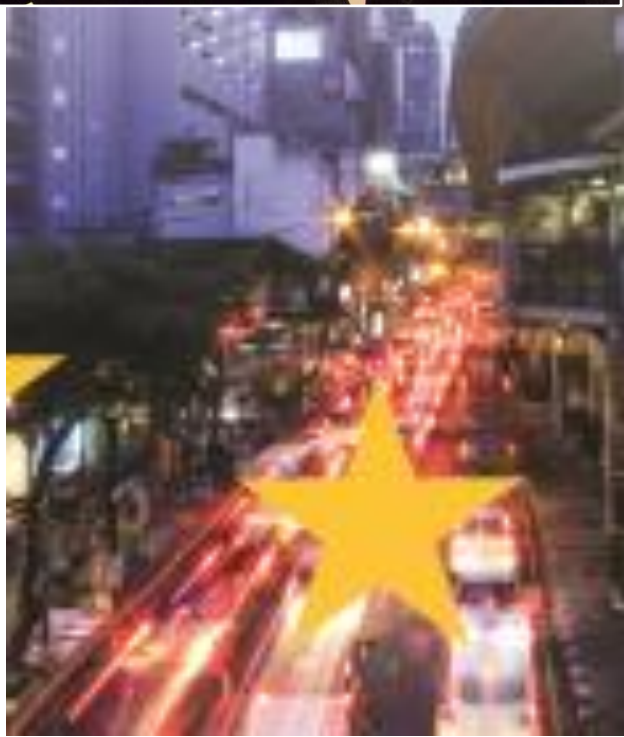
Water Innovation Europe 2014
'Water in Europe: Green tape or Blue Gold?'
Event Report – Key messages



WssTP
The European Water Platform

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INTRODUCTION

The world runs on water, so water-related research and innovation is very important. Clean, reliable water supplies are vital for industry, agriculture, and energy production. Every community and ecosystem on the Earth depends on water that is used for sanitation, hygiene, and daily survival. Water, waste and energy use are constantly increasing, leading to an intensification of research and development. Globally, 70% of freshwater use is for agriculture, 22% for industry, and 8% for domestic activities. Water is a complex issue. The European water sector is highly fragmented, with more than 70,000 water utilities across the 28 EU Member States, and with more than 3, 000 technology providers. In addition, citizens often demonstrate a lack of understanding and interest in the topic of water and its challenges; they often take water for granted, not realising the luxury of having water services available 24 hours per day, 365 days per year.

The World Economic Forum has identified the risk of a water supply crisis as one of the **top three global risks**, in addition to some other risks such as a failure of climate change mitigation and adaptation, and extreme events such as floods and droughts.

All economic activities in the world that depend on water have a combined market value of $70.2 trillion - including $2.8 trillion for the water-handling economy that involves direct management of water, $720 billion for water-related equipment and services, and $557.8 billion for water treatment and distribution.

The total global waste water treatment market has a value of $388 billion for the period of 2010-2016 with a European market share of 27.3%, preceded only by the East-Asia Pacific region, with a market share of 37.6%.

The main drivers for water are the challenges related to climate change. For example, it is predicted that water scarcity will affect 63% of the world's population by 2025 - with some externalities like the intensity of rain events, flooding, growing urbanism, etc. But water scarcity also creates an opportunity! Water services have to offer exemplary operational solutions, helping to drive the move to an economy that is cleaner, greener and more efficient. Megatrends reshaping the world are: growth of population and ageing, urbanisation and megacities, social inequalities, resource scarcity, growing energy prices, climate change, new technologies, better informed populations, nature, and safety and well-being.

SOME CHALLENGES

For a long time the value of water has not been internationalised and valorised and/or included in economies and in EU economic policy. The Water Framework Directive has brought a systemic approach to water management. A number of achievements materialising this systemic approach in Europe have been realised, in particular introducing a systems' approach to integrated water resources management, involving different stakeholders at different geographical scales within river basins. However, besides putting further effort into achieving a good ecological status of European rivers, lakes, coastal areas and European seas, the challenge is how we capitalise on the strengths of this systemic approach and reinforce the EU's leading position to create new markets for new industries and to capture international markets.

