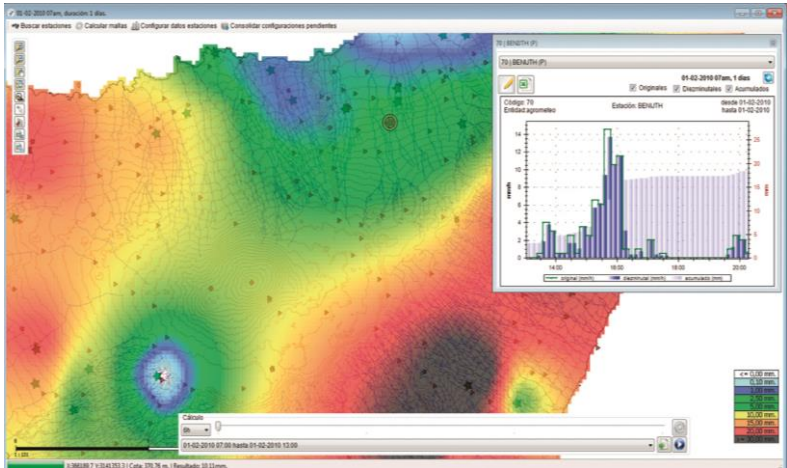
Partner	Type	Technologies trends / tags	Topics
		• Distribution systems • Water treatment • Distribution network • Household installation • Waste Water and Water Cycle	• Water reuse and recycling • Water supply and distribution • Wastewater and storm water collection (including Flood risk management) • Data management and Smart City services
Stadtwerke Karlsruhe GmbH	Company	• Water cycle governing policies • Drinking water supply • Groundwater exploitation • Data management • Observations Data Model • Waste water treatment • Security of supply • Drinking water supply and distribution	• Quality of water • Wastewater treatment (including recovery of resources) • Water supply and distribution • Data management and Smart City services • Management in the water cycle in industry

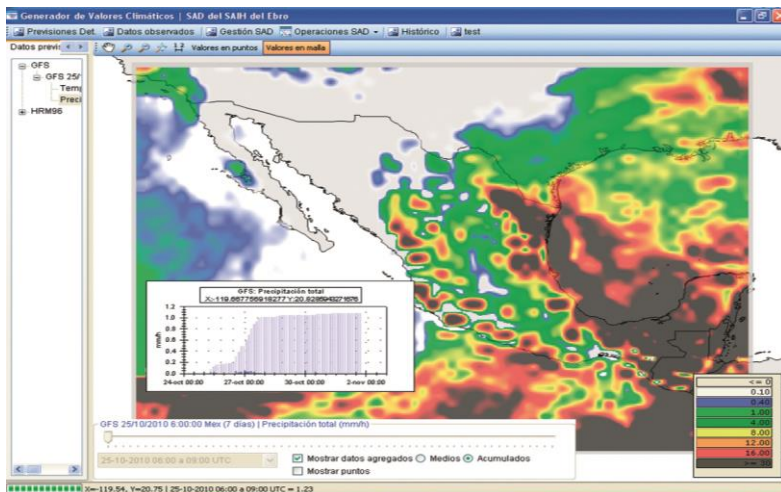
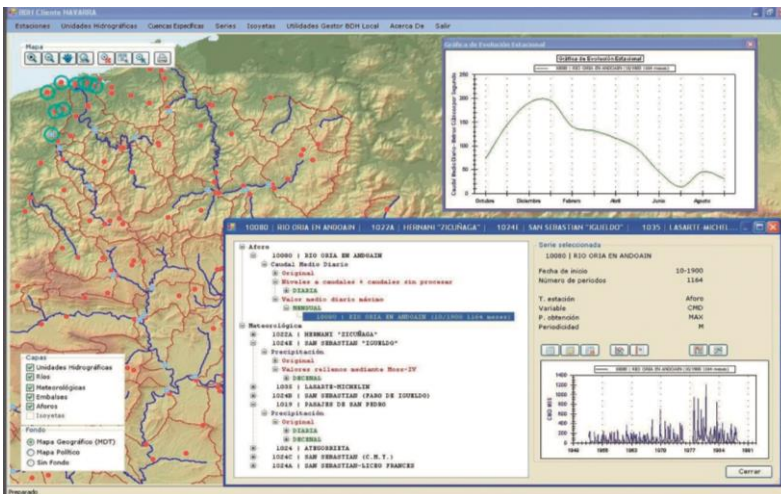
2.13.2 Partners commercial developments

