Objectives and achievements of the European water supply and sanitation technology platform (WSSTP): a review

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Abstract The European Water Supply and Sanitation Technology Platform (WSSTP) is an industry driven organisation aiming to strengthen the potential for technological innovation and the competitiveness of the European Water Industry. In response to global challenges and regional demands a strategy has been proposed to ensure safe, secure and sustainable water and sanitation services for the benefit of industry, the society and the environment. Integrated Water Resources Management is used as a guiding principle. Water supply, wastewater treatment (sanitation), river basin management and concerns of regulators, financing institutions and the civil society are the key elements of a system to be sustainably managed. Decision makers of the private and the public sector are to understand that investment in research, technology development and implementation of innovation is an important element in the process of securing economic prosperity, social stability and functioning of the ecological systems which we as human beings are a part of. A hierarchic, practice oriented structure is proposed to organize and govern research and technology development in Europe. Research will be organized within the framework of thematically designed pilot programmes containing a distinct number of implementation cases to execute close-to-reality research.

Keywords integrated Water Resources Management; sustainable development; technology implementation; wastewater treatment water research; water supply

Introduction

By the end of the 20th century, and after more than hundred years of intensive water research, development and implementation of water technology academic, economic and political decision makers in Europe tended to assume that the water sector had reached a mature state so that investment in water research would no longer be required. Recent developments on the regional and global scale revealed, however, that this assumption is far from being realistic.

In many parts of the World urban areas are growing at very high speed causing the demand of high quality water for potable and industrial use to increase tremendously, but the sources from which water can be abstracted remain more or less constant or even decrease in quantity and quality. Simultaneously, infrastructural components (e.g. pipes, sewers, water works, wastewater treatment plants) are deteriorating in very many cities, particularly in Central Europe and UK, because of the inevitable progress of aging. To overcome such problems innovative concepts of urban water management and innovative technology is urgently needed.

By the year 2004, the EU Commission (EC) in recognition of this demand initiated the foundation of the Water Supply and Sanitation Technology Platform (WSSTP), a new instrument of the EC to develop and implement innovative technology. Since its
foundation the WSSTP produced various documents which in the following will be reviewed and comprehensively discussed.

The concept of technology platforms

In March 2000, the Heads of State and Governments of the European Union, the European Council, met in Lisbon to discuss means to raise the economic competitiveness of the Community. The Council decided to take measures that would bring investment in research and technology to a level of at least 3% of the GDP (Lisbon Strategy, 2000). In the following, the European Research Area (ERA) was established with the intention to better coordinate the various research activities in Europe, and to promote efficient transfer of knowledge. The ERA Communication (2002) expresses a clear intention to prioritize bottom-up initiatives, and to stimulate greater involvement of the private sector in research and technology development (RTD). At this stage it was well understood that industry would invest in RTD only when the results obtained would benefit the companies committing themselves. To make sure that the return of investment is secured the concept of European Technology Platforms (EU Commission 2006a,b), was developed and offered to the private sector as an instrument of pursuing common interests of specific branches. The concept was well received by the private sector. Meanwhile 31 platforms are being active (Table 1).

Technology Platforms provide a framework of stakeholders, led by industry, to define research and development priorities, timeframes and action plans on a number of strategically important issues. Technology Platforms are supposed to play a key role in ensuring an adequate focus of research funding on areas with a high degree of industrial relevance.

