Water
safe, strong and sustainable

European vision for water supply and sanitation in 2030

Water Supply and Sanitation Technology Platform

Version, October 2005

About this vision

In January 2004 the European Commission adopted the European Environmental Technology Action Plan (ETAP). The objective of ETAP is to remove obstacles and to release the full potential of environmental technologies for environmental protection, while contributing to competitiveness and economic growth.

ETAP has identified water supply and sanitation technologies as a topic to be supported through a European Technology Platform. The mission and related objectives of the *Water Supply and Sanitation Technology Platform* (WSSTP) are to strengthen the **competitiveness** and the potential for technological **innovation** of the European Water Industry. The WSSTP will through the formulation and development of a vision, a research agenda, and an implementation plan meet global challenges and regional demands to ensure **safe, secure and sustainable** water and sanitation services, for the benefit of society and the environment, within the framework of integrated water resources management.

The European water sector is highly fragmented: water resources, water supply and sanitation/wastewater have often been managed locally. This fragmentation is an obstacle for developing a research strategy for a competitive water sector. Overcoming this obstacle is one of the important aims of WSSTP.

This *Vision Document* was conceived and drafted by five working groups, consisting of water sector experts and representatives of water sector stakeholders. The vision paints a picture of what could be achieved by 2030 if resources for research and development resources would be made available and targeted to respond onto the issues and challenges that the European water sector is facing. The vision identifies research needs on a high level, to be developed further in more detail in a the document *Strategic Research Agenda*.

It also addresses the delivery of the mission of WSSTP. Proposals how to deliver the research will be covered in the third document, i.e. the *Implementation Plan*.

One of the major achievements of the WSSTP is that only after 6 months the very fragmented water sector has been able to produce a common vision on their future. This unique cooperation and coordination of multiple stakeholders further develops during the discussions on the Strategic Research Agenda.

We, the experts and stakeholders within WSSTP, intend and hope that this vision will become a guideline for future research and development for the European water sector.

We would welcome your suggestions for inclusion in the new version of this document.

Contact: www.wsstp.org

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2005 - The European water sector today and its challenges

Water is the basis of life. We were all taught this in school and we all take water and sanitation for granted, but few people realise how tremendously important advanced water supply and sanitation services really are, with respect to both, economic development and safeguarding health and survival. To maintain or to (further) develop a prosperous economy, clean water supplies and safe disposal of sewage are essential. People need water for their physical well-being, not only to drink or do their washing, but also as a resource for agriculture and industry. Production of food, materials, clothes and other necessities is impossible without water. Millions of people are displaced; many perish for lack of water or endure regional conflicts over water resources.

Investments in water are an engine for accelerated economic growth, sustainable development, improved health and reduced poverty. The Stockholm International Water Institute at the United Nations in New York reports at a meeting in 2005 that poor countries with improved access to water and sanitation services enjoy much higher GDP growth than those without.

Global data on water

Approximately 97% of water in the world is seawater and 3% is fresh water. Of the fresh water only 13% is accessible, which is 0.4% of the total amount of water. Today more than 2 billion people are affected by water shortages in over 40 countries. Two million tons per day of human waste are deposited in water courses. Half the population of the developing world are exposed to polluted sources of water that increase disease incidence. Of all natural disasters in the 1990's 90% were water related. Some 263 river basins are shared by two or more nations. The increase in numbers of people from 6 billion to 9 billion will be the main driver of water resources management for the next 50 years.

Those who have power have water, those who have water have power. All over the world water is in great demand: everybody wants and needs it because it is the basis of life. The World Water Council estimates that domestic water use worldwide will increase by about 40% for the next two decades. Because of the ongoing migration the demand for safe drinking water and proper sanitation is sky rocketing in urban areas where 65% of the world population will live by the year 2035. Some 17% more water is needed to grow food for a growing population. In addition, water demand for industry and energy generation will increase rapidly. Unfortunately, water also is a limited and vulnerable resource. The use of water affects the quality of this resource itself as well as the environment and nature in a broader sense. It is therefore essential to manage the supply and disposal of water wisely to ensure that clean water continues to be available to us and future generations, and at an affordable cost. Rapid climatic change might lead to strain and shortages, including in regions where this has never been observed before.

