Culligan®

Waste Water Reuse

A resource worth thinking about

Besides bringing countless numbers of undeniable benefits, technological development has also brought about a few serious problems, of which the availability of natural resources is certainly one of the most obvious.

Until a few decades ago, water was thought of as a practically unlimited, virtually free resource; today it is clear that we were wrong. The quality of both underground and surface water sources has been severely jeopardised, while the quantity of water available is already insufficient for current requirements, let alone for those expected in the future.

The situation must therefore be tackled with all the means available, while implementing articulated corrective policies involving:

→ ANTI-WASTE MEASURES

→ ANTI-POLLUTION MEASURES

→ REUSE OF RESOURCES

CULLIGAN: WORLD LEADER IN THE WATER TREATMENT

POSSIBLE STRATEGIES

→ ANTI-WASTE MEASURES

→ ANTI-POLLUTION MEASURES

→ REUSE OF RESOURCES

OPPORTUNITIES AND RESPECT FOR THE ENVIRONMENT

Companies wishing to promote waste water recovery today have an exceptional opportunity for development, for themselves and the environment: by submitting a project to the competent Ministry, they could be eligible for EU funding. These companies are comforted also by the knowledge that they are supporting a more modern, civilised approach in full respect of the environment and its resources.

→ ANTI-WASTE MEASURES

This strategy involves the implementation of an information and education policy, combined with targeted technological development. For example, all latest-generation home appliances are designed to contain water consumption: indeed a modern washing machine uses approximately 80% less water than one 30 years ago, as do toilet flushes and all other home and industrial appliances using water (which, as everyone knows, is increasingly expensive).

→ ANTI-POLLUTION MEASURES

Environmental pollution is a more complex issue, given the substantial economic interests at stake, not to mention the fact that the implementation of more environmental-friendly codes of conduct by business and private citizens costs money (cleaning up the environment is obviously even more expensive, but more often than not funding for this is public...). Education by itself is therefore not sufficient, and must be accompanied by fines that are hefty enough to convince careless polluters.

→ REUSE OF RESOURCES

A third corrective strategy – not to be seen as an alternative but rather as complementary to the first two – involves the reuse of waste water. The water that we use in almost all cases comes from the waterworks, and has therefore undergone a costly series of processing stages to make it drinkable and safe. After use, this water is returned to the environment by means of the sewage system, though often with its quality only slightly altered: consider how much water is poured into the drains after having been used to wash fruit and vegetables, to hose down a terrace or for rinsing in a carwash.

THE NECESSARY TREATMENTS IN RELATION TO

Waste water from civilian and industrial discharges undergoes two basic treatments: **primary and secondary.**


1

→ PRIMARY TREATMENT

During **primary treatment**, a system of screens separate the water from large foreign bodies, which can range from leaves and small dead animals through to a wide variety of solids picked up by the drain water.

→ SECONDARY TREATMENT

During **secondary treatment**, water undergoes biological purification. The water is enriched with activated sludge and oxygen, so that organic substances are ionised, i.e. broken down to the state of dissolved mineral salt. In successive settlements, the water is separated from suspended solids to bring it to the parameters required for safe return to the environment and reservoirs.

2

→ TERTIARY TREATMENT

Another stage of treatment can sometimes follow the previous two. **Tertiary treatment** involves thorough filtering without the aid of chemical agents, after which the water is suitable for a wide range of uses, such as irrigation or general industrial applications. This treatment is therefore the starting point for profitable reuse of water, indeed numerous towns and companies have added a tertiary treatment capability to their purification plants, with total satisfaction.

→ QUATERNARY TREATMENT

But the story doesn't end there; other technological procedures are now available for further treatment of waste water, affording impeccable quality standards and economic benefits. Indeed today it is possible for private companies to perform **quaternary treatment** based on Ultra-filtration or Reverse Osmosis, technologies that assure a product specifically suited to certain industrial uses at low cost, without having to sacrifice any of the advantages afforded by potable water (in fact, the quality of the final product can be improved by more precise targeting of the required characteristics). Carefully monitored pilot plants constructed in different locations have helped assess the performance of the installed equipment, pointing to the conclusion that the objective set has been achieved - that of reducing water costs while assuring excellent quality standards.