Table 1 Technology platforms (status January 2007)

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<tr>
<th>Platform Name</th>
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<tr>
<td>Advanced Engineering Materials and Technologies</td>
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<td>Advisory Council for Aeronautics Research in Europe</td>
<td>ACARE</td>
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<td>Embedded Computing Systems</td>
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<td>European Technology Platform on Smart Systems Integration</td>
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<td>Food for Life</td>
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<td>Forest based sector Technology Platform</td>
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<td>Integral Satcom Initiative</td>
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<td>Water Supply and Sanitation Technology Platform</td>
<td>WSSTP</td>
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<td>Waterborne ETP</td>
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<td>Zero Emission Fossil Fuel Power Plants</td>
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Source: www.cordis.eu
by covering the whole economic value chain. They are considered to be powerful actors in the development of the European research policy, particularly with respect to the 7th Research Framework Programme (FP7). Last but not least, Technology Platforms are expected to address technological challenges resulting from the various facets of global change, and contribute to a timely development and deployment of new technologies with a clear commitment to sustainable development.

Each of the platforms is expected to work out an overview of the current state of technology in the respective branch and an identification of the most promising areas of innovation. A Vision Document was to be presented taking as a horizon the world as it may or should look like in 10, 20 and 30 years from now, respectively. Based on these visions the platforms are supposed to develop a strategy to meet the various imaginary targets (Strategic Research Agenda). And finally, a plan should be worked out which provides reasonable chances to actually meet the set targets (Implementation Plan).

The water supply and sanitation technology platform

In response to the increasing problems of water supply and wastewater management, both within Europe and world wide, the European Environmental Technology Action Plan (2004) (ETAP) was resolved in 2004 by the EU Commission. In particular, this plan calls for:

† strengthening and focusing RTD in the field of environmental technology,
† establishment of a specifically oriented technology platform,
† establishment of centres to test innovative technologies and demonstrate their well performance,
† innovative financial instruments to share risks,
† procurement of environmental technology,
† awareness-raising,
† targeted training, and
† responsible investment in developing countries.

In the framework of the development of ETAP a Water Issue Group was established in November 2002, and a multi-stakeholder consultation was held in March 2003. During this meeting the establishment of a Water Technology Platform was proposed. This proposal was eventually adopted by the EU Commission as part of ETAP (COM(2004) 38 final). In May 2004, during a specific stakeholder meeting, the Water Supply and Sanitation Technology Platform was established. Founding members were single companies, organisations representing utilities, manufacturers, engineering societies and science, and various NGOs. An EU Member States mirror was installed to make sure that specific national interests are properly regarded, and that research at Member State and at EU level complement each other.

As all the other Technology Platforms, the WSSTP was set up to contribute to the strengthening of the competitiveness of the European economy. In the specific case of the WSSTP the goal is to add a competitive edge to the European water sector and its capacity to develop and implement innovative methodology and technology. But the aims and goals of the WSSTP extend far beyond this purely economic centre view. The WSSTP is also to be understood as an answer to global challenges resulting from climate change, population growth and growth of urban areas, shrinkage of population due to decreasing birth rate and emigration, aging of societies, aging of infrastructural assets – just to name a view of the pressing problems of today. The WSSTP is to provide solutions to such problem areas – solutions which are economically sound, acceptable by the end-users and compatible with the general sustainability axiom. The WSSTP is expected to search for solutions which serve the present and foster the ability of future
generations to solve problems as they may develop in the years to come. Solutions are to be identified which serve people, industry and the ecosystem, both on the local and on the global scale.

In short, the WSSTP was set up

- to promote the development of readily acceptable, sustainable technologies,
- to initiate step changes of the technological capacity of the European water sector,
- to secure active participation of small and medium size enterprises,
- to enable active participation of developing countries and NGOs working on water supply and sanitation issues, and
- to strengthen competitiveness of the European water sector.

To structure the discussions and communication the Platform installed four thematic working groups (TWG 1 to 4) and a horizontal working group (HWG):

- TWG 1 Management of water resources at the water shed level.
- TWG 2 Specific concerns of urban and peri-urban areas.
- TWG 3 Specific concerns of water using industry and providers of water technology.
- TWG 4 Specific concerns of agriculture.
- HWG Cross-cutting issues.