Water and sanitation for people

Worldwide over one billion people do not have safe drinking water within a fifteen minutes walk of their homes. Every eight seconds someone dies from drinking contaminated water. Europe, most parts at least, is privileged in comparison with large parts of the rest of the world: drinking water supply and sanitation facilities have been available here for centuries. Over 90% of European citizens are provided with piped water supply. In Northern and Central Europe 80 to 90% of the population is connected to wastewater treatment plants; in the south and in the new Member States this percentage is 30 to 50%. Throughout Europe over the last two decades water and effluent quality have greatly improved –at a significant cost, though. Water fees in most European countries have risen and will continue to rise.

Water supply, stormwater drainage, wastewater collection and treatment, as well as quality and quantity management of natural water resources need to be efficiently secured or, where necessary, improved. Only through a paradigm shift from fragmented towards integrated urban water management economic development, social balance and ecological integrity can be secured.

Water in agriculture and nature

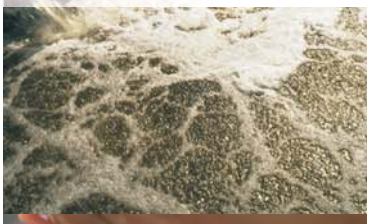
Water is essential for ecosystems and agriculture. Large quantities of water are used for irrigation. Half of the land in the European Union is farmed, mostly by small and medium sized or family run enterprises. Worldwide, agriculture accounts for two thirds of all water used – mainly for irrigation. In Europe, about 30% of the abstracted freshwater is used for agricultural purposes, and up to 75% in Southern Europe. This has a strong impact on nature and water resources. Intensive use of land and water for agriculture significantly contributes to diffuse water pollution through livestock excreta and inappropriate use of fertilisers and pesticides.

Water and sanitation for and in industry

Water is of vital importance in its different functions: transport, heat exchange, cleaning, washing and as raw material to industrial users. Major water using and/or discharging industries are pulp & paper, textile, leather, oil/gas, chemicals/pharmaceuticals, food, energy and metal (including steel). These industries are of great economic importance, based on annual turnover (> 1,500 billion €), investments (> 150 billion €) and their output which reaches 20–50% of the respective world production. More than 7.5 million people are working in about 220.000 companies in these sectors, over 90% of them in SME's. Water related costs can reach up to 25% of the total production costs. These costs will increase due to stronger demands to product quality and safety and more stringent legislation. In addition, a great number of companies, many of them SMEs, produce appliances needed to provide high quality water services to people, industry and agriculture. Given the global needs these companies have the potential to become be major competitors on the international market.

Organising water supply and sanitation

Competitive strength of the European water sector



In 2030, the position of water for industry has changed drastically. Water is not a consumable or utility anymore, but regarded as 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 led to the development of integrated, process- and product-specific technologies, developed in close cooperation between industries, and exported all over the world.

The provision of water supply and wastewater services in Europe has traditionally developed along ad hoc, sectoral, regional or national lines. Because of the ever increasing demand for improved services and the international business opportunities, this approach is no longer viable. EU directives on drinking water, wastewater and bathing water, along with the Water Framework Directive, shall ensure long term availability of this essential resource for all European citizens. These directives in themselves are major drivers for change of the nature and the structure of service providers.

During the last three decades the European water industry has built up a great competitive strength based on

- innovative supply and sanitation concepts, technology, knowledge and skills;
- availability of financial resources;
- wide experience in many industrial sectors;
- close cooperation with European R&D organisations and universities, including active involvement in R&D-projects in the various EU R&D Framework Programmes;
- expanding markets in the EU and outside;
- EU policy on sustainability, environment and energy;
- a broad spectrum of efficient governmental structures, tailored to specific local needs.

The three largest companies providing water supply and sanitation services in the world are European. In addition, a large number of European SME's export their expertise and equipment across the world. Several European firms and institutes have prominent positions in the open market for major water and sanitation studies and implementations.

The European water sector is a major economic player (1% of GDP) with a turnover in the EU of about 80 billion Euro and an average growth rate of 5% per year, compared to 2.5% per year average growth rate for the EU economy.

Challenges ahead

Today, utilities and private companies in EU countries provide largely adequate water and sanitation services to people, industry, agriculture and nature and – in doing so – have created thriving businesses that export their knowledge and skills to the world. However, tremendous forces of change are at work. Changing demands from people, society, industry and agriculture are only some of the many factors that will influence water and sanitation services in the future.