Table 24 WatERP partners commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
HYDS	ADMET	• Radar data processing • Meteorological products • Forecasting products • Hydrometeorological products • Thunderstorm detection • Dual polarization products	• Wastewater and storm water collection (including Flood risk management) • Water Scarcity and droughts

Partner	Commercial development	Technologies trends / tags	Topics
		 <i>Figure 39 ADMET</i>	
HYDS	HiWat	• Data integration and data management • Quantitative precipitation estimation • Quantitative precipitation forecasting • Hydrometeorological products • Hydrological modelling • Alert generator • State-of-the-art visualization application	• Wastewater and storm water collection (including Flood risk management) • Water Scarcity and droughts

Partner	Commercial development	Technologies trends / tags	Topics
	 Figure 40 HiWat		
INCLAM	Storm Management Module	- Rain event characterization - Rainfall information	- Wastewater and storm water collection (including Flood risk management) - Data management and Smart City services
	 Figure 41 Storm management module		
INCLAM	Climate Value Generator	Climate data	Data management and Smart City services

Partner		Technologies trends / tags		Topics	
Commercial development					
					
Figure 42 Climate Value Generator					
INCLAM	Hydrological database	- Integrated Water Cycle management - Hydrometeorological data analysis	Data management and Smart City services		
					
Figure 43 HDB					
INCLAM	Guad Cloud	Distributed hydraulic simulation system	Data management and Smart City services		

Partner	Commercial development	Technologies trends / tags	Topics
			
Eurecat	Water Management Ontology	- Standardization - Water management - Semantic Web - Interoperability	Data management and Smart City services
Eurecat	Water Service Bus Middleware	- Standardization - Water management - Interoperability	Data management and Smart City services
Eurecat	Water Allocation Decision Support System	- Decision support system - Water resources usage	- Water supply and distribution - Data management and Smart City services
Eurecat	Water Pumping Scheduling	- Optimization - Pumping scheduling - Water resources usage	- Water supply and distribution - Data management and Smart City services

Figure 44 Guad|2D, Guad Cloud

2.14 WISDOM



Figure 45 WISDOM logo

The WISDOM project is supported by the European Commission under the 7th Framework Programme. WISDOM (Water analytics and Intelligent Sensing for Demand Optimised Management) project aims at developing and testing an intelligent ICT system that enables "just in time" actuation and monitoring of

the water value chain from water abstraction to discharge, in order to optimise the management of water resources.

The WISDOM project's unique selling point is the combined use of three key elements: the adoption of a semantic approach that captures and conceptualizes holistic water management processes, including the associated socio-technical dimensions (social networks interactions with physical systems).

The adoption of semantic modelling enables to promote:

- the (semi)automated control of the water system operation,
- the computer-aided decision making for human intervention,
- the data sharing among numerous components and tools, and
- the integration of the water infrastructure functionalities,
- the interfacing with other smart energy infrastructures and building systems.

The WISDOM project considers a holistic view of water management systems and processes across the entire water value chain, from abstraction to discharge

The WISDOM project aims at achieving a step change in water and energy savings via the integration of innovative Information and Communication Technologies (ICT) frameworks to optimize water distribution networks and to enable change in consumer behaviour through innovative demand management and adaptive pricing schemes.

More specifically the project aims to develop a sophisticated ICT system that is able to understand, monitor, and control the water network.

We aim that the WISDOM solution is able to:

- To collect real-time data about water consumption at domestic, corporate and city level.
- To deliver an ICT framework for real-time and predictive water management at domestic, corporate and city level.
- To provide a Water Decision Support Environment to enable professionals within the water industry to visualise, manage and optimise the water system.

At a global level, the objectives of the WISDOM project are to:

- increase user awareness and modify behaviours concerning the use of water,
- achieve quantifiable and significant reduction of water consumption,
- achieve peak-period reduction of water and energy distribution loads,
- improved resource efficiency and business operations of water utilities due to ICT,
- contribute to the improvement of the environmental performance of buildings.

