

Plastics to preserve water
That is crystal clear





Water is too valuable to be wasted

The Roadmap to a Resource Efficient Europe of the European Commission highlights water as one of the strategic resources affected by competing demands in Europe. The plastics industry contributes to resource efficiency by providing

- plastic solutions for sustainable water supply and use.
- cutting-edge technology to preserve drinking water.

On a daily basis, we all rely on a safe and constant supply of drinking water. Sustainable water transportation, even over long distances, needs to be leak-free, avoiding corrosion, soil or bacterial contamination. Plastic pipes meet these requirements.

Water supply is also a big challenge in **agriculture**: Farmers need access to water, even more in areas where rains are not very frequent. Plastic materials are the key to innovative and sustainable solutions such as drippers, which supply the plant with the right quantity of water and ensure that no water is wasted.

Another important issue the world faces is **water quality**: According to the World Health Organization (WHO), yearly 1.8 million people die from diarrheal illnesses and more than one billion people worldwide do not have access to clean drinking water. Plastics offer both easy access to water, for example through plastic bottles, as well as effective solutions to clean water.



Clean drinking water: Plastic pipes make it possible

A house is hardly a home without clean drinking water. In the same way that we take electric lighting for granted until there is a blackout, we also underestimate the well-being that plastic pipes create. We expect a continuous flow of clean drinking water to be piped into our homes and we demand that our wastewater is quickly and efficiently piped away from

our homes. Plastic pipes provide a cost-efficient way to meet these demands.

Health, safety and environment matters provide a continuous source of engagement for the plastic pipe industry. At the same time, economic and social issues have to be taken into account. Plastic pipes meet all these aspects of sustainability.

Environmental benefits



- **Flexible pipes are significantly less likely to have defects than rigid pipes.** Plastics piping systems are designed in such a way that leaking of joints is very unlikely.
- **Plastic pipes are energy efficient.** Their low weight means less energy in transport, handling and installation. Their smoothness reduces pumping energy.
- **Plastic pipes provide a sustainable and safe way to distribute valuable drinking water.** Their environmental contribution to public health and sanitation is compelling; their long service life eventually followed by recycling guarantees a high level of sustainability for many hundreds of years.
- **Plastic piping is the preferred material in high-purity water applications.** It is biological resistant to fungi and bacterial attacks. Plastic pipes provide excellent resistance to corrosion, abrasion and chemicals together with high impact resistance. They allow for the production of pipes with long-term durability. Thereby they contribute to the protection of the environment through leakage prevention.



Social benefits



- **Plastic piping can be identified easily.** It can be colour coded, for gas or water distribution, industrial processes or as sewers, fire sprinklers, etc.
- **Plastic piping systems have been approved for potable water applications.** For example, all plastic potable water piping materials and products are tested and listed for compliance to CEN standards.
- **All plastic piping materials have low thermal conductivity.** This means more uniform temperatures when transporting fluids in the pipes and less need for insulation.