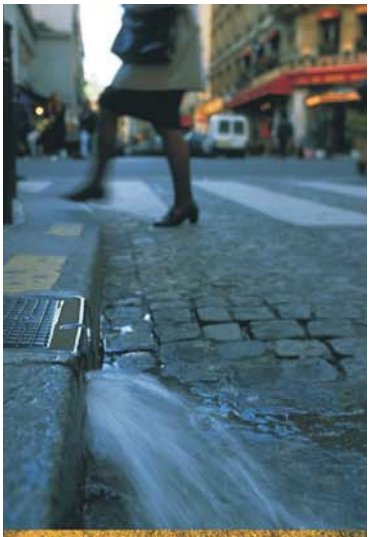
Population growth and movement, particularly in urban and peri-urban areas will increase demands for water supply and sanitation services. These cannot be met fully from traditional (and relatively clean) sources or with existing technology. In various European regions there is already a **shortage of readily treatable water resources**.
This shortage will further increase due to **climate change, pollution and competition between water users**. Fewer but more intense rainfall events will make water management more difficult. Limited availability of easily treatable water will require advanced solutions to provide water for people, industry and agriculture. Groundwater resources are already under pressure, for instance from salt water intrusion and pollution.
In some areas groundwater tables have dropped. The strain on groundwater resources is particularly acute in Greece, Spain, Italy, Southern France and in Southeast England. Alternative resources have to be developed such as seawater, brackish groundwater and treated wastewater. Reducing water consumption is also a way to balance supply and demand of water. New **water technologies** are an important part of the answer to this challenge.

Climate change will make it necessary to adjust design and operational procedures, particularly because of increased occurrence of floods and droughts. The EC Joint Research Centre reports that annual precipitation has increased by 10 to 40% in the last century, while the Mediterranean basin has experienced up to 20% reduction of precipitation. Portugal, Spain and France reported in 2005 the worst drought for decades. Flood waters will mobilise and distribute pollutants and pathogens.

More frequent natural disasters require the sector to deploy a 'quick reaction force' that can provide immediate, elementary water supply and sanitation in afflicted areas.

Professor Peter Cullen one of Australia's leading land and water experts believes that up to 10% of the farming land in Australia is now unsustainable because of recent droughts. With the expected climate change it is not getting any better. This has a profound effect on the Australian economy. Another drought could wipe a third of Australia's forecasted 3 percent economic growth for the next financial year.

Australia loses 1000 to 2000 farmers per year and this number is expected to increase due to climate change. Technologies that capatalise on moisture and allow a rapid response to rainfall are helping farmers to deal with dry conditions.



Many parts of Europe's water supply and sanitation systems are over one hundred years old. This **infrastructure is deteriorating faster than it is rehabilitated**. In some European countries, losses from water supply systems reach the amount of the water supplied – water which has already been pumped and treated. Water pipes burst and sewers collapse, creating nuisances and sometimes even casualties. Total rehabilitation costs are so high that necessary projects are postponed, thus creating even larger problems in the future.

We need to create the political **acceptance to maintain our water infrastructure**. At the same time, we need serious R&D on the question whether **viable alternatives exist to today's water and sanitation systems**.

As water resources become scarcer, we are ever more dependent on their quality. We need to guard them and our water supply infrastructure, from **accidental and deliberate pollution and remain vigilant for threats from new pollutants**. Recent events have shown that centralised water supply and sanitation systems are vulnerable for **sabotage**. Innovative decentralized solutions combined with water re-use should be considered as an option to quickly establish water supply and sanitation in rapidly growing urban areas of developing countries.

Required are new technologies, but also new instruments of financing, governance and stakeholder empowerment including the civil society and advanced education.

Customer expectations regarding all service industries are increasing. The water sector, too, must continuously **improve its efficiency** to meet those expectations. Rising expectations, ageing assets and the need to meet higher standards while still remaining affordable, will drive the sector towards greater efficiency.
The impact of water and sanitation services on the environment requires new tools and methods to **protect the environment**, for instance through the Water Framework Directive. For new Member States, existing water quality and wastewater directives prove a challenge.

Sustainable approaches to the development of water projects are needed to deliver social, economic and environmental benefits. These demands are rapidly becoming pressing issues in the new Member States and in developed and developing countries outside Europe.

Technologies need to be properly integrated with social, economic and organisational measures. Until now a sectoral approach to water resources management has dominated and is still prevailing. Many actors are not fully integrated, and many stakeholders are not involved. This has led to fragmented and un-coordinated implementation of policies and often leads to inefficient or even to unsustainable solutions.

To achieve sustainability, Europe has to apply an integrated and participatory approach for water resource management (IWRM).

