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The future of water services in Europe after 2015

Antoine FREROT
Chairman and CEO
of Veolia Environnement

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Water may be a renewable resource, but it is a resource that must be protected. Once it is used, it is not returned to where it came from, and that can cause local structural imbalances. In order to correct this, and to ensure water supply sustainability, technical solutions exist involving more frequent use of alternative resources, and in particular the reuse of treated waste water.

Making water supplies sustainable also means coming up with a new financial model for water services, which will make it possible to reduce demand while ensuring continuity of service for all kinds of users.

Finally, against the current background of economic and social crisis, access to water must remain a real right for all, at a time when the Millennium Development Goals, set by the United Nations, aim to halve the proportion of the world's population without access to drinking water and sanitation between now and 2015.

INTRODUCTION

Nearly fifty years ago, the biologist and writer Jean Rostand warned us that "man has become too powerful to allow himself to meddle with evil. His excessive strength condemns him to be good" [1]. The environment is now affected by multiple evils, and it is no accident that it is our ephemeral civilisation that has invented sustainable development and the green economy. All too often, man has ventured beyond the boundaries of ecological sustainability, and his ill-fated flirtation with water is evidence of this.

2012 is the year the European Commission has designated the European Year of Water, but it is also a time of major challenges in managing water in Europe. I would like to concentrate on three of these challenges:

- First, water supply sustainability. This will require full implementation of the Water Framework Directive [2], which is aimed at restoring biodiversity and the good chemical status of surface water, as well as the good quantitative and chemical status of groundwater.

- Second, supporting the transformations in water services. These will see profound shifts

in the next few years due to technical innovations, changing user needs, and the necessity of better environmental protection. At the same time, their economic model will have to be overhauled.

- Lastly, making the right to water and sanitation a real right for all, in developing countries but also in the European Union, where, because of its effect on jobs, the economic and financial crisis could well deprive millions of people of these two basic services.

I – ENSURING WATER SUPPLY SUSTAINABILITY

As early as 2010 [3], the European Environment Agency indicated that the objectives of the Water Framework Directive would not all be reached. The Member States' objectives for 2015 vary widely, and some of them call for good status for less than 50 percent of their water resources. The European Commission was in fact right to initiate several infringement proceedings against Member States. It is also considering legislative changes to provide better guidance for them, in particular for the

1. Jean Rostand, *Inquiétudes d'un biologiste*, Paris, Stock, 1967

2. Directive 2000/60/CE of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community policy action in the field of water, known as the WFD.

3. State of the Environment Report 2010

quantitative management of water resources. This was the main purpose of the consultation it launched with its Blueprint to Safeguard Europe's Water Resources Consultation Document [4].

The Commission is well aware that, to achieve tangible results, faster implementation of already available solutions is needed; in certain cases, such as the reuse of waste water, this could necessitate new European legislation.

- **Protecting water resources**

Protecting resources involves financial decisions that are sometimes extremely far-reaching. The Water Framework Directive established river basins [5] as the basis for consultation and negotiation, with an emphasis on public participation. The stakeholders, including the authorities and professionals, are asked to create a plan based on this rule, which is very significant since, to be effective; the solutions must be applied long term and therefore be supported politically and financially. By its very nature, water management is a long-term process.

To protect water resources, further work is needed along two important lines:

- Finishing the implementation of the Urban Waste Water Directive. This Directive has resulted in a massive and beneficial investment policy. In Central Europe, European grants enabled large metropolitan areas, like Budapest and Warsaw, to finance and build waste water treatment plants. The European Commission's sixth report [6], published on 7th December 2011, shows progress on several fronts in the implementation of the Urban Waste Water Directive. Where the directive has been fully deployed, there have been considerable advances in environmental protection. So it is essential for the directive to be deployed in its entirety everywhere. It should be underlined that coastal areas are subject to specific obligations: besides the usual environmental requirements, there are obligations associated with the generally high population density and others relating to protecting bathing and marine waters, which impose higher standards for waste water collection and treatment and for storm water management;
- Combating pollution at the source. Technically, fighting pollution is more efficient before pollutants have been diluted in the natural environment. That is why it is important to track them as far back to their source as possible. By controlling and managing pollutants at the source, ecological balances, the quality of life of nearby residents and drinking water quality can be protected.

