



# European Innovation Partnership on Water (EIP Water)

## Barriers and bottlenecks for Innovation in the Water Sector

1<sup>st</sup> Stage: Identification of non-technological barriers and definition of  
priority and intervention measures

Final Report, including comments from the Steering Group

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# 1 Introduction

The EIP Water has established strategic objectives and priority areas, which are described in the Strategic Implementation Plan (SIP). Several barriers and bottlenecks have been identified and described in the SIP, which hamper the achievement of the objectives pertaining to each priority area.

Europe still has to make a major effort to develop and implement technology solutions to ensure sustainable water use and re-use. The development of innovative technologies and approaches is well analysed and is part of EU and national Research and Innovation programs. Strategies must be improved to allow the “crossing of the valley of death” by more innovation related public and private actions.

However, progress in bringing these technologies to the market is highly dependent on removing the so-called non-technological barriers that pertain the European market. Furthermore, tools should be put in place to support European presence in the international water-innovation markets. In this sense, a competitive and innovative home market is a pre-requisite for exports out of the EU.

Barriers and bottlenecks were discussed at the 3<sup>rd</sup> EIP Water Taskforce meeting (5 March 2013) and it was decided to establish an Ad Hoc Group which should:

- conduct a systematic review of the existing information on barrier and bottleneck areas from different perspectives, covering items linked to the value chains for water and the cross-cutting barriers and social aspects
- identify a selected list of priorities
- define actions to remove or mitigate their impacts

In addition to the Ad Hoc Group, an Industry Expert Group was also nominated to provide guidance and expertise pertaining on barriers and bottlenecks contributed to this document. The EIP Water Secretariat actively supported the drafting. On 20 November 2013 the report was presented to the Task Force. At its 4<sup>th</sup> meeting (6 December 2013), the EIP Steering Group made further comments on the report, which have been taken up during the revision of this revised document.

The analysis and action proposed are a first step into identifying and proposing approaches to underlying barriers and bottlenecks, which represent major areas as summarized in the EIP Water. Further action in relevant areas such as energy-water or agriculture-water will be needed.

## 2 Approach

### 2.1 Method to identify priorities and workplans

In the identification, prioritization of the barriers and bottlenecks and developing actions plan, the main objectives of the EIP Water are to: (1) facilitate, support and speed up the development and deployment of innovative solutions to water

challenges, and (2) create market and implementation opportunities for these innovations both inside and outside Europe. An important similarity in both objectives is creating economic value (creation of successful products and services, increased turnover, job creation, creation of more competitive advantages to operate in export markets). From a general public interest perspective, the objectives of value creation will be met by the capability to also cover societal demands (in the broad sense, incl. needs of the environment). Barriers and bottlenecks, which hamper the creation of measurable supplemental economical value, are identified as most important. Concrete actions to overcome the mentioned hurdles have to follow the adoption of this report, as agreed at the mentioned meetings.

Some barriers and bottlenecks are specific for a specific priority areas of the Strategic Implementation Plan (SIP) of the EIP Water; others cover several of them. Therefore, developing action plans for barriers and bottlenecks, which cover multiple priority areas have a bigger impact and therefore rank higher in the priority list.

It was recommended to focus on a selection of key barriers and bottlenecks and develop intervention measures for these barriers. The Task Force proposed to focus on the domestic European market, in order to target this priority market before addressing export barriers and bottlenecks; though the Steering Group requested actions with export markets and applications in mind.

## 2.2 Barriers & bottlenecks

In the Strategic Implementation Plan (SIP) of the EIP Water, the following eight priority areas and one enabling factor are identified. For each priority area/enabling factor, the SIP has identified barriers and bottlenecks. For each priority area the barriers and bottlenecks mentioned in the SIP are summarized.