The European water sector needs to develop **"curiosity for innovation"**. The water industry is too slow in studying and eventually adopting new technologies.

The World Water Council states: "Without major technological innovations there is little hope of bringing the water equation into balance. There is no doubt that many technological changes can help improve services for millions and reduce the stress on water systems around the world."

To remain in the forefront of this competitive business, innovation skills are essential. The sector must **learn to innovate** and should enhance its capacity to cope with economical, demographic, behavioural and climatic changes.

The knowledge and experience of water supply and sanitation that is available in Europe is dispersed across a large number of small utilities and enterprises. Although not directly visible to the outside world, a considerable body of knowledge has developed in designing and optimising water infrastructure and management systems over the past 150 years. This diversity of solutions adapted to local conditions is in Europe is a very valuable asset to conquer the world market. This value could be considerably enhanced if the dispersed knowledge could be networked and synergies thus be mobilised.

Forces of all actors have to be combined to merge the yet dispersed knowledge and expertise of European water professionals, and use this treasure to enhance the competitiveness of the European water sector.

Beyond Europe - the Millennium Development Goals

The challenges described above concern Europe itself. At the Millennium Summit in September 2000 the Member States of the United Nations (UN) reaffirmed their commitment to working towards a world in which sustaining development and eliminating poverty would have the highest priority. From the agreements and resolutions of this Millennium Summit and other world conferences organised by the UN in the past decade, the so called 'Millennium Development Goals' (MDGs) evolved. Water plays a prominent role in all of these goals.

The amount of deaths attributed to unsafe drinking water is over 3 million per year, greater than the number of deaths caused by AIDS. Clean water is a prerequisite for the treatment of diseases; in developing countries 80% of diseases and 30% of deaths are water related. More than 1 billion people around the world lack safe water and 2.4 billion have no access to sanitation. At the World Summit in Johannesburg in 2002 the European Union launched the EU Water Initiative to contribute to reaching the Millennium Goals. It aims at rallying the EU and its Member States, the civil society and financial

institutions, as well as the expertise and investment potential of the EU's water industry.

Halving this figure in the next 10 years means that every day water treatment and distribution systems have to be built to serve 200,000 people. Similarly, every day sanitation systems need to be established for 900,000 people. It is questionable whether our traditional concept of water supply and sanitation can be implemented to serve that many people within this short period of time.

European diversity and ingenuity is creating innovative techniques and services such as separate collection of used waters, source controls, recovery of valuable materials and re-use. Through these approaches the MDGs might be reached faster than through implementation of traditional concepts and technologies.

What lies ahead of us if no concerted action is taken

We are often faced with the question what difference the WSSTP will make. The impact is made much more visible by describing what we could fear from a status quo in the water sector without collaborative initiatives like the WSSTP. The highlights of a worse case scenario could be:

- Safe and uninterrupted water supply and sanitation services are seriously endangered.
- Domestic water use will increase significantly.
- Due to ongoing migration and increase in world population the demand for safe water and proper sanitation will sky rocket especially in urban and peri –urban areas.
- The demand for water in food production will continue to grow.
- In addition, water demand for industry and energy generation will increase rapidly.
- Rapid climate change might lead to strain and shortages also in regions where this has never happened before.
- Extreme events will continue to surprise more and more areas without a proper and coordinated emergency response being available.
- Water fees in most in European countries will rise even further.
- Significant proportion of farming land will become unsustainable.
- Intensive use of land and water for agriculture significantly contributes to diffuse water pollution.
- Water related cost in industry will increase due to stronger demands.
- (Transboundary) river basins will not be managed in an integrated and sustainable way and downstream users such as agriculture and nature will suffer.
- No significant contributions will be made to the MDGs.
- The competitive position of the European water sector will decline.

2030 - A European vision for the water sector

By 2030 the European water sector is the leading centre of expertise for providing safe, clean and affordable water services while protecting nature. The sector applies a variety of new integrated approaches to solve diverse and interlinked problems. It uses efficient and sustainable technologies which enhance the social, economic and environmental well-being of the community as well as the health and well-being of the planet and its peoples.

We strongly believe that the European water sector will lead the world by 2030 having implemented the following principles:

An integrated and participatory approach to water management

In 2030, as a result of the execution of intra-, inter- and trans-disciplinary research and straightforward implementation of the achieved results, the Water Framework Directive and the EU Water Initiative are implemented. Water resources development and management is based on a participatory approach: users, planners and policymakers are involved at all levels. Lost knowledge on traditional forms of culturally embedded water resources management and treatment is revived. Throughout Europe water and sanitation are managed as integral parts of the water cycle, based on river basin scale. The European water industry and its professionals have expanded their capability to deploy integrated solutions and intend to maintain this approach.