2.14.1 Partners technology trends

Table 25 WISDOM Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
Centre Scientifique et Technique du Batiment	Research Centre	- Microbiology - Water heaters - Hot water pipes - Sustainable water management - Water/Energy savings - Wastewater treatment plants	- Quality of water - Wastewater treatment (including recovery of resources) - Water supply and distribution - Wastewater and storm water collection (including Flood risk management) - Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
D'Appolonia S. p. A.	Company	- Hydrology and hydraulic engineering - Risk, reliability and safety	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Cardiff University	University	- Hydro-environmental numerical models - Prediction of flow, water quality, sediment and contaminant transport processes in coastal, estuarine and inland waters - Water treatment and wastewater treatment works	- Quality of water - Wastewater treatment (including recovery of resources) - Data management and Smart City services
City of Cardiff Council	Company	Land drainage	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Dwr Cymru Welsh Water	Company	- Climate change - Environmental best practices - Leakage detection - Online monitoring	- Water supply and distribution - Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Provincia della Spezia	Company	- Local regulation consultancy - Facility management - Environmental protection	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Società Acquedotti Tirreni S. p. A.	Company	Water service management	Water supply and distribution

Partner	Type	Technologies trends / tags	Topics
		- Water sources search - Water networks - Water treatment facilities - Sewage treatment plants - Integrated water service	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services
Intel Corporation (UK) Limited	Company	- Internet of the Things - Data management - Actionable analytics - Demand prediction - Event detection - Engagement strategies with citizens and other stakeholders	- Water supply and distribution - Data management and Smart City services - Customer Relationship
Imperial College of Science, Technology and Medicine	University	- Sensing networks - Monitoring of water pipelines - Leak detection	- Water supply and distribution - Data management and Smart City services
Advantic Sistemas y Servicios sl	Company	- Water quality - Water distribution - Flow and pressure levels - Leak detection - Water levels - Water usage - Control of irrigation	- Water supply and distribution - Data management and Smart City services
IDRAN Ingegneria e Tecnologia srl	Company	- Geospatial modelling - Hydraulic modelling - Hydrologic modelling - Geomorphologic modelling - Statistical modelling	Data management and Smart City services

2.14.2 Partners commercial developments

Table 26 WISDOM partners' commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
Advantic Sistemas y Servicios sl	Concordia Software Platform	- Common core, customized user interface - Data analysis - Reports - Monitoring platform	- Water supply and distribution - Data management and Smart City services

Partner	Commercial development	Technologies trends / tags	Topics
 Figure 46 Concordia software platform			
IDRAN	FLO-2D	- Hydrological-hydraulic model (2D) - Propagation of flow hydrograms and debris flow - Interaction with infrastructures	Data management and Smart City services
 Figure 47 FLO-2D			
IDRAN	RiverFlow2D	2D river and estuary flexible mesh models - Flood modelling	- Data management and Smart City services - Wastewater and storm water collection (including Flood risk management)

Partner	Commercial development	Technologies trends / tags	Topics
 <i>Figure 48 RiverFlow2D</i>			
IDRAN	Smart-WORM	• GIS • Climatic-hydrological extreme events (flood, landslides, storms)	• Data management and Smart City services • Wastewater and storm water collection (including Flood risk management)

2.15 WIDEST



Figure 49 WIDEST logo

WIDEST is a European Commission (H2020 Coordination and Support Action) project. The vision of WIDEST is to establish and support a thriving and interconnected Information and Communication Technology (ICT) for the Water Community with the main objective of promoting the dissemination and exploitation of the results of European Union (EU) funded activities in this area.

Once the project ends, the vision is twofold: in one hand, contribute to advance the consolidation of ICT for the Water Community that is better informed, defined and integrated than today; on the other hand, WIDEST will help the results and outcomes from current research projects improving their exploitation plans and increasing their dissemination potential by delivering co-produced knowledge to a wide range of stakeholders and actors within the water community.

The project is backed by a strong consortium composed by institutions with proven record of accomplishment and expertise across different facets of ICT for water research, including established connections with key stakeholders.

The WIDEST project is aligned with the 15 EU-funded projects clustered around the ICT4Water Cluster.