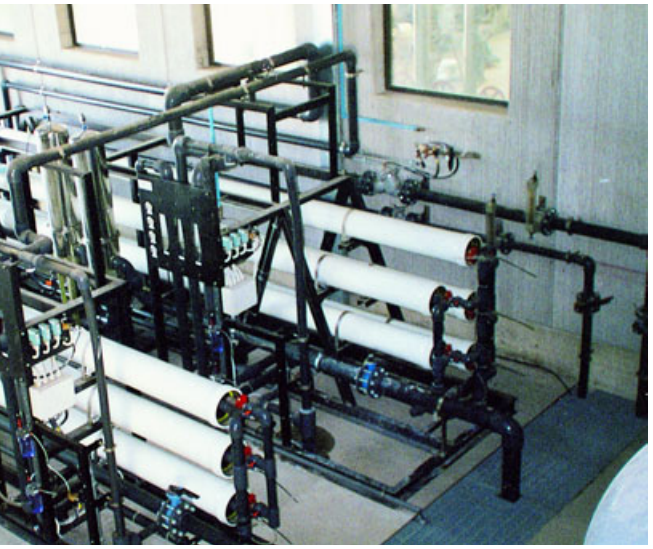

3

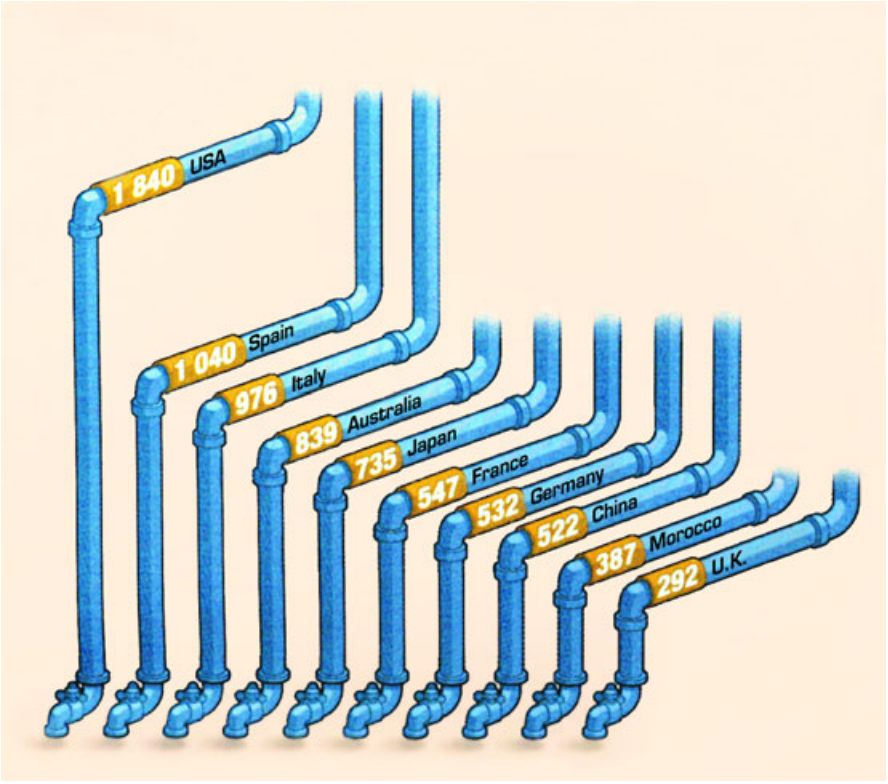
INTENDED USE

1 Secondary treatment:
biological purification stage in a town plant.

2 Tertiary treatment:
filtration of water after biological treatment, to supply an industrial dyeing plant.

3 Quaternary treatment:
Reverse Osmosis unit operating in a slaughterhouse. Process water is recycled to restore its precise chemical and physical properties.





EXTRACTION OF WATER PER INHABITANT/YEAR AROUND THE WORLD

The drawing clearly illustrates the quantities of water extracted from underground in different countries, expressed in cubic metres/inhabitant/year. Note that the total volume of water extracted since 1950 has tripled, while the volume of water available per inhabitant has plummeted from 16,800 to 7,300 cubic metres.