The working groups were governed by a relatively small number of delegates responsible for the compilation of the documents to be delivered to the Board of the Platform, namely a Vision Document (VD), a Strategic Research Agenda (SRA) and an Implementation Plan (IP). These documents served as basis of the VD, SRA and IP which the Platform finally presented to the EU Commission. In the following, some of the aspects discussed in these documents are referred to and interpreted. All the documents produced can be downloaded from the web page of the Platform (www.wsstp.org) and used for further consideration and discussion.

**General approach of the working groups**

The members of the working groups agreed that the sectoral approach taken in the past to develop, install and operate water supply and sanitation systems needs to be replaced by an integrated approach. Surface and groundwater in a distinct water catchment area, water supply and wastewater treatment including treatment and utilization of bio-solids (sludge) are to be conceived as elements of a system which itself is embedded in the political, legal, economic, social and cultural framework prevailing but continuously changing in the region of concern. It was decided to use the concept of Integrated Water Resources Management (IWRM) proposed by Global Water Partnership (GWP, 2000) as a guiding principle.

**TWG 1 (Water management).** Focused itself on the question how to manage sustainably and for sustainable development the economic, ecological and social function of a watershed as a whole and its sub-systems. It was concluded that systems solutions are to be conceived, solutions which address all water aspects in a balanced manner. It was assumed that capacity building should earn highest priority. In particular, the understanding of processes needs to be further developed as well as strategies which enable good governance to become common practice.

**TWG 2 (Water for people).** Dealt primarily with problems of urban and peri-urban areas, but of rural areas were discussed as well. The group proposes intensive research and development activities

- to balance demand and supply in a world of rapid change (climate, population size, globalization etc.),
to ensure quality and security of water supply,

- to reduce environmental impacts caused by over-exploitation of natural resources, and by discharge of pollutants and poorly treated wastewater and sludge,
- to manage infrastructural assets wisely, and
- to improve efficiency of technical components and of management procedures.

The discussion in TWG 3 (Water in Industry) was focused on specific problems of water using industries (e.g., pulp & paper, textile, leather, food, metal, chemical sector). Also discussed were concerns of the private sector involved in supply of equipment, chemicals and installations, of consultancy and services. The members of the working group condensed their views in a vision statement that reads: 'In 2030 for the industry water is not a consumable or utility anymore, but a highly valuable asset: a vital element used in close conjunction with production processes. Industries want to be independent for the supply and further treatment of this critical factor, and demand water qualities up to their specifications, which are carefully tailored to suit product demands and quality standards. Closed water circuits are common, taking optimal advantage of the unique characteristics that water has. The demanding attitude of the industry has lead to the development of integrated, process- and product-specific technologies, developed in close cooperation between industries, and exported all over the world'.

To meet this ambiguous target TWG3 proposes intensive research

- to achieve sustainable water supply and consumption,
- to secure and improve product quality, process stability and cost effectiveness,
- to improve health and safety consequences, and
- to reduce environmental impacts.

The members of TWG 4 (Water in Agriculture) pointed to the fact that agriculture uses by far more fresh water than any other sector. Thus, savings within this sector, achieved by innovative methods and technologies, would have a tremendously positive effects. The working group investigated with great emphasis sub-sectors such as irrigated agriculture, rain fed agriculture, livestock production, aquaculture, and green-house technology. It was concluded that research initiatives should be focused on

- improvement of management practices (water management as well as management of agricultural practices including crop selection, crop design, and management of product distribution to consumers),
- reduction of quality and environmental impacts,
- enhancement of cost effectiveness, and
- increase of quality enhancing, reliable and sustainable production methods.

The HWG (Cross Cutting Issues) dealt with the role of non-scientific and non-technical factors in the process of solving problems of water shed management, water supply and sanitation. It was assumed that availability of the most advanced, most efficient and most cost effective technology may have only little value unless investment in water infrastructure gets prioritized at the local, the State and the supra-national level. Raising the political will to get action following verbal commitments appears to be of utmost importance. But it is not only poor governance to be overcome. In parallel, end-users are to exhibit responsibility for the value of water, water services, for the value of innovative technology and management practices. But how do we know what is acceptable for the end-users and what is not? Without including at the earliest possible stage the civil society in the process of decision making it remains questionable whether or not innovation takes hold.