We are moving from the 3C's (command, comply, control) to the 3I's: integrate, innovate, incentivise. The **WssTP conference is 3I's- Intelligence, Ideas, Interaction.** It is a basis for European Innovation Partnerships (EIPs) to be continued within the framework of Horizon 2020. We are concentrating on the opportunities (knowing the barriers) and increasing possibilities for green growth and jobs, for eco-innovative solutions for our economy and for our society. We already have a strong knowledge base and the appropriate set of skills. In addition, we are now creating favourable framework conditions: legislation, qualitative governmental management structures, entrepreneurship and access to finance and to the market. We are searching for demand-side measures, procurement networks, and standardisation mandates.

We **need a systemic approach to eco-innovation**. We need joined-up thinking to **act across disciplines, sectors, policies**. Successful projects are necessary, but not sufficient. We need to use Horizon 2020 as an investment portfolio to help to realise a green economy – a circular economy of which water is a part.

Water cannot be considered in isolation, as it is linked to production and consumption! For example, EU consumption of agricultural products represents 89% of the water footprint = 4,265 litters/person/day (out of the total 4,815). Innovation it is not just about technology. We need new business models, finance and governance models, and social innovation solutions. We need to join efforts, linking up research and innovation, environmental and regional efforts in the water sector.

FOUR STRATEGIC ORIENTATIONS

The outcome of the conference – Water Innovation Europe 2014 (WIE2014) can be summarised into four strategic orientations for the very near future, where water plays an indispensable role. These are: systemic eco-innovation for a circular economy; nature-based solutions; climate services, and city blueprints for smarter cities and regions.

1. **Systemic eco-innovation** is not only about water. It is about all possible nexuses, such as energy-food-material/resources-agriculture but, of course, water is part of it. We need to cope with challenges in Europe such as environmental pressures (that goes beyond water), resource scarcity (that includes water) in order to increase European competitiveness (where the water sector plays a part), empowering citizens and creating new jobs. We have to maintain an EU leading position on Clean-Tech solutions and markets to become a role model for sustainable production and consumption. We need to realise and materialise this new approach by finding a long-term solutions. These should be based on a systemic service approach moving from products to services, from consumer to user, from waste to resources, and from a depletive to a regenerative environment. Systemic eco-innovation is about change and impacts that encourage stakeholders to collaborate, create new business models, and multiply the impacts of research, development and innovation. Research and innovation have a role to play in ensuring reinforced partnerships for the circular economy, demonstrating the opportunities for moving towards a circular economy via large scale innovative projects and supporting market

replication for creating green jobs with new smart skills. Research and innovation for a circular economy is of interest to all pillars of the Horizon 2020 programme.

Circular economy and water: water must be an integral part of any circular economy. Every drop of water has been here since the Earth began. It is the epitome of recycling through nature's eternal washing machine, with a regularity that allows it to sustain life. But water is not infinite: only 2.5% of the world's water is fresh. If we don't manage it properly, there will not be enough clean, potable water to sustain our growing population, not enough water for our economic and societal needs, nor to maintain the biodiversity of a healthy, natural environment. Aggravated by climate change, growing economic development is leading to a generation of new and more harmful contaminants (for example, pharmaceutical residues, pesticides, etc.). A systemic approach to water innovation is about addressing systems, for example, cities, regions, industrial parks, or river basins / sub-basins, having water-food-agriculture-energy nexuses. It also encourages including a water component into a value chain and life cycle of a design/production/product distribution and use/service/recycle and a reuse cycle.