... that cuts across individual sectors and disciplines....

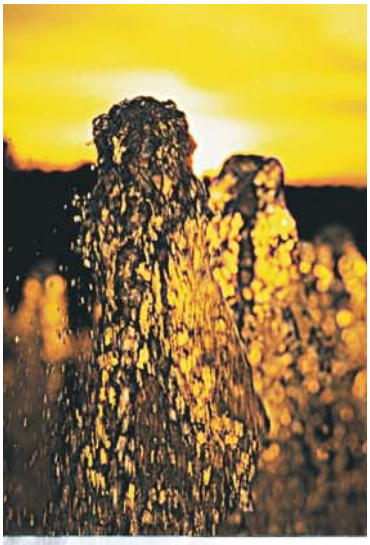
The European water industry has expanded its capability to deploy integrated solutions that cut across individual sectors (intra-disciplinarily) and disciplines (inter-disciplinarily), and involves the civil society in the process of defining research goals and implementation strategies (trans-disciplinarily), thus achieving more efficient and more economic solutions than possible within separate sectors.

... balances the demands of all stakeholders ...

Development and implementation of water projects are guided by the concept of Integrated Water Resources Management (IWRM) to ensure a proper balance between the demands of the various stakeholders (people, industry, agriculture and nature). There is a thorough understanding of the interrelations between these demands and the 'good status' of the total water system of a region. 'Water for nature' has become an essential theme in the management of water resources. Tools and models are available for decision makers to allocate water to the various purposes.

... and is founded in strong public awareness.

The public is fully aware of the importance and impact of changes in aquatic ecosystems. It insists that alternatives have been considered and that the demands of all water users, including nature, are treated in an equitable way.



Demand and supply are balanced...

Pro-active research, demonstration and implementation has paid off for the water sector and its competitiveness, but has also proved to be beneficial for Europe as a whole, its economy and its social and ecological integrity.

... by managing demand ...

In 2030 governments require efficient use of water in Europe's water scarce areas. Well defined and thoughtful execution of cross-sectoral research and implementation involving the civil society at all stages has led to a society "knowing about water". Consumers understand the importance of water for their own well-being, they see the implications of water use and avoid wasting it. As a result of combined technical innovation and enhanced public awareness and readiness to take responsibility each household uses water saving equipment and appliances such as taps, toilets, showers and washing machines that are produced to reduce water consumption. The public supports recovery and re-use concepts. Water consumption by Europe's households is at a sustainable level, while water services are affordable. The use of water to transport human waste is significantly reduced.

Water consumption in industry is minimised through tailor-made water management and treatment concepts and closed water loops. Leakage from water mains and sewer infiltration and exfiltration are minimised.

In agriculture crop water requirements are accurately estimated, enabling water saving in irrigated agriculture and green houses. Technologies that capitalise on moisture and allow a rapid response to rainfall are developed to help farmers deal with dry conditions. Sensors are used to control irrigation schedules and detect leaks in the irrigation system. In rain fed agriculture soil water management has improved. More use is made of drought tolerant crops to address the high variability in rainfall occurrence , intensity, duration and depth. Improved methods have been developed for river or groundwater recharge with treated wastewater.

... by exploiting alternative resources ...

Re-use of water for non-potable applications is the norm in water scarce areas. Non conventional and new water sources are developed. Seawater as well as extensively purified wastewater is used as additional resources for fresh water.

... and clever use of rainwater.

Rainwater is captured via the most economic means, purified and stored effectively, either locally in vessels, reservoirs or in the groundwater aquifer. These systems also cope with extreme events due to changes in the climate.

Regions have learned to live on their natural water resources. Water cycles are closed in the smallest sensible loops. Long distance and inter-basin water transfers are reduced.

Quality and security of water supply and sanitation are ensured ...

...through managing risks in the water cycle...

In 2030, implementation of research on technical and non-technical aspects of water supply and sanitation has led to major achievements with respect to managing risks. Consumers appreciate and enjoy an uninterrupted supply of clean wholesome drinking water. Effective risk management assures water quality within the framework of innovative and cost-effective legislation. Detailed knowledge and reliable tools are available to describe mechanisms and processes at the physical interface between groundwater and surface water, such as flows and the transport and fate of contaminants in subsurface systems. Reliable tools and protocols predict the effects of climate change on the availability and quality of surface and groundwater.