Economic benefits

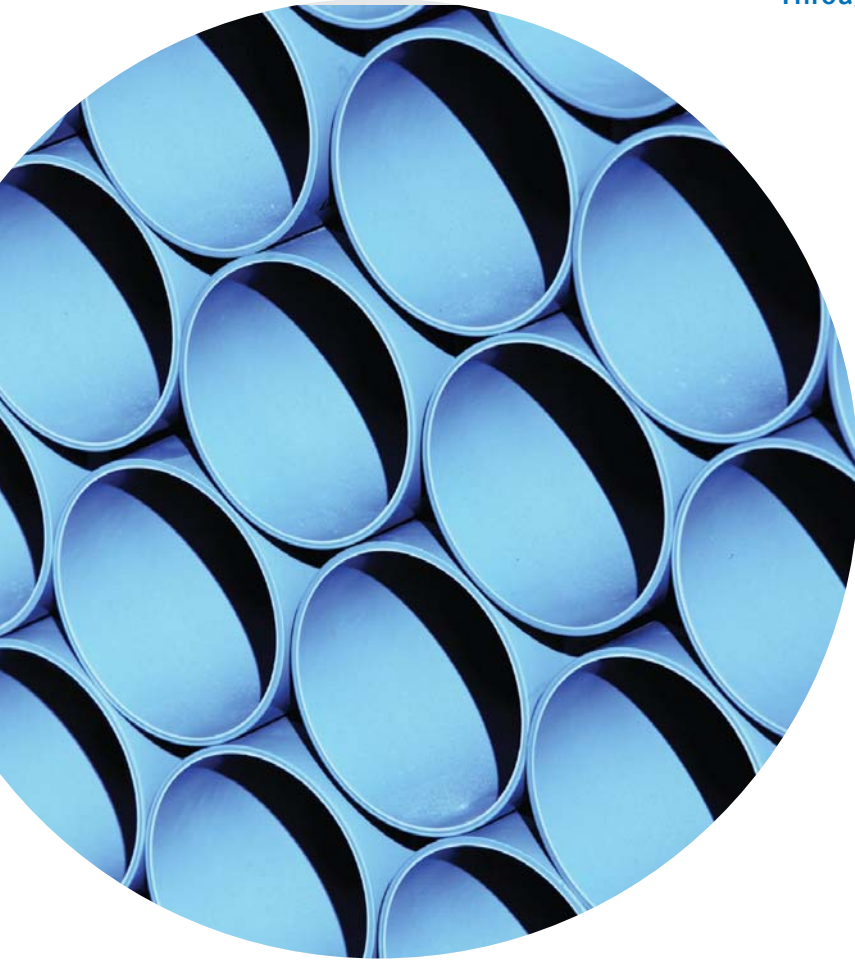


- **Plastic pipes systems have a successful track record.** When installed under the correct conditions, they have a life span of more than 100 years. Examinations of pipe samples taken from some systems have shown no measurable degradation after 45 years of service*.
- **Plastic pipes are cost-effective to install, operate and maintain.** Their low weight and flexibility makes installation easy – and their durability leads to lower maintenance. They are therefore a cost-effective solution in virtually all pipe application areas.
- **Due to their flexibility, the pipes can resist ground movements and be squeezed off for easy repairs.** Also, plastic piping can be joined by numerous methods. The variety of joining methods allows plastic piping to be adapted easily to most field conditions.
- **Plastic piping materials provide excellent service in handling slurries.** For example in the mining industry and for other abrasive solutions.

* Source: TNO-2005 results

Plastic pipes – easier life for everybody!

Through plastic pipes we can...



*Save billions of litres
of drinking water*



*Offer cheaper water,
gas and other
daily needs*



*Use less
electricity for
pumping water*



*Offer better
quality of life*



Did you know?

- Pipe replacement in the UK saves 1.5 million litres of water per day: A £2.7 million project to replace ageing, leaky water mains in Reading/UK will save 1.5 million litres of water every day. More than 7 km of century-old cast-iron pipes are being replaced with plastic piping in the town centre to avoid leaks, which cause disruption in supply and cost for the citizens.
- The UK is investing £100 million between 2010 and 2015 on improving the water mains. Many pipes are more than 70 years old and need to be replaced due to corrosion. This corrosion weakens the structure of the pipe resulting in small holes and cracks appearing over time. For example, in the UK with 14,500 km of pipes supplying over 1.2 million customer properties renewing the network is a non-stop job. Renewing ensures a continuous, secure supply of top quality tap water at the lowest possible price to consumers.
- Water consumption in different economic sectors varies considerably from one region to another, depending on natural conditions, economic and demographic structures. In France (64%), Germany (64%) and the Netherlands (55%), for example, most of the water is used to produce electricity. In Southern Europe, water is mostly used for irrigation, for example in Greece (88%), Spain (72%) and Portugal (59%). Main water use in Scandinavia is for industrial purposes. See graph on page 4.



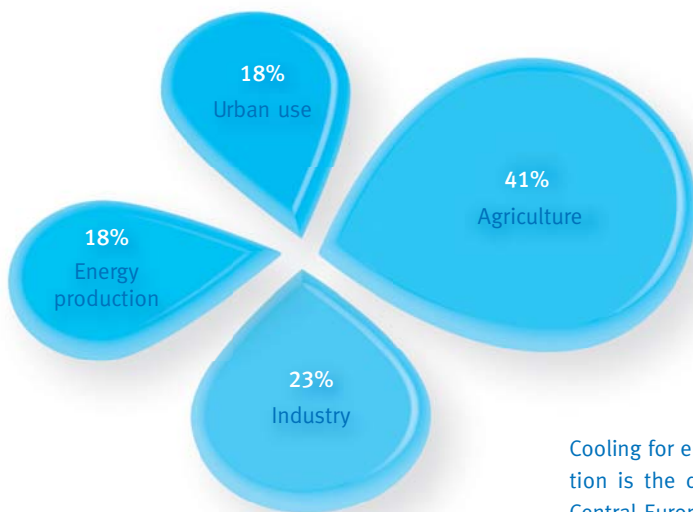
Turning arid areas into fertile land

Agriculture faces big challenges, one of them being water supply. Farmers need access to water, even more in areas where rain is not very frequent. There are various solutions: Distribution channels, which cater for smaller diameter distribution networks and avoid seepage, reservoirs to keep water from rains or drippers mounted in pipes to provide tailored irrigation under all topographical conditions. There are also other techniques to reduce water waste and to deliver the targeted amount of water directly to the plant. Plastics enable efficient use of water through innovative and sustainable solutions:

Irrigation: Thanks to the use of plastics in agriculture, water can be saved and crops can even be planted in desert areas. Plastic irrigation pipes and drippers prevent waste of water and nutrients.