2. **Nature-based solutions** to address societal challenges are solutions about use; they copy from, are assisted or supported by nature, or are inspired by nature. They are proven to be cost-effective, resource efficient, multi-purpose and multi-beneficial, simultaneously benefitting environmental, social and economic objectives. Innovations with nature are helping to address societal challenges in cities and climate adaptation actions. For example, artificial wetlands are becoming a well-established waste water treatment method in a wide range of industries. The research and innovation priorities here include re-naturalising and greening of cities, restoring degraded natural ecosystems, adapting to climate change, finding solutions for disaster risk reduction, leaving space for natural rivers and creating flood-plains, re-naturalising water-related and water-dependent ecosystems as well as building innovative strategies for an integrated management of land use, urban/sub-urban and rural areas and coastal zones. Nature-based solutions are an opportunity for society and for the growing urban communities to restore degraded areas and to have sustainable urban and peri-urban areas; to find holistic solutions for addressing extreme events, and improving quality of life for citizens living in a greener, cleaner and more natural environment and creating greener infrastructures for this purpose.

3. **Climate services** derive economic and societal value from climate research, data, models to supply investors (public and private) with customised information products and services to make smarter investment and business decisions. If we know better how climate change will impact our activity, we can better anticipate, adapt and seize an opportunity to adapt to various changes and to decouple economic growth from an overexploitation and pollution of a natural capital, of our natural resources. For example, studies show that a 1% increase in an area experiencing drought leads to a 2.7% fall in a country's GDP in a single year! For each 1% area affected by excessive rainfall, GDP growth is reduced by 1.8%. Growing interest in investing in security and resilience also affects water management. Thus, managing impacts on water resources will require adaptation of infrastructures, economies and society. Climate change can have a drastic impact on cities. Adaptation strategies are needed, and it is important to know how drought conditions are likely to develop or what the impact of extreme flood event can be.

   What do we mean by climate services? – This is a broad concept that covers the transformation of climate-related data together with the other related information into forecasts, projections, trends, economic analyses, assessments and predictions. It will lead to the development of best solutions to tackle growing challenges of climate change and to have opportunities to adapt to the new circumstances ensuring sustainable growth for society at large. For the water sector, climate services mean that we have to find innovative, research-based solutions for water infrastructures ensuring climate proofing, preventing risks and ensuring a long-term life of infrastructures. Climate services at the river basin scale mean that we have to find integrated smart solutions for water resource allocation, taking into account water quality trends. The key challenges for smart and integrated

solutions addressing climate change are reliable projections to support reliable solutions in a dynamically changing, uncertain framework. Climate risk management focuses on adaptation and mitigation measures to support decisions in a context of sustainable development, in order to understand current and future climate-related risk from climate variability, limits of adaptation, impacts of inaction and need for transformation. There is a need to strengthen a knowledge base to be able to predict and take appropriate measures to cope with extreme flood risks in Europe and to address the impact of such events on society, economy and environment. For climate risk management, it is important to incorporate interdependencies between risk bearers, to include the special nature of extreme risks in the analysis, and to include risk perspectives – especially the importance of integration with social sciences. Climate services also cover an assessment of water quantity threats such as raw water scarcity during longer droughts, lowered groundwater levels, increased frequency of water pipe failures, and peak consumption caused by high temperatures, increased temperature of raw and distributed water. Innovations are needed for climate services to safeguard EU citizens from environment-related pressures and risks and wellbeing in protecting, conserving and enhancing the European natural capital.

4. **City blueprints for smarter cities and regions** is a concept complementing a circular economy, with a number of interaction and interdependencies of a variety of cross sectoral components such as energy-mobility-buildings-water supply-waste water-solid waste-climate adaptation-ICT. Thus, in a smart city concept, water is a crucial element that needs a long-term coherent social, economic and ecological agenda with water-wise solutions to ensure city services implementing a circular economy, focusing on social innovation, with greatly improved governance and innovative business models. ICT research and innovations for efficient water management offer a number of actions such as real-time data collection, monitoring and modelling of network behaviour, increased user awareness, adaptive pricing; rapid response, leakage detection and reduction, cost simulation approach for a complex urban supply and demand forecasting for water distribution systems, or protecting water quality by using a smart grids approach.