Figure 50 ICT for Water cluster projects

2.15.1 Partners technology trends

Table 27 WIDEST Technology trends by partner

Partner	Type	Technologies trends / tags	Topics
Eurecat	Research Centre	- Water demand management - Pumping scheduling - Decision Support System - Optimization - Machine learning - Standardization - Semantic Web - Water reuse and recycle - Risk analysis - Water management cost analysis - Water quality - Flood risk assessment - Irrigation management - Water supply and distribution	- Water reuse and recycling - Water-energy nexus - Water supply and distribution - Data management and Smart City services
University of Exeter	University	- Decision support system - Demand management	- Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services

Partner	Type	Technologies trends / tags	Topics
			Customer Relationship
CETaqua	Research Centre	- Sustainability - Water Quality - Water treatment - Alternative Water Resources - Information Technologies - Water Economy - Asset management - Energy - Decision support systems - Real time monitoring - Advanced irrigation systems - Demand management	- Quality of water - Wastewater treatment (including recovery of resources) - Water-energy nexus - Water supply and distribution - Sustainable development, Circular Economy & Ecosystem services - Data management and Smart City services - Management of the water cycle in industry
IWA	Company	- Urban sanitation - Pumping energy efficiency - Water, climate and energy - Water supply services - Basins of the future - Cities of the future	Sustainable development, Circular Economy & Ecosystem services
WssTP	Company	- Sustainability - Water supply sanitation - Water management - Water resources - Water scarcity	Sustainable development, Circular Economy & Ecosystem services
University Nice Sophia Antipolis	University	- Energy water - Hydroinformatics - Water utilities management	- Water-energy nexus - Water supply and distribution - Data management and Smart City services - Management of the water cycle in industry

2.15.2 Partners commercial developments

Table 28 WIDEST partners' commercial developments

Partner	Commercial development	Technologies trends / tags	Topics
Eurecat	Water Management Ontology	- Standardization - Water management - Semantic Web - Interoperability	Data management and Smart City services
Eurecat	Water Service Bus Middleware	- Standardization - Water management - Interoperability	Data management and Smart City services
Eurecat	Water Allocation Decision Support System	- Decision support system - Water resources usage	- Water supply and distribution - Data management and Smart City services

Partner	Commercial development	Technologies trends / tags	Topics
Eurecat	Water Pumping Scheduling	• Optimization • Pumping scheduling • Water resources usage	• Water supply and distribution • Data management and Smart City services

3. Conclusions and Future Work

This first report regarding technology trends and commercial developments has analysed several institutions, including Universities, research centres, associations and private companies. As this is the first iteration of this analysis, it has been focused on the members of the consortium of each ICT4Water cluster project.

For each institution, a search regarding its research interests and fields of activity has been done, mainly consulting online resources, and especially their corresponding main websites. Hence, the information here presented may differ from the actual role the member has in its participating project, as it has been based in the public available information. The information collected has been exclusively obtained from public and open websites. When possible, the information has been focused on the concrete department or secondary company, instead of focusing in the generic one, or group, or University. Thanks to that, the results are closer related to the intentions of this report.

When no information has been found, the partner has been linked to activities related to the project, making use of available project related information.



Figure 51 Technology trends word cloud

Following with the analysis, the Figure 51 Technology trends word cloud depicts the more frequent words used in the “personal” description of research interests and activity fields. It has to be taken in consideration that this field is open, and freely described by each institution. However, there are no surprises in the results, where water and management have a key role. Other important technology

trends include the words quality, resources, environmental and treatment. This is also an expected outcome, as many efforts are focused on assuring quality of water, improving water treatment, optimizing resources and environmental regarding issues.

Starting from these technology trends, topics following Annex I: WIDEST Thematic Areas has been assigned to each institution.

