

## **ICT for Water Management – Issues and questions to be discussed with domain experts and stakeholders**

*This document outlines a number of ICT research issues and questions as they relate to increasing efforts to improve efficiency in water management. It is based largely on research and technology development issues which have been identified in the Strategic Research Agenda prepared by the European Technology Platform for Water, known as the Water Supply and Sanitation Technology Platform (WssTP). The issues identified make sense in the context of a co-ordinated development and management process which takes account of land and other resources and aims to balance social, economic and sustainability needs. This overarching participatory planning and implementation process is known as Integrated Water Resources Management (IWRM). The following issues can be outlined from an ICT perspective:*

### **1. Goals & Priorities for ICT- enabled Integrated Water Resources Management (IWRM)**

#### **1.1 Goals/Targets**

- Peak-period reduction of water and energy distribution loads (at least 15% savings)
- Consumer water and energy saving (at least 15% savings)
- Reduction of CO2 emissions (at least 20% reduction)
- Real-life testing and validated system and user requirements, involving all major stakeholders and end users while ensuring ethical and privacy safeguards

#### **1.2 Focus on ICT- enabled solutions: Major building blocks**

ICT-enabled solutions for integrated water resources management (IWRM), involving as key building blocks:

- Innovative demand management systems;
- Decision support system;
- Data management technologies;

#### **1.3 Priorities, added value and needs of R&D at EU level**

- To set up priorities and reach consensus;
- To overcome barriers;
- To demonstrate added-value and foster developments;
- To strengthen constituencies and to build critical mass;
- To generate new ICT business opportunities and potential markets;

### **2. Possible ICT R&D needs for water resources management**

#### **2.1 Intelligent water metering: Potential and opportunities**

### **2.1.1 Real-time monitoring and control on a wide scale enabled by intelligent water metering.**

Real-Time monitoring and control systems have been deployed over the last few decades in water plants and big facilities, for real-time optimized operation, alarms management, energy optimisation, quality control, crisis management. But these technologies were neither mature nor cheap enough to be deployed on a large scale in water distribution networks. **Intelligent water metering should provide additional reliable real-time data at affordable cost.**

### **2.1.2 ICT tools (including Intelligent water metering) make it possible to detect leaks on-line whereas Automated Meter Reading (AMR) through fixed networks are creating new business opportunities**

District metering, on-line leak detection, automated meter reading through fixed networks, all those new businesses are not far from being mature and lead the water industry to start evolving from lack of data to the management of multi-sources data. This evolution is rapidly moving forward due to new generations of on-line sensors. There is here a real research need for assessing how new advanced and cheap sensors, and their associated sensor networks, will really fit the requirements of the water industry and how easy and economically feasible it will be to massively deploy those new sensors in water networks and facilities.

### **2.1.3 Identify and build up consensus on a minimum set of functionalities for intelligent water metering in order to open up new markets and to stimulate new ICT business opportunities on the basis of price differentiation**

**2.1.4 Smart Meters and ICT web tools are much likely to benefit both utilities and final consumers as well as to contribute to better use of scarce water resources. In particular, they will empower end users with real time information, increase their awareness and stimulate behavioural changes.**

The evolution of electronics, telecommunications and battery technologies is now changing previous paradigm. This is a major evolution for water businesses, municipalities, which may lead to new distributed utility management opportunities that are likely to benefit all parties involved and to contribute to the achievement of demanding environmental sustainability targets.

## **2.2. Balancing Supply and Demand issues**

- Development of water saving concepts and technologies
- Methods of customer awareness raising and education promoting efficient use of water (EUW)
- Advanced metering technologies to promote EUW
- Develop ICT tools to better understand, predict and manage demand
- Determine the impacts of water demand and supply management options
- Asset management tools for sustainable maintenance and upgrade programmes and for integrated design of networks and decentralized processes

## **2.3. Enabling Framework issues**

- Identify most appropriate methods, namely risk management, IWRM and DSS for various water industry applications
- Gain agreement on harmonised approach for the above
- Research the relative importance of the barriers to the implementation of integrated water solutions
- Identify the most appropriate knowledge transfer and education methods

#### **2.4. For deployment of new advanced water management is it still necessary to launch pilots to test and validate new business models**

A new revolution has already started and is leading water utilities and water companies to adapt their practices and organisations to get ready to develop and manage Networks of Sensors for appropriate applications. But, the water industry is not yet ready to deploy those systems, and another research need consists in being able to understand their total environmental and economic cost of ownership (impacts on operational and maintenance business processes and organisations).

#### **2.5. Implementation Cases issues. The focus should be on urban areas and addressing diversity in terms of geography, climate and user consumption patterns.**

The following examples of some implementation cases have been outlined by the European Technology Platform for Water (WssTP). They have been used to develop an understanding of key issues, translate them into potential needs and identify long-term requirements, contact key local stakeholders including Research and Technology Development Topics.

**Berlin:** Large conurbation characterised via semi closed water cycle through bank filtration and artificial infiltration. Current ICT R&D topics are:

- Optimised water services (energy efficiency, asset management and leakage control)

**London:** Suffers from problems of aging infrastructure because of its early urban development: leakage and quality issues related to the water supply network are coupled with increasing water scarcity from changing rainfall patterns and population pressures in south-east England. It is intended to use London as an example to develop:

- Smart metering to provide real-time data on water consumption and costs for the benefit of customers and operators
- Solutions for demand management to minimise the reliance on expensive technological equipment to satisfy demand.

**Madrid:** Fast developing city situated in water stressed area with high summer temperatures. The case will be used to develop:

- Integrated resource management techniques
- Demand forecasting and management

**Prague:** Used as a basis to develop:

- Augmented environmental protection measures in line with EU standards

- Cost effectiveness solutions to upgrading assets

## **2.6. Other topics and ideas**

Additional topics and ideas to be considered in establishing ICT research needs for efficient water management or to be discussed in a future consultation with ICT and water constituency experts, should be sent to [manuel.monteiro@ec.europa.eu](mailto:manuel.monteiro@ec.europa.eu) or [antonios.barbas@ec.europa.eu](mailto:antonios.barbas@ec.europa.eu)