



**Changing the way our cities work  
to make water an abundant resource**

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## ***Executive summary***

Water should be available to anyone in a quantity sufficient to fulfill all needs and consumptions, from cooking to washing, from gardening to industrial processing, to any other usage we can make of this precious liquid. In a continent like Europe, where water is all but scarce, there should not be any problem in fulfilling everyone's desire: where water is actually insufficient, as in a few areas of Southern Europe, there should not be any problems if we let the market provide the means for a transfer of water from where it is abundant to where it is lacked.

Of course, different needs also have different requirements of quantity and quality: the water we need in our homes has far tighter requirements than water needed to cool down industrial machineries. At the same time, water for toileting and cooking must be of 100 per cent pure quality, to ensure the needed health and hygienic requirements, but flushing a WC could be accomplished as well using the so-called grey waters, that is water previously used for other purposes, or meteoric waters captured and stored into tanks and sent through a pipe network without undergoing any treatment.

If the actual quality of the water we use depends on the way we organize our life and on the technologies we make use of, the same is true as far as quantity is concerned. We should always make use of the thriftiest technologies available, in order to save as much water as possible. Saving would not be just a way to preserve a scarce resource (though we know water, in Europe, is not scarce in quantity, but rather in quality), but also a way to exploit a likely source of wealth by selling excess water to those who lack it.

The problem, then, is to organize our cities and our life so that the we are able to use all existing stocks of water, without wastes and inefficiencies, to satisfy all demands and needs, providing the correct quality needed for each and every particular usage and, at the same time, fuelling the economical cycle.

That means we have to work on three different paths, from a general point of view to a more detailed one:

1. on the design of the network of a water treatment and distribution system in an urban area, in order to pass from a centrally controlled and managed distribution system to a locally managed one where consumers can, at the same time, adapt the system to their own needs and demands requirements and be held responsible for managing it;
2. on the legal and technical requirements for the estate development industry, in order to give way to a sort of *smart building*, where all infrastructures are electronically controlled with the target to optimize all energy and resources consumptions;
3. on the introduction of machineries and appliances of better and better state-of-the-art technologies in our buildings (homes, industries, commercial centers, shops), aiming at preserving the existing stocks of water, by accomplishing more and more tasks with one unit of water.

## ***A new design for water treatment and distribution systems***

Currently, throughout Europe and the industrialized world (as well as in those developing countries where some form of urbanization and state organization is present) freshwater is provided for according to one definite model of servicing: water is taken from surface sources, like rivers or lakes, or underground aquifers. It is then pumped into a network of underground tubes and channels to the single units of consumption, be them residencies or industrial plants or else. It does happen, though it is more and more uncommon, that industrial plants are allowed to exploit their own wells, if they have any: over the years, though, legislations in all industrialized countries has aimed at addressing all demands and treatments to a central organization, usually publicly owned, closing all existing authorizations to private wells exploitations. Discharges from consumption units are pumped to a treatment plant – where they do exist, but unfortunately we still do have large urban areas in Europe where water treatment plants are nothing but utopy. Milan, with its one and a half million inhabitants, is such a case – before being unloaded into a body of water again. Rare is the case of water networks designed to distinguish between black waters and grey waters. Most do make a difference between water discharged from residential areas and water coming as a result of industrial and commercial (which are sometimes as polluting as the former) processes. The difference in collection and treatment, though, is based mostly on the urbanistic organization of the territory: industrial areas, services and commercial centers, residential units, small shops and tourist areas.

The system, then, is completely centralized and leaves no room for considering more locally based needs: end consumers, no matter if they are industrial plants with requirements of large quantity of water for their production processes or small residential units where water is only needed for the typical household needs like washing and cooking. A centralized model of management cannot take into consideration the individual requirements of the single consumer, nor can it adjust its servicing to changes in the quality and quantity of water demanded by one or more consumers. This can only be accomplished if it is the consumers themselves who own the right to manage their own distribution network. And, of course, bear the responsibility to invest on it. An administration, national or local whatsoever, should only make sure, then, each and every system respect a set of guidelines and of minimum levels of quality of water and servicing.

Decentralizing the distribution and the management of freshwater would have act positively on the impact urban areas have on the environment. Cities are still organized according to a model originally drawn in the 1800s and then developed in the past century: the urban area is cut into smaller slices, and each slice is given a role in the complete picture. We have, then, sectors for residential areas, others bound to host industrial plants and the likes. Sporting areas, where all large stadium and sporting arenas are concentrated. Train stations are next to bus stations, and commercial centers are alongside the major roads and highways, in order to facilitate their appeal on passing by consumers. A division of roles thought to ease the work of a city and make it more efficient. As a matter of fact, this system, which is now over a century old, turns out to be a waste of resources and a source of problems. We have, for example, an excessive consumption of resources (soil, building materials, working hours...) because we have to provide infrastructures for provision and collection of water to cover the hypothetical maximum level of demand in all areas of a city, even if a building or a facility or an areas, as well, will be completely void during the day (as in the case of a residential areas) or at nighttimes or during working holidays (as it does happen with industrial plants)