... better treatment technologies for all kinds of water ...

By 2030 new, reliable treatment technologies have been developed, tested and optimized for different economic, climatic and cultural conditions. They are used for management and production of drinking water, industrial process water and the treatment of wastewater. More robust processes treat polluted water and prevent the deterioration of water quality in water distribution systems. Advanced technologies enable recovery of valuable materials and energy from wastewater, and water re-use.

... comprehensive quality monitoring ...

Quality monitoring and control at critical points in water cycles in supply, industry and agriculture are common practice in 2030, helping to safeguard the quality of water and food. In case of an accident or even deliberate tampering, the cause can quickly be identified by means of advanced information technology, the impact minimised and reoccurrence prevented.

... and an emergency supply available ...

Compact and mobile systems are available for providing water supply and sanitation services in case of emergency situations all over the world.

... creating a strong public confidence.

As a result of the better mathematical models, numerical simulation tools, and cross-sectoral decision support systems that have been developed by 2030, it is easier to communicate uncertainty and risk information to stakeholders and water managers. Transparency and reproducibility are ensured; in the water management decision process they facilitate the dialogue between political decision makers, water managers, stakeholders and analysts. Improved approaches for crisis management, including understanding and managing consumers trust and perception are standard. Public confidence in the water sector is strong.

The environmental impact of water supply and sanitation services is reduced...

... by regarding water as a self-sustaining cycle ...

By 2030, investment in research and implementation led to a significant decrease of the need to apply technical means for securing the good status of aquatic environments. Throughout Europe the water cycle is commonly understood as self-sustaining, and the environmental impact of water supply and sanitation services is reduced. Waste water is efficiently collected from households, trade and industry, treated and meets quality standards that allow re-use or discharge to the environment. Water cycles in agriculture and water using industries are closed. Valuable components are abstracted and re-used.

... reducing water-based emissions ...

Improved methods are available to identify and remove (new) environmental threats and pollutants from wastewater, before it is disposed. Water-using industries have reduced their water-based emissions, including thermal emissions. Closed water cycles are implemented, without affecting the process or the quality of the final products. Thanks to novel stormwater management methods developed and implemented in urban areas overflows from sewer systems are minimised. Also pollution from diffuse sources is reduced as novel agricultural practices and land use options have been developed and implemented. Models are used regularly to predict the effects of land use changes on discharges, groundwater and water quality. In agriculture more rational use of water, agrochemicals, minerals and other compounds are adopted to minimise emissions and to safeguard the environment. Food utilisation is optimised to minimise manure production and diffuse emissions. Non-beneficial emissions of biotic and abiotic substances to the environment are minimised. Greenhouse farming has become a sustainable option as a result of the improvement in water and energy management and the reduction of emissions. In urban areas hazardous runoff is treated to prevent pollutants to enter the water cycle.

... making usable products out of wastewater and sludge ...

Materials from water and wastewater treatment are recovered and returned to the cycle of materials. Improved wastewater treatment and recovery methods are available that extract valuable nutrients like nitrogen and phosphate. The organic material and nutrients in sewage sludge are fully utilised in areas where soil is depleted or subject to erosion. The sludge produced is transformed into usable products for agriculture, industry and landscaping without any risk to human health or concern about environmental pollution. CO_2 emissions will be minimised.

... reducing energy consumption ...

Sustainable treatment methods reduce energy and chemical consumption and the production of sludge. New equipment features higher efficiencies and lower energy use. The energy of sewage sludge is increasingly used. Industrial effluents are used for heating.

... and taking local conditions into account ...

Use is made of extensive knowledge of how water abstractions and/or physical flow discontinuities (e.g. dams) affect the local environment and land use. Effects on e.g. agriculture or nature are taken into account and mitigated when necessary. Livestock production has developed into a sector consisting of both intensive and extensive farming, depending on local environmental conditions and the requirements of the Water Framework Directive.

...while preserving nature.

Improved knowledge and models predict the effects of e.g. water abstraction or water-based emissions on the ecological status. Water protection and the agricultural sector have an important role in nature preservation.

Assets are managed cost-effectively and efficiency is improved ...

... through better understanding of all costs ...