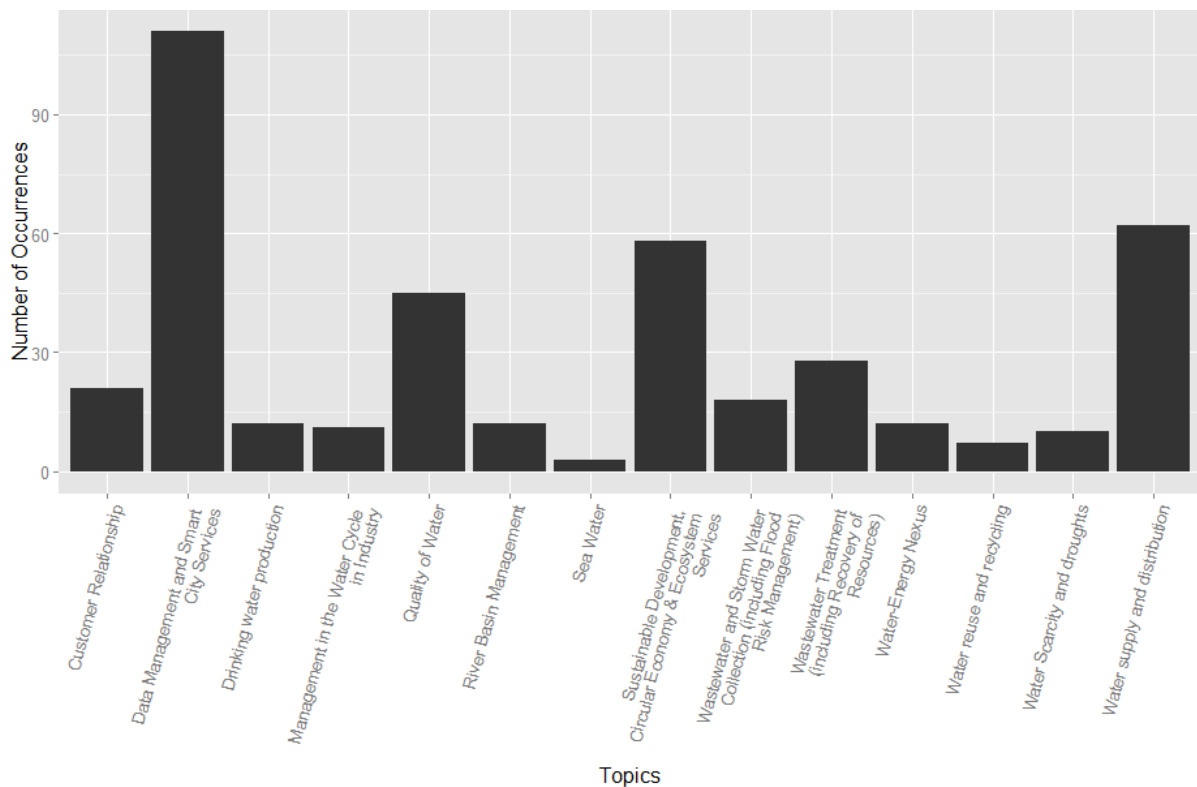


Figure 52 Topic frequencies in technology trends

As can be seen in Figure 52 Topic frequencies in technology trends, the more important trends are related to “Data Management and Smart City services”, “Water supply and distribution” and “Sustainable development, circular economy and ecosystem services”. From these results, the importance of data management has been made evident. Current technologies regarding sensor data, semantic tagging and big data analytics reinforce this topic. What is more, in most cases it will serve to Smart City’s necessities. Moreover, water supply and distribution is one of the major concerns in the sector, smart monitoring and leakage controls are basic in modern infrastructures. Finally, the “Sustainable development, circular economy and ecosystem services” topic is also on top topics. This can be explained by understanding the importance of how the necessity to accomplish with limitations and trying to make good use of each available resource. Ecosystem services are reinforced by the fact that several projects have consultancy institutions to improve project management and provide policy advice.



Figure 53 Commercial developments word cloud

When doing the same analysis, but focusing on commercial developments, similar results are obtained. Water management, data, monitoring, leakage detection are important terms.