- **Water reuse and recycling:** technical barriers; limited capacity to formulate and institutionalize measures; lack of financial incentives; public perception; sub-optimal markets for recovered nutrients; lack of robust industrial processes using different qualities of water; absence of EU harmonised standards for reused water; social acceptance of recovered resources.
- **Water and wastewater treatment:** lack of awareness of the economic value of water, lack of incentives for full-scale implementation and validation of innovative solutions; social acceptance of recovered resources; lack of knowledge with regard to the occurrence of emerging pollutants.
- **Water Energy Nexus:** insufficient integration of European water and energy policies; inadequate economic incentives to adopt efficient water and energy technologies; lack of low energy technologies; variable supply of renewable energy sources.
- **Flood and Drought Management:** lack of integration of scattered monitoring networks; uncertainty in meteorological forecasts for flood and drought risk assessment; lack of integration of different dimensions of risk; insufficient knowledge on the economic value of risk; lack of awareness and preparedness of populations to deal with risks; fragmentation of institutions and responsibilities.

- **Ecosystem Services:** fragmentation of responsibilities and knowledge; limited addressing of water use planning and pricing policy to ecosystem needs; limited understanding of connections between healthy ecosystems and the attainment of social and economic goals; insufficient development and alignment of monitoring and reporting frameworks with the ecosystem approach.
- **Water governance:** fragmentation of institutions and responsibilities; institutional barriers; low profile on the political agenda; lack of public awareness and private involvement.
- **Modelling and Decision Support Systems (MDSS):** lack of holistic approach to water management and fragmented governance; lack of integration ecological, economic, social and institutional perspectives at the technical and methodological level; lack of leadership due to legal and institutional barriers; no long-term funding opportunities; limited development of durable solutions.
- **Financing for Innovation:** insufficient overall financial flows into the sector (low pay-back of investments); weak profitability arising from inadequate cost recovery; high capital-intensity, with built-in risk aversion; resources for SMEs to respond to market opportunities, nor access to sources of funding; lack of combined funding models,.
- **Smart technologies:** lack of knowledge of new technologies and its capabilities upon making investment decisions; risk-aversion by consumers and governance bodies; lack of launching customers; fragmented sector.

### 3 Priorities and workplans that require extra attention

#### 3.1 Prioritized barriers & bottlenecks

The following barriers and bottlenecks which occur in several priority areas are identified in the SIP and advised to be prioritized by further EIP Water action:

1. **Lack of funds for SMEs:** Many SMEs are innovative and develop excellent products and services. In their innovation process when a prototype is developed they are often confronted with a lack of financial resources for further development, customization, demonstration and commercialization. Due to little or no access to funds, R&D programs or other financial resources, further development stops.
2. **Risk aversion of the water sector:** The water service sector, as well as industrial sectors have a high capital-intensity and deal with high risk aversion for innovative technologies. Therefore there is a low preparedness to act as a launching customer for innovative processes or products. This is understandable, because often deficiencies occur in first full scale projects and have high financial impacts. Due to health issues, this risk aversion is also prominent in the public regarding drinking water.