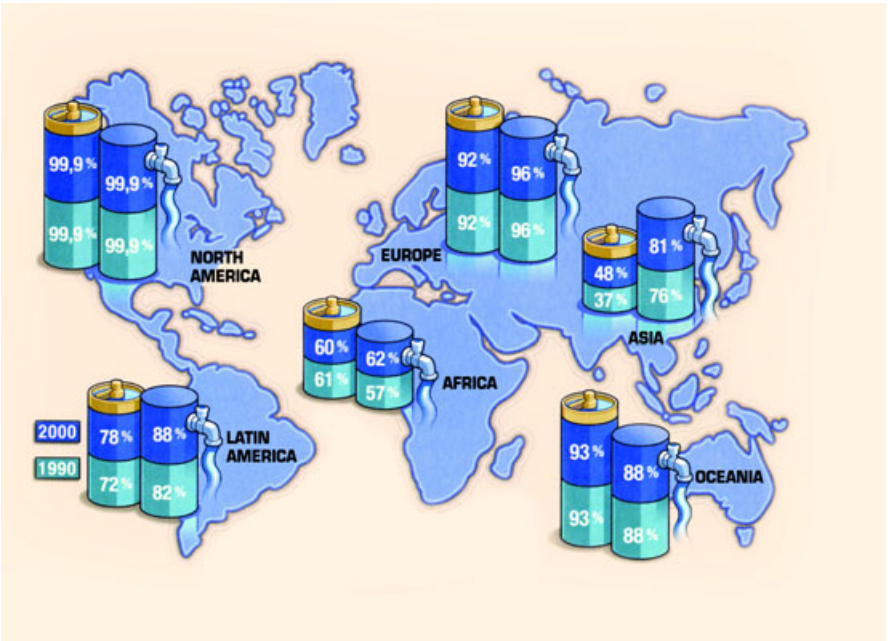
WORLD SITUATION IN THE USE OF WATER

ACCESS TO POTABLE WATER AND WASTE WATER TREATMENT SERVICES AROUND THE WORLD

The graph illustrates the percentage of population with access to potable water supplies and waste water treatment in different continents. In Asia, some 80% of the entire population has no regular access to a sewerage system, while two thirds have no access to any public distribution of potable water.

Percentage of population connected to the sewage system

Percentage of population connected to the drinking water system



THE REUSE OF RESOURCES: RECYCLED WATER

There is a great number of applications in which, instead of costly tap water, recycled water could be used without any compromise on quality of life – a product that, after initial use as potable water, has undergone a treatment making it suitable for less "noble" usages.

Here are a few:

→ IRRIGATION

Irrigation is without doubt one of the most important applications. It is a well-known fact that a large proportion of potable water distributed is used to irrigate fields, vegetable gardens and parks; but it is also true that a sufficiently recycled product would be just as effective, and if used on a large scale, would help save enormous quantities of precious resources.
To recall the quantities actually at stake, bear in mind that a single kilogram of wheat requires 500 litres of water to grow, and a kilogram of rice – the cereal that constitutes a staple food element for 61% of the world population – requires no less than 2,000 litres!


IRRIGATION

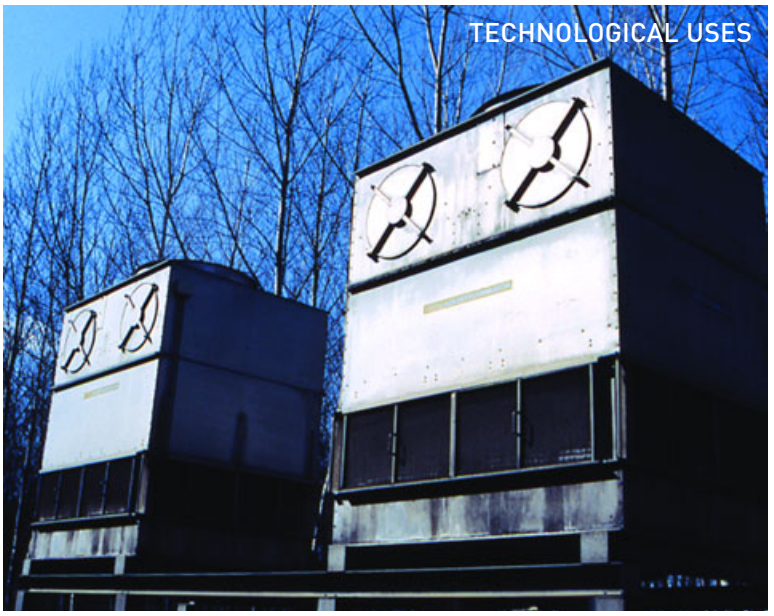
→ INDUSTRIAL USE

Large quantities of water are also used in many industrial processes (with the obvious exception of applications demanding a specific quality standard), plant cooling applications, fire-fighting systems, rinsing in different production cycle stages.


INDUSTRIAL USE

→ TECHNOLOGICAL USES

Water for technological uses includes that for washing down streets in urban centres or fuelling heating or air-conditioning plants.
Large quantities of water are necessary for these applications.


TECHNOLOGICAL USES

REFERENCES

Capo Passero Camping • Porto Palo (SR) - Italy

Centro Commerciale Multiplex Millenium • Rome - Italy

CNR • Florence - Italy

Fondo Patti • Palermo - Italy

Granarolo Latte • Bologna - Italy

Karanhjukar Hydroelectric • Reykjavik - Island

Inalca • Reggio Emilia - Italy

Municipality of Bazzano • Bologna - Italy

Municipality of Carpi • Modena - Italy

Municipality of Carro • Alessandria - Italy

Municipality of Gavi • Alessandria - Italy

Outlet Foiano della Chiana • Arezzo - Italy

Renault • Naples - Italy


1

2


3

1 Municipality of Bazzano - tertiary treatment.

2 Municipality of Carpi - tertiary treatment.

3 Waste water treatment.

CE *Designed and manufactured according to CE Directives in force*

QUALITY SYSTEM CERTIFIED ACCORDING TO UNI EN ISO 9001:2000 NORM

CULLIGAN ITALIANA SpA
e-mail: culligan@culligan.it
http://www.culligan.it

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