Reservoirs: Rain water can be retained in reservoirs lined with plastics, making water accessible to farmers, even in areas where rains are not very frequent.

Greenhouses: Closed spaces such as greenhouses, tunnels or plastic film for mulching expose plants to the desired level of sunlight so they can grow in ideal conditions according to their physiological properties. The use of greenhouses indeed allow farmers to create the appropriate environmental conditions that plants require for faster and safer growth, to avoid extreme temperatures and protect crops from harmful external conditions.

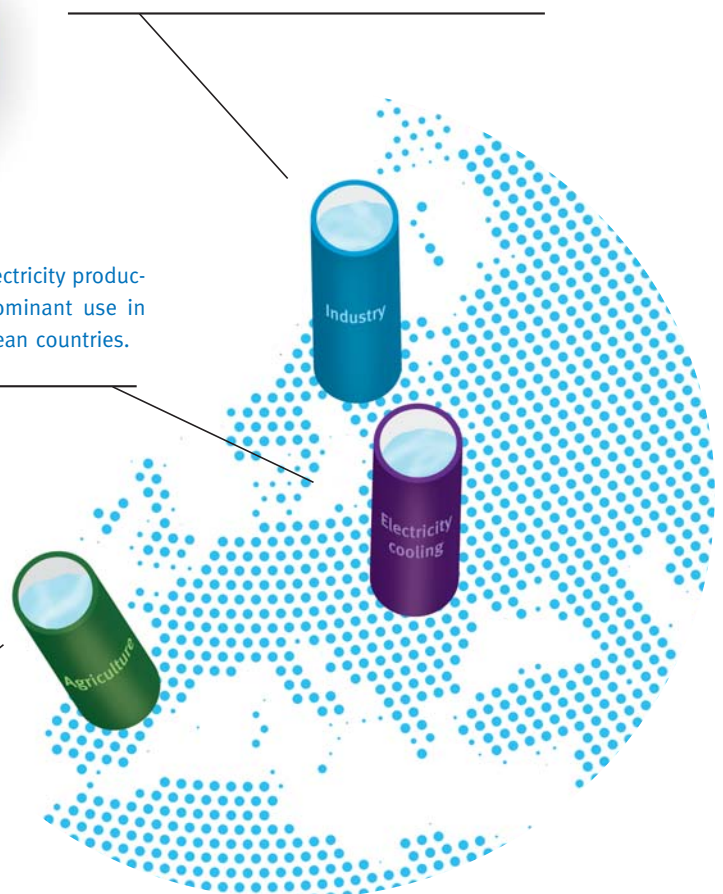


On average, 41% of total water use in Europe is for agriculture, 23% for industry, 18 % for urban use and 18% for energy production.

Agriculture accounts for 50 to 70% of the total water use in South-Western European countries.

In Northern European countries such as Finland and Sweden, little water is used in agriculture. Water is mainly used for industrial purposes.

Cooling for electricity production is the dominant use in Central European countries.





Make water drinkable again

Water contamination and water scarcity are global challenges we are facing. Plastic filters – initially developed for use in space vehicles – offer an effective and easy solution to make contaminated water drinkable again.

Desalination of seawater, brackish groundwater or river water for a public potable water supply is increasingly being considered or adopted around the world. This applies especially in areas where demand has been increasing beyond sustainable supply of fresh water, where water sources are fragile or overdrawn and climate change is making previously reliable sources unreliable. Polymeric membranes, which are used in desalination plants, contribute significantly to providing sustainable solutions in arid regions such as India, Australia, and the Middle East.



Domestic water purification system

Better health from clean water

Ray Hammond, author of *The World In 2030*, had concluded his study warning us that one of the main challenges people would have to face would be the lack of drinking water. Portable water purification systems offer sustainable solutions, especially in developing countries.

The primary element of such systems is an approximately 30 cm long plastic housing that contains filter membranes. They provide ultrafiltration (UF membranes) and remove viruses as well as bacteria from dirty surface water that may have come from rivers, lakes, rainwater collection barrels or puddles.

By using portable purification stations, the risk of contracting gastrointestinal illnesses from dirty water is reduced drastically. Some systems are not only lightweight and easy-to-use, but are also inexpensive. They are able to purify at least 18,000 litres of water reliably without the need for batteries, electricity, replacement parts, chemicals or complex technology. Water purified by the unit has been tested by the EPA (United States Environmental Protection Agency) and declared potable. The systems can be quickly and easily distributed during natural disasters, for example in response to the Chinese earthquake in August 2008 or relief efforts in Thailand in November 2011.



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