The discussions in the HWG made very clear that an “enabling framework” is to be established simultaneously to the development of innovative concepts, methodology and technology (Figure 1). To enable innovative technology to materialize, the political,
legal, economic, social and cultural conditions characteristic of that region are to be understood and respected. This calls for a trans-disciplinary approach is to be exercised. Research is necessary in order to identify methods and means to build-up the enabling frame within which technological advances can flourish.

**Visions and recommendations**

After intensive discussions the Platform agreed to a catalogue of visions (VD) concerning short-, mid- and long-term developments. A strategic research agenda (SRA) was issued which contains recommendations on how to get the visions to become reality. And finally, a concept has been proposed to get the results of research and development materializes within a reasonably short time frame (IP).

**Visions**

The members of the Platform consider investments in water infrastructure and water services as an engine for accelerated economic growth, sustainable development, improved health and reduction of poverty. Prioritization of water research with the aim of developing innovative methods to manage water resources and technical assets in a sustainable way is assumed to provide positive impacts on the further development of the economies, the societies and the ecosystems not only in Europe, but in the newly industrialized and in the developing countries as well. It will be a sound answer of Europe to the Millennium Development Goals set by the United Nations. It will also be a sound answer of the engineering community to mitigate at least some of the impacts of global warming and climate change such as change of precipitation patterns, droughts, and floodings (Vision Document, 2005).

The Platform foresees a paradigm shift to take place from fragmentation to integration, from single use to multiple use of abstracted water, from discharge, send away, mixing and dilution practices to separate collection and to recovery of materials and energy for subsequent reuse in urban areas, industrial plants and in agriculture. Subsequently, economic development, social balance and ecological integrity can be secured,
particularly in areas where fresh water is a limited resource per se or because of the increase of local demands.

The shift of paradigm will also enhance the readiness of political decision makers, governmental and financial institutions, decision makers in industry and agriculture, and the general public to prioritize the issue of water shed management, water supply and sanitation. This will drive the process of merging the yet dispersed knowledge and expertise to the benefit of man and nature.

The Platform expects that within the upcoming 20 to 30 years the following achievements will be met.

- The various private sectors, scientific disciplines, and the world which finances, governs and uses water and water infrastructure will have joined forces and act in an integrated manner.
- Balance and wise management of the demands of all stakeholders will be common practice, taking local conditions into account while preserving aquatic and terrestrial ecosystems.
- Use of alternative resources will complement use of natural water resources while focusing on recovery and reuse.
- Water-based emissions and subsequent pollution of environmental bodies as well as detrimental health effects will get reduced.
- Comprehensive quality monitoring will be instrumental.
- Risks in the water cycle will be responsibly managed.
- Strong public awareness and confidence will lead to enhancement of the political will to invest in water research and the installation of water infrastructure.

Strategic research agenda

The Strategic Research Agenda which the Platform agreed upon (SRA, 2006) describes the research which must be undertaken to realize the visions. This agenda is not to be understood as a final product, however. An on-going stakeholder driven approach empowering all stakeholders (private and public) is necessary to define the future of research, and to share in the actual research and implementation activities.