3. **Lack of demonstration sites:** There is a lack of demonstration sites for new technologies to customers and consumers due to the difficulty in pulling together a wide group of stakeholders acknowledging the benefits of innovation and also the capital-intensive nature of such large-scale demonstration in relation to their true economic value. But without a demonstration site there is no national market, and without a national market there is usually no international market. The reason of the lack of demonstration sites is very much linked to (2), the risk aversion of the water sector.
4. **Inconsistency and fragmentation of policies and regulations:** The water sector is characterized by a complicated regulatory environment along/across the various political hierarchy levels that result in fragmentation (e.g. different regulations and standards per region). Coherent regulation has the potential to stimulate innovation as outlined in a specific report<sup>1</sup>. Some examples of bottlenecks in specific priority areas are:
- the insufficient integration of European water and energy policies, resulting in neglecting interconnected effects;
  - water treatment technologies in contact with water for potable use, suffer from non-harmonized regulation across the EU. They are certified at (EU) national level and there are multiple countries with specific and different requirements. The cost of certifying multiple products in multiple countries is prohibitive, resulting ultimately in a limitation of technologies to only few large scale processes per country that justify the approval cost. This ultimately leads to adoption of sub-optimal technologies;
  - Inconsistencies between environmental and water policies can hinder innovation in water sector. Indeed, the reuse or recycling of water may increase the concentration of pollutants in waste water without increasing the total mass of pollutants discharged to the environment. The current implementation of the Emission Industrial Directive is not taking sufficiently on board this new situation.
5. **Water authorities and water sector fragmentation:** At different levels the utilities responsible for water supply, wastewater, storm water, waste, and energy are independent of each other. The water sector is highly fragmented and conflicting in policy, ownership and responsibilities. As a result, there is only a low intensity of cooperation between the various sectors and thus potential synergies are not recognized or realized. Often the utilities are relatively small, lacking strategic, technological and planning competencies as well as necessary funds to implement innovative water system solutions as well in flood and drought risk management and ecosystem services. Very different stakeholder interests from

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<sup>1</sup> Technopolis Group (2013). Screening of regulatory framework. Report developed for European Commission, DG-RTD C1/. September 2013.

urban areas (drinking water), agriculture (irrigation), and from industry (process, product water, waste water), have encountered views about overarching water innovation and will favour it differently.

6. **Conservative Procurement:** Current approaches give preference to low/lowest cost offers neglecting longer-term operational or lifecycle costs, and to proven technologies, which therefore hampers the innovation processes. At the same time large part of the the general public are critical on innovation procurement as recently demonstrated in the reaction to the EC plans for a EU-wide procurement of public services.

## 3.2 Actions

The following actions have been identified and are supported by the EIP Steering Group. They will now receive a further refinement to make them operational. For each action, a small drafting group will prepare a roadmap with a timeline for further action that will be presented and agreed at the next TF meeting.

### 3.2.1 Develop fit-for-purpose financial instruments (e.g. revolving funds)

An important link between prioritized barriers and bottlenecks (1), (2) and (3) is the financial risk of many different actors: water users/launching customers, equipments providers, contractors, developers/demonstrators, funders/banks and SMEs. EU Institutions and stakeholders are currently discussing how to combine public and private funding from e.g. Horizon 2020, Structural funds, EIB loans and private investments within various policy initiatives. The EIP Water should explore these results and their feasibility for the implementation of the Water SIP As another model, a revolving fund might remove or at least mitigate this barrier. Such a fund should cover (a part of) financial risks for customers but especially for launching customers who applies innovative technologies. As a result, it improves the innovation potential by creating new demonstration sites. It might be considered that access to the fund is favoured by numerous SMEs. In the concept of a revolving fund, innovators who will use this facility will have to be committed to deposit a percentage of their future turn over on their innovative products back into the fund.

It is recommended to explore the feasibility of a revolving fund, because it might mitigate several barriers/bottlenecks which occur in many priority areas. Important items in assessing the feasibility of a revolving fund are: first funding/funders, management and administration of the fund risks of the fund, project selection, etc.

Furthermore, future work should be based on the outcomes of the 'demand and supply of financial instruments for water innovation', study currently being carried out by the European Investment Bank (EIB), and also consider the results of the EIP Water Action Group FINNOWATER.

### **3.2.2 Establish an EU-wide coherent regulatory landscape**

Regulations (incl. standards, harmonised implementation, joint targets) are essential to innovation in the water sector. Although water regulations are highly conservative, at the same time they should also address and facilitate innovation. The EC Water Blueprint<sup>2</sup> has provided an excellent analysis of the state of implementation of water legislation and its relation with related policies and identifies innovation as an important tool to support the implementation of water policy. Furthermore, EU regulations can and should be analysed regarding their positive and negative effects to place innovations at the global water market. Some examples for topics to look at are:

- Ensure EU-wide implementation of water related policies to achieve its objectives, and to gain consumer confidence and provide legal certainty to investors.
- Fitness check on impact for innovation in upcoming water related policies.
- The impact assessment for EU action with regard to common legal and standard approaches for water reuse. Need to ensure consistency between water and health or environmental policies. For instance, the applicability criteria for BAT-AEL under IED Directive should be adapted by including a clarification that water saving measures can be taken into account by national authorities when defining emission limit values in permits.
- Stimulate innovative approaches in sustainable water management and support their implementation via the spending of EU funds (incl. CSF Funds and EIB loans).
- Enforce water pricing/cost-recovery obligations under the Water Framework Directive, including metering when relevant; and as an ex ante condition under the Rural Development and Cohesion policy funds.

### **3.2.3 Install structured EU coherent approach for Public-Public and Public-Private Partnerships**

There is a (5) low intensity of cooperation between the various sectors of the water-related value-chain and thus potential synergies are not recognized or realized. Often the utilities are relatively small, lacking developing pragmatic cooperations. Water management at national, regional or local level does not facilitate the implementation of innovative solutions, mainly because of fragmentation of approaches, lack of critical mass for investments and insufficient market size. It is therefore advised to explore the potential and develop partnership approaches for ensuring cooperation and finance, such as PPP (Public-Private-Partnerships) and inter-sectoral frameworks. Intellectual Property Rights (IPR) issues, and society's concerns regarding water as a public good might also be assessed and considered in this action plan. The establishment of these partnerships should also target international export markets.

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<sup>2</sup> [http://ec.europa.eu/environment/water/blueprint/index\\_en.htm](http://ec.europa.eu/environment/water/blueprint/index_en.htm)

### 3.2.4 Improve public and investor confidence by showcases and demonstration sites

The barriers of the above mentioned lack of investments and public scepticism combined with a low intensity of cooperation between various sectors, and thus missing potential synergies, is widely accepted. At the same time it is also recognized that in several regions good examples of cooperation between different areas occur. Therefore, it is advised to identify these good examples – e.g. of useful policies regarding balancing water and energy - , identify which barriers they have solved, improve their dissemination and develop one or more regional showcases. Learned lessons should be drawn from the EIP Active and Healthy Ageing's "Reference Sites".

### 3.2.5 Evaluate the potential of Public Procurement for driving innovation

Interprete and adapt the public procurement rules to promote innovation: given the size of its budgets, procurement has a big potential to stimulate innovation in the value chain. Considering that EU procurement rules recently have been changed, it will be more effective to identify best practices and develop new organization models like PPPs (link with 3.2.3), which can better deal with the existing rules. The learnings from the recent EU-wide debate about public procurement rules or public services have to be included. The societal part (Safe and secure societies) of the Horizon 2020 program gives opportunities to implement research to better understand consumers reactions and needs).

## 3.3 Other actions

Other identified areas, where action will be required in a next step, are:

- **Impact study on the relevance of water related innovation to overall EU economy:** In order to get support for innovation and trigger the needed structural changes in the markets and governance systems, more systematic data and evidence are needed. Water security and efficient management are crucial not only for the sector but to the continuous development of the overall economy and the societal welfare.
- Specific barriers and bottlenecks for innovation of water aspects in the **agricultural and energy sectors**, and their integration in a sustainable water management need further evaluation (in coordination with other initiatives, such as e.g. the EIP on Agricultural Productivity and Sustainability)

## 3.4 Next steps

The drafting groups provisionally established at the 4<sup>th</sup> Task Force meeting will present detailed action plans for agreement by the Task Force and start of action. Discussion will take place at the 5<sup>th</sup> Task Force meeting (3 April 2014). Overcoming barriers and bottlenecks is a key activity of the EIP Water's long term strategy, including not only quick-win actions and measures but also those ones expected in the medium-long term, to build trust among partners. The follow-up of the implementation will be a steady agenda item for the EIP Water Steering Group.