We should take note, also, that in the latest decades our countries have deindustrialized, moving heavier plants to other countries or even continents or substituting older and more impactful production processes and plants with lighter ones, whose weight on the environment and demand for resources (soil, water, energy) is much lower. Commercial and residential units have taken on places and buildings previously occupied and exploited as industrial sites. The miniaturization of production machineries and their better performances as for noise and pollution have made it possible to install small firms in residential condominiums. Space is not as definitely divided as it used to be, thanks to the development of science and technology, but our legislative systems are still far from understanding it.

This mix of activities and residences has a number of positive impacts on our urban areas. First of all, it eliminates the problem of parts of a city where nobody goes at night – office only or industrial areas, for instance – and are, as a consequence, a sort of nobody's land where gangs of thieves and vandals can freely do their work, if we do not spend high sums of money to install alarm systems and provide for public and private security guards. The more important consequence, though, is that it makes it possible to build and manage all infrastructures as shared goods between the different activities and destinations: no more freshwater tubes in industrial areas left void and unused at night because plants are closed, or during the day in residential areas because all residents are at work. All resources can then be exploited to their best, saving materials, work and resources. A situation much more sustainable, both economically and environmentally.

## ***Smarter buildings***

In all countries there are laws and rules determining the technical characteristics of a building. There are specifically drawn according to its final destination, to commercial purposes, for production of industrial items or for mere residential needs. Unfortunately, most of these prescriptions are aimed at ensuring the largest fiscal levies possible: real estates, indeed, are at the base of all tax systems, as it is impossible to conceive the existence of a house, a shop or an industrial plant. Ownership can be hidden within a maze of the so called chinese boxes, but a building is something physical and it cannot escape control and classification by the revenue offices of a country.

If the public administrations shifted their attention from the mere possess of an estate property to the quantity of resources (not only water, but also energy, soil, building materials) needed in the construction and management processes of a building, owners and renters would be stimulated to search for better ways to build, in the first instance, and then manage an estate. That would give way the introduction of higher technologies in our buildings, may be to the point that a house, a shop or a commercial center could become completely self-sufficient as far as many of the external inputs today required (not only water, but also energy, pickup and treatment of wastes)

The necessity of external input of water could be limited, and perhaps zeroed, by capturing meteoric for use, after adequate treatment, as grey water (in flushing WCs, watering yards and gardens). Even water for cooking and washing and toileting could be recycled as grey water and re-used together with meteoric water.

We should not be afraid of water treatment installations costs. They number in the millions of euros only when we project treatment plants for cities or large urban areas: if we turn our eyes to the smaller size of an industrial plant, a commercial center, a small shop or a residential building, prices are much lower. The recent progresses in these technologies would make it possible to install a water treatment unit in the basement of a condominium, or use it to serve a small area of a very few thousands inhabitants. A rise in the demand would make prices go upward, but the rise would also be counterweighted by the lowering of industrial costs for producing and distributing the products and service them, with positive impacts on the consumers' price.

## ***State of the art technologies***

In our technological world, the possibilities ensured by scientific and industrial progress are always on the move. And they run fast, too. What is at the forefront of development today is bound to be obsolete in a matter of months (all personal computer users are fully aware that today's latest model will be surpassed by a newer one every six months, and that's just because the producers cannot cope with quicker rhythms) or in a few years at the latest in the case of more complicated and costly technologies.

That is true for what concerns the infrastructures, the machineries and the appliances we can encounter where we live, work, shop or gather for social events. Adjusting to the newer technologies is costly, though, and cannot be accomplished without some form of financial help (or punishment, if for too long a time a building is left without upgradings) from local and national administration. This help would come along with the shift of the public administration's attention from the possession or enjoyment of a real estate or a building, to the use of resources that property makes. With the money gathered from taxing excessive consumption of water and of other resources like energy, soil and air, it would be possible to finance the installation of better and newer technologies, in order to facilitate keeping up the pace with the technological development.

We should not overlook that stimulating the technological changes would also help the research and development efforts of industries and universities, with positive consequences on the whole community and society, which would enjoy a positive push toward a greater level of dynamism.

## ***Conclusion***

If we really want to solve the problem of the availability of water, then, the solution would be in a reform of the urbanistic management of our cities, mixing what is today secluded and divided, decentralizing the management of this resource and spreading the necessary scientific and managerial know-how. Abandoning a centralized management of freshwater would make people understand we cannot allow mismanagement, misuse and wastes of that precious liquid: we do have in a good sufficient quantity, here in Europe – apart, as already mentioned, from a few areas in Southern Europe - but we cannot afford wasting it with inefficient and irresponsible consumptions.