A wide variety of factors – from global warming to aging societies – were identified which are likely to drive future developments in the water sector, and which call for specific, well defined and carefully executed research activities. The related challenges, if addressed proactively and responsively, could offer tremendous opportunities. The following four challenges appear to be most important with respect to research needs and innovation potentials. In the SRA (2006) the challenges are circumscribed as:

Increasing water stress and water costs. ‘Water stress can occur in any geographical region where the demand for water exceeds the bearing capacity of available water resources. Water stress may be primarily a water quantity issue, but it can also occur as a consequence of a deterioration of water quality or lack of appropriate water management. Transboundary issues add complexity to the problem. Water stressed areas need to be managed in such a way that the availability of good quality water is no longer a barrier to economic growth. This requires domestic, agricultural and industrial water users to be able to adapt their activities so that they can still function effectively and competitively without exceeding the limits of the available water resources, or compromising freshwater ecosystems. Increasing water demand and higher quality standards increase the costs for all users. Water saving technologies and water recycling/reuse technologies will become necessary’.
Urbanisation. “Global population growth and growth of urban areas as a result of migration poses an enormous, yet not thoroughly understood stress on local governments and on the world community as a whole. Population growth on the local scale causes a concomitant, often over-proportional increase of the demand for water and food, and an increase of wastewater generation and subsequent deterioration of the water quality in the respective receiving waters. More than that, migration leads – temporarily or not – to a loss of family ties, societal norms and subsequently loss of moral values. Unwillingness to pay for water services and subsequent reluctance of investors to build up and maintain water infrastructure are among many others the immediate consequences.”

Extreme events. “Global warming and the resulting change of climatic conditions has an impact on the rate by which glaciers, groundwater bodies and reservoirs get recharged, and upon the frequency and severity of extreme events (droughts, floods, heat waves or blizzards). These extreme weather events are devastating to humans and the economy – including water supply and sanitation services – as they threaten and disrupt normal life in vast areas and for long periods.”

“Many Rural and under-developed areas within and outside Europe are lacking significant infrastructure for water services. The lack of basic infrastructure makes these areas less attractive for economic activity and development with the effect that people tend to leave these areas. Water supplies, wastewater treatment and reuse for public, industrial and agricultural water demands in such areas need to be non-conventional, decentralised, easy to service and highly reliable. The technology needed must be affordable and manageable. Improvement of the water infrastructure may attract new developments in such regions and help to reduce migration to urban areas.

In the light of these daunting challenges but realizing the tremendous opportunities research and development initiatives may have the members of the Platform agreed that research on single issues in isolation would not lead to any breakthrough solutions. The distinctive and key innovative feature of WSSTP research is that it will adopt a systems approach and develop integrated solutions which address all the major issues and relevant interfaces within the system. This overarching systems approach will considers water supply, sanitation, water use in agriculture and industry and river basin management to be embedded into the local framework of laws, regulations, and into customs.”

Five areas of research and technology development have been identified to meet the challenges described above: Balancing demand and supply (1); Ensuring appropriate quality and security (2); Reducing negative environmental impacts (3); Making available novel approaches to the design, construction and operation of water infrastructure assets (4); Leading the way to the establishment of an enabling framework (5).

Implementation

Having agreed to a Strategic Research Agenda the question had to be answered how to transform the agenda into action. After intensive discussions it was decided to take a stepwise approach within a framework of action of Pilot Programmes and Implementation Cases (SRA, 2006, IP, 2007).

A pilot programme is defined as an “organizational structure that embraces the whole conceptualisation, feasibility, (including generic research and enabling technology development), prototype development, piloting, demonstration and deployment of cases; a structure set up to carry out precisely targeted and prioritized research that is defined by and tested in a number of real-life applications. The ultimate objective of a pilot programme is to develop new and innovative contributions to solving a major European
water problem through the formation of multi-facetted, multi-sectoral and highly competitive consortia” (SRA, 2006).

Each pilot programme will be composed of a number of “Implementation Cases” addressing major water issues in selected regions. The principal characteristics of an implementation case are described in the SRA as:

1. Systemic integrated solutions for large multiple issues, within the framework of IWRM.
2. Real-life situations, such that technologies and methods to be developed can be based on realistic situations and realistic data.
3. Geographically transferable, the technology and methods developed for the particular case will be – transferable to similar situations elsewhere.
4. Addresses urgent social/economic problems with potential for system optimization, i.e. problems that can benefit from optimization across the whole water system, rather than just optimizing for a single user.

