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Water reuse gains traction

The future of wastewater management will lie in harnessing this resource.

▶ The beneficial reuse of treated wastewater is gaining traction worldwide. Water scarcity is the main driver in many areas. In others, regulations on environmental discharge — like California’s Title 22 rules or the Clean Water Act’s total maximum daily load (TMDL) requirements — often make reuse more economical than further treatment and disposal.

As demand continues to increase, water treatment professionals are searching globally for insight into technologies and tactics that make water reuse effective and economical.

Demystifying the process

Singapore’s cutting edge NEWater system raised the bar for wastewater reuse. At five NEWater reclamation plants around the country, Singapore’s Public Utilities Board (PUB) treats 30 percent of the nation’s water demand with a combination of conventional wastewater treatment, screen filtration, membrane microfiltration and reverse osmosis. UV and hydrogen peroxide disinfection complete the process. The resulting water exceeds the quality of Singapore’s traditional drinking water supplies across a wide variety of parameters, from bacteria and organic substances to color and clarity.

NEWater is being blended with other drinking water sources to augment Singapore’s potable water supplies, and is also supplied to wafer fabrication plants, which demand extremely pure water.



Treated wastewater supports Israel’s high-value agriculture sector. Recycled water is valued, regulated and priced based on how it has been treated.

Just as important as the technical triumph of NEWater is PUB’s outstanding educational program. NEWater enjoys high acceptance and public confidence as a result of the board’s extensive communica-



The City of Beersheva's wastewater treatment plant disinfects its recycled water with UV to comply with European Union standards.

tions about the system. Through websites, literature, bottled water giveaways and even a hands-on visitor's center that has hosted more than 800,000 guests, the PUB has demystified and explained the wastewater treatment and reuse process.

Removing obstacles

Israel is another world leader in wastewater reuse — the desert nation recycles 75 percent of its wastewater. The country is also a global leader in a variety of key issues surrounding recycled water, including its strategy of pricing the treated water at one-quarter the rate of potable water to help ensure strong demand.

As the water treatment industry evolves worldwide, the intended use of the water will increasingly dictate the level of treatment and the cost of the product. Israel is already well along on that path.

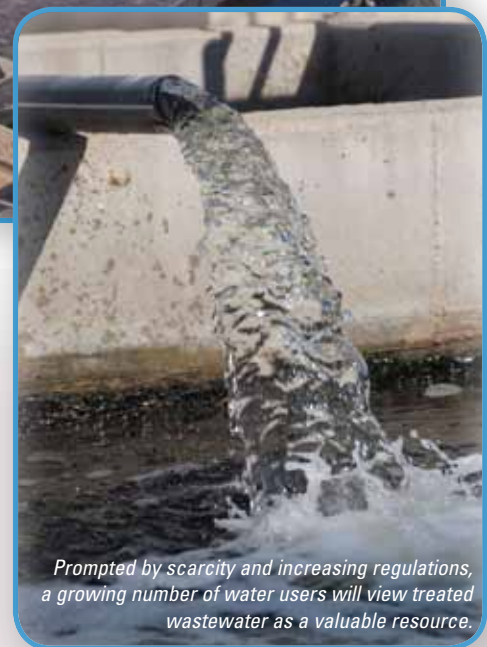
Israeli water and soil scientists are also at the forefront of studies on salinity and soil ion exchange, the result of dealing with land application of high-salinity treated wastewater. The nation's water professionals view the water supply as an unbroken flow from first use to reuse. They're eager for more seawater desalination plants to come online — not just because they

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will increase potable water supplies, but because desalinated seawater is far less saline than the country's groundwater, which in turn will yield treated wastewater with lower electrical conductivity (EC) values.

Similarly, when boron levels in treated wastewater approached levels that were harmful to crops, the Israeli government worked with detergent manufacturers to create boron-free laundry soaps that significantly reduced concentrations of the mineral in the wastewater stream.

The Israeli city of Beersheva is home to an exemplary wastewater treatment plant. The facility treats municipal and industrial wastewater and distributes it to area farmers. Because much of the local crop is exported to Europe, plant managers disinfect the water with UV to comply with European Union regulations barring irrigation with chlorinated water. In order to ensure efficient operation of the UV sys-



Prompted by scarcity and increasing regulations, a growing number of water users will view treated wastewater as a valuable resource.

tems, the disinfection units are preceded by 25-micron automatic self-cleaning screen filters and 7-micron automatic microfiber (AMF) systems that capture solids in cassettes of tightly wound polyester thread that can be automatically cleaned with high-pressure jets of water.

U.S. leaders

The same technologies are gaining ground in the U.S. One large regional wastewater treatment system uses a variety of automatic self-cleaning screen filters — which focus backflush through a series of rotating nozzles once a target pressure differential is reached between the clean and dirty sides of the screen — prior to

reverse osmosis treatment of reuse water. The membrane-treated wastewater is then pumped to nearby users, including a large industrial facility that employs it for cooling water, as well as local golf courses that use it for irrigation.

Many wastewater treatment authorities around the country treat portions of their wastewater for use within their own water treatment plants as process water. Sidestream filtration systems efficiently divert an appropriate fraction of the flow, then remove solids prior to distribution of the treated water around the plants for seal water and spray water on belt filter and plate-and-frame presses.

We are also eagerly watching a new facility in the West that is treating wastewater for land application rather than discharge into a local river. A TMDL on the city's stretch of the river requires treatment for heat and nutrients prior to discharge. The city realized that treatment for irriga-

tion would be far more cost effective.

With more than 44,000 TMDLs already written around the country and more on the way, a growing number of communities and water users throughout the U.S. will be seeking alternatives to costly pre-discharge treatment. And as populations grow and continue competing for limited water supplies, our nation will increasingly see the tremendous value in water reuse.

For generations, wastewater has been a disposal issue. We've evolved from seeing wastewater in just sanitary terms and begun recognizing the amount of energy and resources required to dispose of the liquid and solid components of wastewater. The next step in our evolution will be viewing it as a resource, as Singapore and Israel have done. The future of wastewater management will lie in harnessing this resource. Tomorrow's wastewater professionals will capture energy from the effluent, whether it's through digestion, com-

busting solids or some other technology. Other solids will help build organic matter in soils and nourish plants. And the water that remains will be used and reused in a cycle that more truly reflects its value.

All those things are happening today out on the leading edge of wastewater treatment. What will be especially exciting is — no matter what the drivers are — when wastewater reuse becomes commonplace. **WT**

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