The OPPORTUNITIES

These four strategic orientations, derived from the numerous presentations at the WIE2014 event, indicate a huge number of non-exhaustive **opportunities - listed below - for a sustainable water sector** to support economic growth, resource efficiency and the creation of smart green jobs.

1) **Water scarcity is the main driver for water recycling and reuse,** options that are a unique opportunity for bringing about a paradigm shift towards a circular economy. Measures for different incentives at different levels to be deployed in **industrial markets** (e.g., chemical, pharmaceutical, food, textile industries) and in agriculture. Priorities for actions to be identified in **regard to pollution loads**.

2) **Nanomaterials, plastic litter and macro-waste** are the drivers for incentives to assure global coastal and marine environment protection - including prevention and protection measures of coastal zone and marine environment management, disaster risk reduction and climate mitigation measures from accidental pollution and extreme events. For waste water treatment, the challenges and measures to work on are: to develop higher standards and to go for further innovations and market deployment of the additional advanced treatment; solutions to improve energy efficiency towards zero-energy treatment plants limiting the environmental footprint, and smart solutions for an integrated water management in urban and peri-urban areas.

3) The way forward for **greening our economy and secure resources** is the development and deployment of a concept **from removing compounds from waste water streams to recovering resources**. That involves the redesigning of current technologies towards optimal product recovery and development of dedicated technological concepts towards higher market and technology readiness levels. Developing new business opportunities while rethinking current water management scenarios in industrial, agricultural and municipal water sectors, and exploiting resources in the most valuable and usable form possible. **Water reuse and alternative water** is a rapidly growing market; it is a market for existing and new technologies.

4) Innovations in water should secure a **sustainable supply of resources and** an **integrated and systematic approach to river basin management,** ensuring water availability solutions for all users matching the supply and demand side; solutions for ranking and pricing food, water, energy access rights; and sustainable solutions addressing extreme events, profiting from tidal, hydropower energy.

5) **The current value chain shift** is another huge opportunity for technology providers to move towards higher technological systems enabling more complex and more efficient solutions.

6) **ICT development for water** is an opportunity for developing smart water, on-line water and wastewater **solutions**. **We need to create actionable water market intelligence and strategic support to it.**

7) **Addressing carbon footprint of water-related economy in urban and peri-urban areas** is another opportunity to find the solutions for (a) low energy waste water treatment, integrated advanced treatment, (b) resource (nutrient, energy, critical materials) recovery; (c) industrial waste water treatment and linking it with circular, smart economy solutions; (d) sludge pre-treatment technologies. Furthermore, energy and resource recovery thematic areas are an opportunity for disruptive technologies.

8) Other opportunities for water are solutions in **bridging the supply-demand side of innovation into a supply-demand partnership** via demonstration and commercialisation.

9) **New business models inside the EU for water services and economy**, for example, deriving from a paradigm shift towards decentralised smart treatment systems going to green solutions for a circular economy.

10) In Europe we have a huge opportunity for a **growing number of SMEs,** via support and innovative actions: entrepreneurship and partnership centres development for water technologies; knowledge management with the increasing importance of water in business development for growth of SMEs, creating and exploiting smart specialisation and innovations linked to water.

11) There are opportunities for developing **innovation systems at regional level** in terms of knowledge creation, joining partners into clusters, linking various stakeholders together via brokerage events, speed dating sessions; marketing of innovation and innovation-based products and services, and facilitating business networks.

12) **Collaboration at the global international level**, for example, with China, Latin America, Israel, points to a number of unique opportunities for water sector internationalisation and valorisation. For example, on pollution control and water resource protection, urban water infrastructure, industrial water efficiency and clean technology, sludge management, water recycling combined with urban development; centralised / decentralised wastewater treatment and reuse, advanced treatment membranes, energy efficiency, networks management (leaks, modelling of water distribution), sewage modelling, urban floods management, ecological restoration, urban water recycling; cleaner production taking into account desalination, membranes, applications in agriculture such as water saving irrigation, protection from diffuse pollution, groundwater protection, artificial recharge; soil remediation and river restoration; water security for sustainable growth; desalination; market research, business.

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