Six pilot theme programmes have been identified to address the four major challenges for sustainable water management: Mitigation of water stress in coastal zones (Pilot 1); Sustainable water management inside and around large urban areas (Pilot 2); Sustainable water management for agriculture (Pilot 3); Sustainable water management for industry (Pilot 4); Reclamation of degraded water zones (surface water and groundwater) (Pilot 5); Proactive and corrective management of extreme hydro-climatic events (Pilot 6).

To mitigate water stress in coastal zones the Platform identified needs for research and technology development in the following areas:

- prevention of deficit, use of alternate water resources and artificial recharge
- mitigation of salt-water intrusion
- monitoring network, prevention and control of pollution and contaminants, forecasting network
- optimization of borehole infrastructure for ground water abstraction and prevention of saline water intrusion (positioning, design and operation)

Concerning sustainable water management inside and around large urban areas the following RTD initiatives were identified as most important:

- balancing water demand and supply.
- ensuring water quality and security.
- protecting the environment and reducing the ecological footprint of big cities.
- designing, managing and maintaining sustainable infrastructure assets.

To achieve sustainable water management in agriculture the following key actions are described in the SRA (2006).

- Safe use and reuse of water in agriculture. This calls for the design of new technologies and management methods for e.g. ‘cascading’ systems and safe reuse of treated wastewater.
- Improvement of water use efficiency at different scales (local, regional, economic branch). This needs the development of new water management tools, such as integrated models and decision support systems at basin level. Further on, the improvement of sustainable production methods (including options for organic farming) at farm level is required as well as improvement of water use efficiency and water productivity.
- Reduction of diffuse pollution caused by agrochemicals, nutrients and manure. This will require the development of cost-effective, easy-to-access and adaptive technologies for precise dosing and application: agro-chemicals, fertilization and semi-liquid manure spreading.
According to the authors of the SRA (2006) the pilot programme on sustainable water management in industry should focus on clusters of industries which have similar problems rather than at an area or site. The subjects can be related to the type of industrial activity (sector related), the use of water for specific purposes (e.g. cooling water) or to any existing non-technological barriers (e.g. legislation, culture). Implementation cases will focus on

- water fit for use
- closing water cycles
- reducing environmental impact and water costs
- water quality monitoring and control
- control of biofouling, scaling and corrosion sectors of industry using large amounts of water.

The pilot programme on reclamation of degraded water zones builds upon to the European Water Framework Directive (2000) resolved by the European Parliament on October 23, 2000. In this area a wide variety of research needs were identified and described in the SRA (2006). Among these are the following.

- Development of techniques to map the state of degraded water sources systems, to derive the cause-effect relationships that have led to the degraded state, to generate information that can support transparent decision making between all stakeholders, to plan scenarios for system restoration, covering physical, ecological, social and economic benefits and costs, and to mitigate specific adverse impacts.
- Development of optimal strategies and Decision Support Systems.
- To guide optimal investment strategies and/or optimal allocation of water resources.
- To provide integrated forecasting and Early Warning Systems, using real-time data, integrating hydrological parameters, pollution loads, temperature, bacteria and water quality.
- To demonstrate the effectiveness of such methods in a limited number of actual implementation cases.
- To derive from these cases ‘lessons-learned’ and ‘best practice’ guidelines for possible application in similar cases in Europe and outside Europe.
- To disseminate this information to stakeholders involved in such similar cases.
- To develop appropriate treatment technologies to ensure that discharges to the environment can reliably meet the required standards.