Restoring the quality of water resources is definitely beneficial, but not polluting them in the first place is even better. From this point of view, the effectiveness of treatment at the source depends on the cooperation of all stakeholders and use of suitable technologies and practices at their sites. Industry and agriculture are subject to a system of more and more stringent obligations and regulations. This poses, for example, the delicate question of the funds to be used under the Common Agricultural Policy to apply those regulations and support change in farming practices. Such changes have a bearing on the food self-sufficiency of the Union and the Member States, and are therefore major issues for Europe.

- **Expanding the use of alternative resources**

Ensuring water supply sustainability means correcting imbalances between the resources available and the demand for water. The amount of water on the planet is not decreasing. Water is a renewable resource, unlike other resources such as fossil hydrocarbons. On the other hand, there are local imbalances that damage the environment and undermine the biodiversity of ecosystems and the satisfaction of human needs. This is particularly true of highly urbanised areas, which are often found on coasts, as is the case around the Mediterranean and Baltic Seas.

These imbalances can be partially reduced by eliminating leaks – which sometimes reach totally unacceptable levels – in public distribution networks and by shifting from a water supply policy to a policy of managing demand. But in areas with pronounced structural imbalances between available resources and demand for water, it is necessary to turn to alternative resources.

> *Sea water, an alternative resource in unlimited supply*

Sea water is the most abundant source of water on the planet. Yet, worldwide, only a tiny proportion – less than 2 percent – of drinking water is produced by desalinating sea water. In comparison, 40 percent of the world's population lives less than 70 km from a coast. Even so, the number of desalination plants is gradually increasing, with 16,000 having already been built. For its part, Veolia is the world leader in desalination in terms of installed capacity. The largest reverse-osmosis desalination plant currently in operation is located in Ashkelon, Israel. Its annual production covers the needs of 1.4 million people.

4. A "Blueprint to Safeguard Europe's Water Resources Consultation Document", European Commission, Environment Directorate-General

5. Also called "hydrographic districts".

6. http://ec.europa.eu/environment/water/water-urbanwaste/implementation/pdf/SEC_2011_1561_F_EN.pdf

Although it costs more than treating fresh water, sea water desalination using reverse osmosis is becoming less and less expensive. This is due to improvements in energy efficiency, economies of scale and a continuous drop in the price of membranes, which has fallen by 50 percent in 10 years.

Desalination gives coastal cities an effective solution to the problem of scarcity and a way of satisfying increasing demand for water, but it requires large amounts of energy. However, enormous progress has been made, with energy consumption per cubic metre of desalinated water divided by seven between 1970, when 20 kWh was required, and now, with less than 3 kWh required for the most efficient processes. Further progress is expected during this decade. As for the brine discharged, with good dilution and dispersal techniques and carefully chosen discharge points, there is no chemical or thermal disturbance of the marine ecosystems.

> *Reuse of treated waste water: a technique of the future for Europe*

In arid or water-stressed areas, recycled waste water is the most promising alternative water resource. It can supply large volumes of water for industrial, agricultural or domestic use. Following repeated droughts, Australia has developed considerable capacity for recycling waste water so as to build water supply systems that are less dependent on unpredictable and erratic precipitation.

When scarce, water is too valuable a resource to be used only once before being returned to nature. In economic terms, recycled waste water has many advantages: it is found in the same place as where it is needed; it is the only resource that grows with needs (making it possible to prevent or attenuate usage conflicts); it is cheaper to treat than sea water. In environmental terms, reusing waste water eliminates the need for extraction from scarce fresh water sources; increases the productivity of raw water initially drawn from nature by multiplying the water cycles; and reduces the pollutants ultimately discharged into the natural environment.

Recycled waste water can be used for all types of consumption, even to produce drinking water, as is the case in Singapore and in Windhoek, Namibia. However, it is used primarily to irrigate farmland and green spaces, and to produce process water for industry. This leaves the question of the health standards to apply, which, of course, vary according to the use to which the recycled waste water is put. The European Commis-

sion's Environment Directorate-General proposes several options to make up for the absence of waste water reuse standards. One of them is to prepare a European regulation or directive establishing standards for reused waste water [7]. This option should be chosen for several reasons:

- first, the absence of firm Europe-wide legislation translates on the ground into case-by-case authorisations, which reduces the technique's value in furthering the objectives of the Water Framework Directive [8];
- next, if the local and national public authorities had European standards, they would be in a better position when they wanted to use this technology to guarantee users that it is safe. People's potential reservations in this area should not be underestimated;
- last, Europe-wide legislation would avoid two-speed regulation in the Union. While the Member States and local authorities retain the right to choose whether or not to reuse treated waste water, the safety rules applied must be identical for everyone.