As result of extensive research, development, demonstration and implementation, in 2030 the values of water and ecosystems are perceived by stakeholders. All external costs are included explicitly in every economic analysis related to water management. The complete water supply and sanitation upstream-downstream chain from intake of water at the sources to discharging used water, including treatment and pumping plants as well as pipe networks and other assets, are managed as an integrated system. There is better understanding of the costs of all components in the chain, including the impact on the environment and of society as a whole. Benchmarks with appropriate performance indicators and service standards contribute to this understanding.

... risk analysis based maintenance and replacement of assets ...

Because of the aged water supply and sanitation infrastructure assets are rehabilitated at an appropriate rate. Innovative rehabilitation solutions are efficient and cause only little disturbance. Based on a detailed understanding of the failures of the past, rehabilitation measures are targeted where they are needed most. Improved methods are used to assess the condition and remaining life of assets, taking whole life cost into account. Novel treatment processes are retrofitted into existing plants. Water infrastructure rehabilitation is incorporated into the initial planning phase of a development to facilitate future management.

What is needed to achieve competitiveness and sustainability? What is needed to meet the Millennium Development Goals?

We need...

... and better materials and technology ...

New approaches reduce the life cycle cost of new assets. New materials and equipment improve durability, reduce maintenance costs and prevent water quality deterioration (and comply with the requirements of the harmonised European Acceptance Scheme EAS).. The water supply and sewage systems operate to high levels of service, reliability and security while remaining efficient, affordable and competitive. Intelligent methods for continuous monitoring and automatic operation reduce staff costs. Low cost ways to treat a variety of raw water qualities are developed. By 2030 also cost-effective water technologies for management and treatment of industrial process water and wastewater are developed and implemented.

... that takes economic, environmental and societal impact into account.

Social, economic and environmental considerations underpin water resources development and management. Respect is paid to the specific concerns and demands of the local situation (cultural heritage, economic bearing capacity and climate). New technologies and related equipment are based on new principles and combined with new process concepts and new system solutions that are knowledge based, competitive, sustainable, reliable, cost-effective and tailor-made.

Economic and ecological improvement can only be achieved by combining innovative, leading-edge technology with good governance and participation of local communities - particularly the women - in the decision making process. The appropriate modification of political, legal, institutional, financial, educational, technical and social conditions will bring about sustained and effective change by 2030. Engineers can accomplish a lot, but to get sustainable solution implemented a inter- and a trans-disciplinary approach is indispensable.

The visions described above materialises as Europe adopts and executes a unique cross-sectoral approach.
Key components of this concept are **integration** of:

- water supply, sanitation, re-use, and regional water resource;
- technological, economic, social and cultural aspects in research, development and implementation projects;
- Private enterprises, utilities, governmental institutions and science in the design and execution of projects.

... reinforced stakeholders consultation ...

The model of 'this is governance business' is replaced by a model in which stakeholders participate at all levels. Better use of all types of knowledge is promoted, scientific and indigenous knowledge to enhance community based participation in water resources management in rural and peri-urban areas.

Stakeholders are actively consulted on water and sanitation issues, leading to an increase in public awareness and acceptance. Better decisions are made because the decision-making process is enriched with relevant viewpoints.

... continuous risk evaluation ...

Risks involved are monitored constantly, in view of the high importance of water and sanitation infrastructure and the importance of avoiding water system failures. These risks are translated into a language that allows stakeholders to perceive them appropriately.

... effective and efficient transfer of information ...

An effective and efficient transfer of information is set up between key stakeholders, including researchers, practitioners, decision makers and representatives of the civil society. The EU Water Initiative promotes user-friendly compilations of major findings from previous research, this could be considered as a step in the direction of promoting public repositories of scientific data and knowledge for free access to citizens.

... standardisation ...

A European system of standardisation and certification is in operation in order to stimulate compatibility, competition and the implementation of water technology and services.

... communication of know-how ...

The dispersed know-how on designing and optimising local water infrastructure and management systems is communicated to enhance cross-fertilisation and further development.

... attention to innovation and implementation ...

Public and private parties have a clear-cut plan to promote research and innovation in water and sanitation technology. Particular attention is paid to bridge the gap between invention of novel technologies and services and their implementation. Users and regulators encourage the introduction of new promising technologies.

... tailoring technology to local situations ...

Sound knowledge about local traditions and about culture based concerns are used to improve the local situation with respect to water supply, sanitation and food production.

Results:

… involvement of women …

Traditionally, women are responsible for providing food, water and hygiene to their families, but water supply and sanitation services do rarely respect the specific, often culture based expectations and requirements of women. In many societies adequate water supply and sanitation, health, education and economic status are interrelated. By 2030, research has revealed and communicated the specific needs of women observing cultural heritage and societal norms. After tailored water supply and sanitation services have been available, hygiene and health have improved, and women and children could spend more time in education and in generating income.

