

# A European rationale for reuse

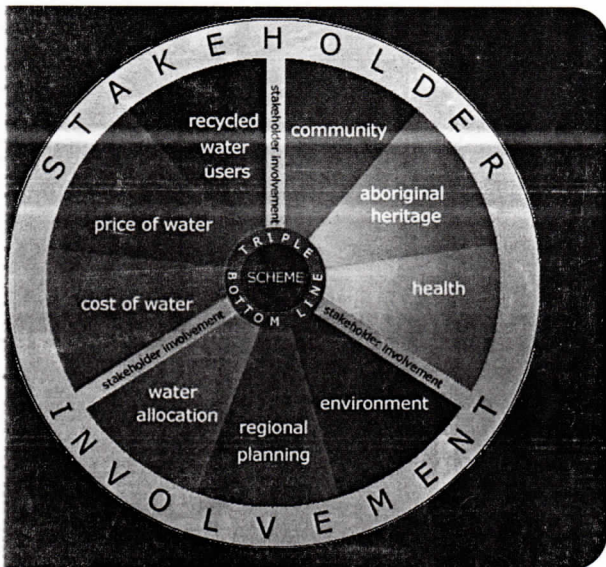
● European water resources are under pressure as the population expands and the climate becomes more extreme. As a result, wastewater reuse is gradually being integrated into water resource management strategies throughout the continent.

**JAN SMITH** reports on current progress and the obstacles that Europe faces.

Europe's fairly ample water supply has resulted in there not being a huge amount of investment in water reuse within the continent. Yet an estimated 31% of the population lives in regions where water resources are under strain, and it appears the situation can only get worse. Not only does Europe suffer from a great deal of climate variation from year to year, but global climate patterns indicate that it may be heading toward more seasonal extremes that will result in frequent droughts and floods. Such severe hydrological events, coupled with a high population density, places Europe in a precarious position in terms of future water resource management.

Southern Europe is particularly affected by water scarcity and so the population, which is increasing in parallel with the budding tourism industry, is gradually becoming more dependent on recycled wastewater, predominantly for irrigation. Northern Europe on the other hand has a fairly plentiful water supply, although for decades most major European cities and their river basins have been reliant on appropriately treated wastewater to help recharge their surface and groundwater resource.

*The Sustainability Wheel, as used in Western Australia. Stakeholder involvement runs throughout the whole process. The 'triple bottom line' approach indicates economic, environmental & social justification while 'scheme' stands for the engineering project, the last part of the process.*



'Water reuse is of fundamental importance to the European environment and economy,' says Bruce Durham, international project manager for alternative water resources at Veolia Water. However, at present there are no European-wide accepted quality guidelines or framework for best practice. Durham was speaking at a meeting with others involved in reuse, and the general consensus was that, for the concept of wastewater reuse to progress, uniform guidance is required at European level.

The meeting heard from Nick Turner, sharing his experiences as water recycling strategy manager of the Water Cycle Project for the State Water Corporation, Perth (see box). 'You can't change physics; if there's not enough water, there's not enough. What you can change is cultural behaviours, policy and regulation,' he explains.

Both Durham and Turner feel that there is currently too much concentration on technology, which is not the true challenge when compared to water use behaviours and institutional impediments. There have been many advances in the effectiveness and reliability of wastewater treatment technologies but it is suggested that it is policy, rather than technology, which ought to be the focus of Europe's efforts. 'Europe needs to be prepared, rather than waiting for the next crisis to emerge,' comments Durham. The proposal is to introduce policy and regulation that will prevent dramatic variations in water supply, so that crisis management need not come into play.

'There are major knowledge gaps on the relative importance of different parts of the water cycle,' Durham says. 'There is a lack of integration of the cycle and a lack of understanding as to how it all fits together. All those concerned need to manage the total water cycle and avoid the risk of focusing just on drinking water quality and wastewater treatment for environmental protection, as if they were unrelated subjects.'