Finally, the pilot programme on proactive and corrective management of extreme hydro-climatic events calls for RTD such as:

- forecasting the hydro-meteorological aspects
- warning systems, monitoring network and crisis management
- long term flood mitigation
- short and long-term drought management
- regional scale flooding
- local scale multiple hazard management
- drought and river flow management

As mentioned above, each pilot programme will accommodate a number of Implementation Cases (IC) of which some were identified in the SRA (2006). Each of the ICs will have geographical coverage within Europe, and should have a proper commitment from individual problem owners (e.g. national or local governments) and from industrial partners. Each IC should organise its own financial engineering scheme, and should capitalize on the participation of small and medium size enterprises.
Future organisation of WSSTP

After having finalized the Vision Document, Strategic Research Agenda and the Implementation Plan the Platform will now enter into a operation and application phase. The proposed research agenda is now to be executed. Research, development of pilot technologies and demonstration of the well performance of the developed methods will mostly be financed by the members of the platform. Research projects will hopefully be co-financed through the 7th Research Framework Programme (FP7) and by the customers who will profit from the application of innovative methods and technologies.

To be successful the Platform needs an organisational structure different from the one applied during the initial phase. The following assumptions are described in the SRA (2006) and in the IP (2007) as guidelines for the development of the new organisation structure:

† “A bottom up approach, to allow and stimulate the formation of a multitude of individual consortia, involving multiple stakeholders from various competence areas which will involve themselves in the realization of demonstration cases.”
† “Strong coordination capacities, to align the different initiatives, to stimulate cooperation for the formation of consortia, and to avoid overlap or duplication of activities and subjects, within pilots and between consortia.”
† “Competent financial engineering support, to address the needs of the different initiatives with a clear view on European, national and local financing mechanisms in order to create and maximize financial opportunities.”
† “Efficient and flexible governance, minimizing overhead and allowing maximal involvement of interested parties in a open and transparent manner.”
† “Effective support and outreaching behaviour, to involve the optimum number of relevant stakeholders, to maintain dynamics, and to secure follow up actions and supply managerial assistance to all levels.”

Although the consortia involved in the execution of the ICs will be completely independent with regards to their organisation and individual responsibilities, it is crucial that these consortia are aligned at an organisational level and also for knowledge and performance management. The broad network that will develop under the umbrella of the Platform, will have an invaluable potential to create and demonstrate the innovative solutions necessary to help solving problems arising within Europe and outside of Europe.

WSSTP is not yet but will become in 2007 a legal “not for profit” association under Belgium law. It will be composed of corporate, associate and honorary members, and it will be governed by an Executive Board supported by a secretariat in relation with the existing Member States Mirror Group. Financing of the various projects (pilot programmes, implementation cases) will be leveraged by a Financial Engineering Committee. The Pilots Coordination Committee will be responsible for organisation and quality control of the pilot programmes, and a number of Pilot Advisory Panels will be responsible for the Implementation Cases within the Pilot Programmes.

Summary

Intensive discussion of the various working groups and at the Board level of the Water Supply and Sanitation Technology Platform led to the conclusion that alternative concepts, innovative methods and novel techniques are required to cope with the challenges posed by factors such as climate change, migration into urban areas, increasing demand of comfort and public health, and aging of technical assets.

Investment in water research and development of methods and technologies appears to be of crucial importance to secure economic prosperity, social stability, health and function of ecosystems.
The complexity of the problems to be solved requires an adequate response. Water supply, wastewater treatment (sanitation), river basin management, and concerns of regulators, financial institutions, educators and the civil society are to be treated as elements of an integrated system. Time is ripe to replace sectoral by consequently executed integrated approaches.

In response to such challenges WSSTP proposes a hierarchic structure to promote effectiveness of research and development of innovative methods and technologies. This structure encompasses a number of pilot programmes each containing a distinct number of implementation cases to study the efficacy of solutions under near to reality conditions. The intention is to favour basic research simultaneously with practical application on a case by case basis but with the condition that the results obtained are transferable to similar situations elsewhere.

Readers interested in learning more about the content of the documents are advised to download the material from web page of the Platform (URL: http://www.wsstp.org).

References