… and education and training.

By 2030, specific educational programmes have been developed and implemented which facilitate appreciation of water services, enhance readiness to pay for the service people receive, and which foster the readiness of political decision makers to invest in the installation and maintenance of water supply and sanitation infrastructure. Providers and users of water services are well trained in a proper design and operation of technical devices and systems.

These enabling conditions, combined with long-term strategic research activities, development and practical demonstration of technical means and management structures bring about the strengthening of the competitiveness of the European water sector, sustainable development and will be major contributions to the meet the Millennium Development Goals.

Enhanced competitiveness of the European water sector …

The diversity of the European water sector is an important advantage for Europe, when considering the challenges of the world water market. Neither Europe nor other regions can be viewed as homogeneous with respect to water supply and sanitation. There are wide variations in climatic, economic and social, political and cultural conditions as well as consumer habits, skills of operators and value systems. Europe's ability to propose tailored solutions is based on the diversity within its water sector. Europe has expertise in technology and governance to satisfy a wide variety of local demands.
By mastering the challenges throughout Europe by 2030 in an integral, cross-sectoral approach, a body of expertise will be developed which has commercial applications outside Europe. The capacity and capability of SME's is fully exploited. Approaches and technologies are identified which are adaptable and affordable for countries outside Europe. Widespread implementation of existing and newly developed technologies will have led to strong competitiveness and sustainability of the European water sector.

As a result of long-term strategic research accomplished throughout Europe, demonstration of the efficacy of research results and implementation of systems solutions, Europe has improved its pre-eminent position in the world as a source of competence, expertise, and excellence in provision of environmental technology and good governance.

... and solid contributions to the Millennium Development Goals.

By the year **2010**, the European water sector has demonstrated solid expertise to develop the basic components of advanced, environmentally sound and economically affordable water management systems, providing low cost and sustainable technologies for supply and sanitation systems for developing countries. As in other domains of technology, mass production of parts and appliances leads to a significant decrease of costs and to an economic boost for European manufacturers.

Water and sanitation are no longer understood as separate issues, but as components of a system embedded in the overall cycle of materials and in the local environment and in its inherent economic, political and social system.

In the same time frame, an intensive life long educational campaign is developed and applied in Europe and throughout the world, to raise public acceptance of the unique value of water and sanitation services. Education and training programmes have led to rational use of water throughout Europe, reducing over-exploitation of water resources in densely populated areas. They also have lead to the development of water and sanitation systems that are responsive to the needs and preferences of the consumers. As a result, the political will to invest in advanced water and sanitation services is fostered such that, by the year **2020**, significant changes have occurred in Europe and in many of the developing countries, despite their state of economic development. Novel means of design and innovative technologies allow continuous adaptation of water and sanitation systems to climatic and demographic changes. Many countries outside of Europe by then will have adopted these management concepts, as a result of successful demonstration of the suitability of advanced water technologies and of integrated urban water management. The effects of cultural variations, environmental laws and regulations on the appropriateness of solutions are better understood.

A crucial breakthrough in reaching the Millennium Development Goals is triggered by several factors, including political will, public appreciation of the value of water and sanitation services, readiness of the financial sector to invest and the ability of the European water industry to provide tailored technical solutions.

Networks contributing to the Vision document

CityNet - The network of European Research projects on Integrated Urban Water management

DWF - Danish Water Forum

Peter Wilderer
Winner 2003 Stockholm Water Prize
EASA-IOS

ESA - European Space Agency

EurAqua

EUCETSA - European Committee of Environmental Technology Suppliers Associations (B)

EUREAU - European Union of National Associations of Water Suppliers and Waste Water Services

ISIS - Institute of Environmental Engineering System
University of Warsaw, Poland

IAHR - International Association for Hydraulic Research

IWA - International Water Association

NWP - Netherlands Water Partnership

European Association of Research and Technology Organizations

MSMG - Member States Mirror Group

Schlumberger Water Services

RWE - Thames Water

VEOLIA Environment

UIE - Union des Industries et Entreprises de l'Eau et de l'Environnement

UKWIR - UK Water Industry Research

WEKNOW - Web Based European Knowledge Network on Water

VDI - The association of German engineers

Water Supply and Sanitation Technology Platform

For more information on WSSTP please visit **www.wsstp.org**.