It was suggested at the meeting that a UK integrated water cycle stakeholder

task force be created, pulling together all involved with the water cycle. The objectives would be to identify the priorities and create an action plan that would include water reuse as one of the alternative solutions in the UK. Perhaps this proposed task force model could then be considered for each European member state.

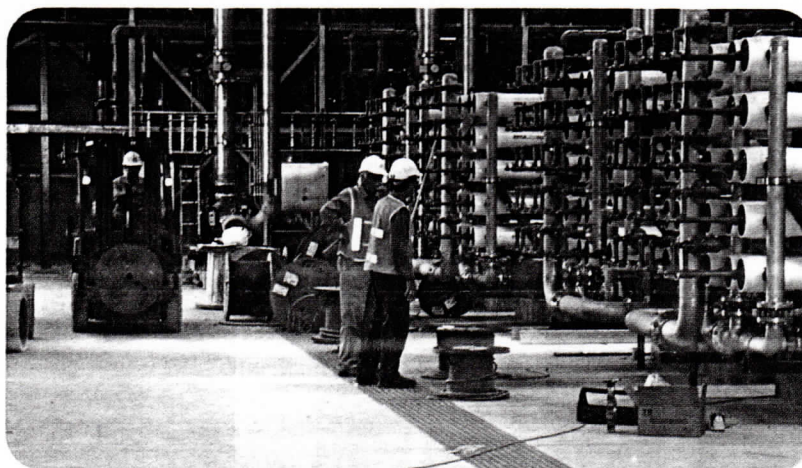
Despite the lack of Europe-wide quality guidelines and best practice policy that was discussed at the meeting, a number of EU countries have recognised the importance of reuse in reducing pollution (by lessening discharge) and overcoming water shortages and, although the issue is still very much a controversial one, action has been going on for some time in various parts of Europe. France has been using wastewater to irrigate crops for many years, while reuse for various forms of irrigation has been progressively adopted by virtually all Mediterranean countries. Densely populated northern European regions are already benefiting from direct reuse for industry (potable substitution) and indirect reuse through planned aquifer recharge.

Belgium is an interesting case as it has one of the lowest water availabilities per head of population among the EU countries, and several municipal and industrial water reuse projects are carried out in the region of Flanders. One notable venture going on in this region is that of the IWVA Torreele Plant where, based on the experience of pilot tests, effluent is treated via a series of steps including micro-filtration, cartridge filters, reverse osmosis and ultraviolet irradiation to produce infiltration water for artificial recharge of an unconfined aquifer in a dune water catchment of St-André for indirect potable reuse. There has been a direct engagement with the community on this matter and, as a result, the plant has been widely accepted by the public. Nothing at all has been concealed, to the extent that a visitor centre has actually been created so that the public are able to see exactly how the process and their water cycle works. Such an open approach has resulted in

successful water reuse.

Public, and other stakeholders', perception is quite clearly a key issue and suggestions have been made that the European community is a far less challenging stakeholder than elsewhere in the world. Paul Jeffrey of Cranfield University explains, 'Trust in those who are setting and policing standards is essential.' Even so, it is not only attitudes and perceptions that pose a problem; there are also a number of risks associated with wastewater reuse that must also be considered - technical, economic and hygienic.

The EU Water Framework Directive is the key driver when it comes to the introduction of water reuse policy and the integrated management of water resources, although other action is being taken. Durham, who is also the technical secretary of the reuse group of Eureau, an organisation that represents the national associations of water suppliers and wastewater service in Europe, hopes to encourage the European Commission to take note of reuse developments and to coordinate efforts across Europe. However, if one harmonious European approach is taken, the diversity of EU



The Kwinana Water Recycling Plant, the largest water recycling scheme in Western Australia, will supply 6GL/yr of high quality recycled water to Perth industries, freeing up valuable drinking water for other uses. The plant, designed and built by Veolia Water Systems, will be in operation by the end of 2004.

countries must not be overlooked. A policy that is successful in one country might not necessarily deliver the same success in another - there must be a degree of flexibility involved. A European working group on the impact of the 2003 drought has disseminated a questionnaire to member states which will measure the effects of the drought and gather information on current practices across Europe.