II – ANTICIPATE AND SUPPORT CHANGES TO WATER SERVICES

• *Water services implement and will continue to implement major innovations*

Water services are in no way "static" or "set in stone". They need to innovate to continue to provide the best possible response to people's needs and protect nature. The progress made in sea water desalination over the past three decades is an illustration in point. In the future, water services will be increasingly innovative. In what ways?

First, tomorrow's services will make far greater use of alternative resources, whether recycled waste water or desalinated sea water. In other words, the "water of the future" will often be "alternative water".

Next, distribution networks will become "smart". Their "intelligence" will be provided by sensors interacting with consumers to help them monitor their water consumption in real time and so manage it better. In this area, Veolia has created the M2o City joint venture with French telecoms operator Orange. It aims to install 5 million smart water meters in France. They will be equipped with a modern remote reading system using radio and Internet technology.

At the moment, complete traceability of water in large distribution networks is an exception. But in the future, it will become the norm. Monitoring water quality at all

7. A "Blueprint to Safeguard Europe's Water Resources Consultation Document", European Commission, Environment Directorate-General (pages 8 and 10). On the two other options: develop EU guidelines on the certification system for water reuse and the adoption of standards on the use of recycled wastewater in agriculture by the European Committee for Standardisation.

8. Decree of 2nd August 2010 regarding the use of water resulting from urban waste water treatment for irrigating crops or green spaces.

times in pipes extending over thousands of kilometres is no easy feat, as the water flows continuously in all directions underground. Our engineers have tested an innovative solution on a section of the Shanghai network. It is now being rolled out at the operational level by SEDIF, the Greater Paris water authority. Serving 4 million people, SEDIF is one of the largest drinking water services in Europe.

There will also be innovations in monitoring indicators. Water service performance assessment will rely on new tools to measure the service's environmental footprint. To go one step further than the "water footprint" that measures extraction in absolute terms, Veolia has developed a new indicator called the Water Impact Index (WiiX). It measures the impact on the local availability of resources, including quality. WiiX therefore takes into account three crucial aspects: the quantity of water used, the level of demand on water resources and the overall water quality.

More generally, although European institutions may have agreed or must agree on environmental protection targets while allowing local authorities to adapt application to their specific conditions, checking the implementation of these targets requires the development of key indicators. A balance will have to be found between the precision of these indicators, so that they are recognised as reliable by experts, and the ease with which they can be understood by the general public. These indicators and the associated limit values will be used by all stakeholders to assess progress made, and will therefore be the subject of political negotiation and decisions.

Lastly, in the future, water services will increasingly interact with other municipal activities. The barriers between water, energy and waste will cease to exist and they will become closely interrelated. A convergence is already at work between the various environmental services. For example, tomorrow's waste water treatment plants will be fully fledged biorefineries: they will produce clean water; they will generate more energy than they will consume; and they will produce biofertilisers and bioplastics from the organic matter contained in waste water sludge. The conversion of this

organic matter into products with a marketable value for the plastics industry is the driving force behind the groundbreaking research by Veolia Water at the Brussels-North waste water treatment plant [9]. This is a world first.

• **Renewing the economic model of water services**

The deployment of these technical innovations must go hand in hand with other innovations, economic in this instance, to overhaul the economic model of water services and how they operate. Traditionally, a water service's income is entirely or primarily based on the sale of water. This approach harks back to the concerns of health specialists who oversaw the creation of these services in the 19th century. The overriding interest then was to increase households' water consumption to improve their hygiene and also to help finance network extension. This economic model is hampered by three major difficulties today:

- the first relates, on the one hand, to the increased cost of water service as a result of more stringent standards and the additional tasks expected of water service providers (such as storm water treatment, roadworks, river maintenance, decentralised cooperation, etc.), and, on the other hand, the steady decline in the volume of water consumed and so the base for revenue. These changes are all occurring in an industry with fixed costs: 80 percent of a water service's costs are constants, while 80 percent of its revenue is variable. Over the long term, this scissor effect between growing costs and decreasing revenue is destabilising the financial balance of water services whether under public or private management;
- the second difficulty is linked to the risk of breaking up public water services. Some solutions may at first sight seem attractive, but they actually weaken the overarching solidarity. This is the case when a consumer decides to disconnect from the public network in order to consume only what it produces or recycles. When a large industrial consumer or an eco-district makes such a decision and disconnects from the public network, it reduces the financial resources of the municipal network. It is

9. "Green Economy and resource efficiency: which models for tomorrow?", Antoine Frérot, *European Issues*, No. 206, 23 May 2011

therefore essential to protect the integrity of water and waste water services: we must make sure that such "individual" solutions do not threaten these two services by paving the way for their gradual break-up;

- the third difficulty is the increasing scarcity of water resources. This is in complete contradiction with the economic rationale on which these services were built and which encourages public and private operators to increase the volume of water they sell. To balance the equation between water service funding and the environment, water services must now be remunerated in such a way as to encourage water resource conservation, but without undermining any of the progress made in public health.