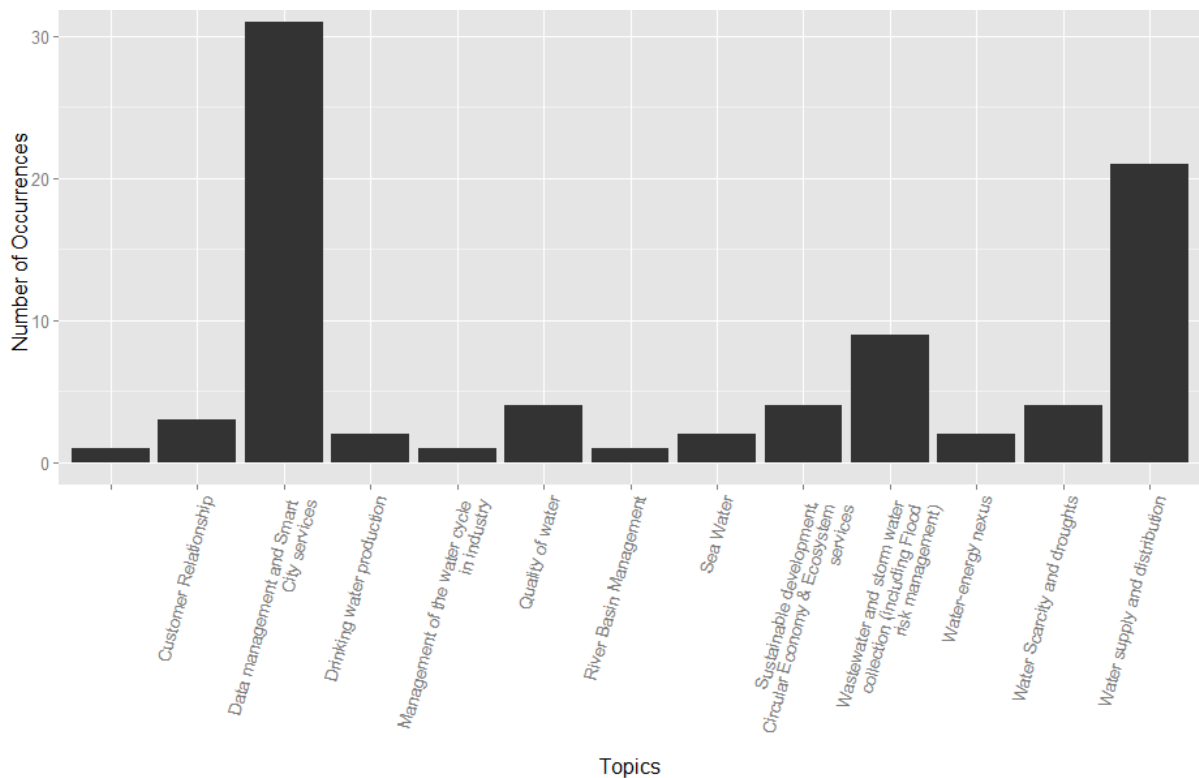


Figure 54 Topic frequencies in commercial developments

When analysing the topics in commercial developments, the results are similar, but there is one frequent topic which is not relevant in the other graphic: the “Wastewater and storm water collection (including Flood risk management)”. This can be explained by the fact that early warning systems preventing natural disasters and covering extreme events are important software in the sector.

Future iterations of this analysis will focus on update this information, and after that, extend it with other existing technology trends and commercial developments from other key actors in the water sector.

4. References

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5. Annex I: WIDEST Thematic Areas

Table 29 WIDEST Thematic Areas

WIDEST Thematic Areas	EIP Water	EU	Water Technology Companies
Drinking water production	Water and wastewater treatment, (including recovery of resources)	Drinking water	Drinking water production
Quality of water			Quality of water
Wastewater treatment (including recovery of resources)		Water pollution	Wastewater treatment
			Recovery of resources
Water reuse and recycling	Water reuse and recycling	Blueprint	Water reuse and recycling
Water-energy nexus	Water-energy nexus		Energy recovery
Water supply and distribution			Water supply and distribution
Wastewater and storm water collection (including Flood risk management)	Flood and drought risk management	Flood Risk Management	Wastewater and storm water collection
Water Scarcity and droughts		Water Scarcity and Droughts	
Sustainable development, Circular Economy & Ecosystem services	Ecosystem services		Sustainable development
River Basin Management		River Basin Management	
Sea Water		Bathing Water	
Data management and Smart City services			Data management and Smart City services
Customer Relationship			Customer Relationship
Management of the water cycle in industry			Management of the water cycle in industry