Wastewater reuse is not the only water saving solution; there are a number of other options such as avoidance of supply network leakage, rainwater harvesting, more economical irrigation techniques and tapping other water sources

(desalination). Seawater desalination is currently a favourable method of creating an alternative water resource and some appear to think it the only solution. However, the concept of water reuse to alleviate scarcity is gradually being integrated into various water resource management strategies within Europe and it could be that, as reuse becomes more widely understood and accepted, as the diversification of reuse practices develop and as the suggested lack of relevant EU quality guidelines and best practice is resolved, wastewater reuse could continue to grow at a faster rate than desalination. ●

## Australia offers a reuse perspective for Europe

Serious drought hit Perth back in 1981 and since then there have been repeating episodes of water scarcity that have challenged Western Australia (WA) in terms of water resource. 'We hit a very big wall very quickly in 2001 when inflow to our Perth dams was less than 18% of the average for the previous 25 years,' says Nick Turner, the water recycling strategy manager of the Water Cycle Project for the State Water Corporation, Perth. As a result of WA's subsequent vulnerability to the ongoing climate changes, numerous actions were taken. Water use restrictions were put in place, a suite of demand management initiatives were introduced (including education programmes and Waterwise plumbers/garden centre/irrigator programmes), infrastructure was redeveloped and a State Water Strategy was launched. Within this strategy the Water Cycle Project was introduced, a key aim of which is to reach a 20% target of wastewater reuse by the year 2012. This is double the existing reuse in WA. This target is 'realistic but challenging', says Turner, who has been involved in writing and negotiating the strategic plan.

Turner tells us that 'a waterwise way of life is now almost culturally embedded' in WA, but it is clear that efficient use of water is no longer the only solution. WA's growing population (at a rate of 2-3% per annum in Perth) and drying climate mean that integrated water resource management is essential. The sustainability approach being taken in WA looks at the issue from a total water cycle perspective and considers environmental, economic and social aspects (see sustainability wheel image). 'Stakeholder involvement is the most important thing you have to do - it should run through everything,' comments Turner. Involving all stakeholders in this way allows an understanding of their priorities and willingness to pay. The government has generally supported the recommendations of the water

recycling strategy because all stakeholders have prepared and signed the recommendations.

Three categories of wastewater reuse are being considered by stakeholders to attain the 20% target for WA. There are numerous sites under consideration for industrial reuse; the Mosman Peninsula has been placed in the green spaces category, and reuse for agricultural purposes is a possibility in Carabooda. Replenishing aquifers with recycled water to augment scheme water supplies has also been considered, but will not form part of the 20% target. 'When you reach the point that you are asking the public to consider the concept of drinking reused water, nothing is easy,' says Turner. While the public generally support wastewater reuse for industrial purposes, the idea of scheme augmentation has been met with significant resistance around the world, for instance in California. Experience appears to show that people have a fundamental revulsion to the concept of drinking water that has passed through the human body, regardless of how well it is treated. However, there are examples in Europe where this has been implemented successfully, such as the Torreele Plant in Belgium (see main article). 'The Belgium strategy is more or less a model of what could be achieved in Western Australia, but we need to involve our stakeholders over a long period of time before we could consider using this approach,' explains Turner.

In short, WA has recognised the essential part that wastewater reuse has to play in maintaining a sustainable water supply. As a consequence, the Water Corporation of WA has committed to achieving the 'right' level of water recycling as part of an integrated water cycle management approach, which, according to Turner, is likely to be more than 20%, heading WA in the direction where water reuse is a vital element of its economy.