How can this be achieved in practice? There are three main areas of reform open to us:

- Implement water service funding based both on taxpayers and users, and not just on users. The aim is to have the user pay for all those aspects of the water service that are actually related to the drinking and waste water services provided. The other aspects that benefit the entire population of a region must be funded by the taxpayer. Concretely, the water service will gradually evolve towards a mixed user-taxpayer system of funding.

- Institute a remuneration system in part based on the operator's performance. The operator's remuneration would then be based on two components: the quantity of water invoiced and the operator's performance levels. The latter would be assessed using a system of indicators for water quality, environmental protection, infrastructure management, and so on. A target would be set for each indicator, for example, providing 99.9 percent or higher compliance with the quality standards set by the public authorities, or obtaining a user satisfaction rate above 80 percent. Such a system would encourage water services to improve their performance. With this approach, if an operator wanted to increase its revenue, it would be more important for it to achieve its qualitative targets rather than just sell more cubic metres of water.

- Make a distinction between the volume of water sold from water extracted from the environment and the volume sold from recycled wastewater. With this system, the operator's remuneration would be proportional to the volume of water invoiced, and this is important, but it would be disconnected from the volume extracted from surface and groundwater resources. In this way the commercial imperative to "sell more" would no longer clash with the ecological imperative to "conserve natural resources".

III - MAKING THE RIGHT TO WATER AND SANITATION A REAL RIGHT FOR ALL

2015 is an important deadline in the field of water, and on two scores:

- for us, as Europeans, it marks the end of the first deadline given by the European Union to restore the quality of our water resources and ensure that their status is good;

- for the entire international community, 2015 is an even more important year. It is the year set by the United Nations for achieving the Millennium Development Goals and thereby reducing poverty in the world. For water, these goals consist in halving the percentage of people without access to safe drinking water and basic sanitation.

The Millennium Development Goals concern developing countries above all. Yet poverty is spreading in developed countries, including European countries, and is forcing them to find ways to maintain access to water for poor people who are already connected to a network. Access to water and sanitation is still a major challenge for the European Union even though it does not take the same form as in developing countries. The European Union should pursue two objectives:

- continue its work on access to water and sanitation worldwide, particularly through its development aid policy. Close to 800 million people still do not have access to drinking water and 2.5 billion people lack basic sanitation [10];

- throughout the European Union, ensure a real right to access to water for populations still deprived of that right – the homeless, for example – and ensure this right for people seriously affected by the recession.

According to the OECD, for water service to be accessible to all, a household's water bill should not exceed 3 percent of its income. In France, the price of water averages 0.8 percent of household income. While well below the OECD's recommended level, many people are finding themselves above this threshold due to the recession. The situation is similar in most European countries and the public authorities and operators are responding by strengthening existing solutions or introducing new ones to maintain access to water service for people who already have it but risk losing it due to financial difficulties. For example, Veolia is devoting 1 percent of the revenue from its contract with SEDIF, the Greater Paris water authority, to ensuring water for all: this amount goes mainly to financing personalised water vouchers for the poorest households.

The European Union earmarked €14 billion from its

10. "Progress on Drinking Water and Sanitation-2012 update", Unicef and World Health Organization 2012

Structural Funds [11] from 2007 to 2013 for water and sanitation. Yet many Member States still need massive investments to ensure access to water and sanitation, which is why government subsidies are given – the users cannot bear all the operating and investment costs for these services. Furthermore, the Structural Funds remain indispensable to guaranteeing good quality basic public services to all Europeans, and that helps build social cohesion in the Union.

implicitly, that water is like a large mutual benefit society. All the inhabitants of a river basin are interdependent on each other's use of the water, for better or for worse. And it is important to manage carefully those many "water societies", in Europe and elsewhere, to avoid exhausting nature. While man is water's worst enemy, he is also its best friend, provided he is willing and equips himself for that role.

11. http://ec.europa.eu/environment/water/water-urbanwaste/implementation/pdf/SEC_2011_1561_F_EN.pdf

CONCLUSION

The challenges facing the European Union remind us,

Antoine FREROT

Chairman and CEO of Veolia Environnement

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