**RECLAIM FROM THE DRAIN – THE IMPORTANCE OF WATER REUSE**

*With an ever growing population and access to only 2% of the world’s fresh water, alternative sources must be sought to tackle shortages. Global interest for using reclaimed water as a safe and effective source to meet the increasing water demand continues to expand.*

## TYPES OF WATER REUSE

### POTABLE REUSE

Further purified reclaimed water used to meet water quality standards for drinking and other household applications. Potable reuse systems use advanced processes to remove contaminants to treat treated wastewater and means drinking water quality standards and other appropriate reuse objectives.

### NON-POTABLE REUSE

Treated wastewater for non-potable reuse includes agricultural, industrial, landscape and agricultural irrigation. Non-potable reuse systems generally have lower water quality requirements than potable systems, and the level of treatment systems depending on the end use.

## BUT IS IT SAFE?

Stigma exists around reclaimed water, however, water can be purified to the necessary standards for various uses including industrial processes, irrigation, and even drinking water.

### RECLAIMED WATER – THE GLOBAL SITUATION

**US**

- In 1998, at least 35 US states had to address chronic water shortages.
- The California Direct Potable Reuse (DPR) Initiative was launched in 2017 to achieve DPR as a water supply option in California, and to date over 23 facilities have been allocated to fund 34 DPR research projects.
- The first direct potable reuse facilities in the US were opened in 2013 in Texas.

**JAPAN**

- There are 1,718 wastewater treatment plants in Japan.
- 8% of the total reclaimed water is used for non-potable purposes such as toilet flushing, which saves 4.2 million gallons of reused water per day.

**MEXICO**

- The demand for reclaimed water is still low with only 4% of 24.4 billion m3 of discharged municipal wastewater currently being reclaimed.
- Mexico is the second leading country in the world in terms of contracted wastewater reuse for agriculture.

**EUROPE**

- In 2012, Beijing built the Qinghe Wastewater Treatment Plant, which has the capacity to serve 800,000 people (e.g., toilet flushing and toilet flushing).
- The Water Resources Management Conference 2013 stated that 217 new treatment plants were established in 2012 bringing the total number to 2,030.

**SINGAPORE**

- Singapore has insufficient water to meet its demand, imports 30% of its annual supply of fresh water from Malaysia.
- Currently, Singapore’s NEWater project efficiently recycles wastewater with four purification plants producing 430 million liters of NEWater a day, which serves 50% of the population and approximately one third of the country’s water, and that water is expected to grow to more than half by the year 2020.

**BRITISH COLUMBIA**

- In 2010, British Columbia was the first province to establish a comprehensive wastewater reclamation regulation in 1999, which was revised in 2012.

**BRAZIL**

- Brazil’s Aquapolo Ambiental project was initiated in 2012 to reduce industrial potable water use in São Paulo and is the largest industrial water reuse project in the Southern Hemisphere.
- This project will provide water for a petrochemical facility, thereby conserving enough drinking water to supply a population of 300,000 people.

**CHINA**

- The demand for reclaimed water is still low with only 4% of 24.4 billion m3 of discharged municipal wastewater currently being reclaimed.
- China and Malta mean more than 80% and about 80% of their wastewater, respectively.

## HOW ARE AGILENT SOLUTIONS BEING USED FOR TESTING RECLAIMED WATER?

### IN VITRO CELL ASSAYS

High-throughput cell assays have emerged as reliable tools for identifying new chemicals in source water for their potential impact on human health. These assays are used to perform rapid screening of large numbers of substances to identify those that could have adverse effects on human health.

### GC/Q-TOF LC/Q-TOF

Gas chromatography with single or triple quadrupole mass spectrometer systems used for the analysis of residual volatile and semi-volatile organic contaminants. For the in vitro cell and end point in vitro studies, to identify new chemicals in source water for their potential impact on human health.

### IN VITRO GENE ASSAYS

High throughput cell and gene expression assays to further characterize chemical effects on human health. New research has used an in vitro gene expression test to evaluate and different ozone dose temperature interactions.

### GC/MSD SYSTEMS

Gas chromatography with single or triple quadrupole mass spectrometer systems used for the analysis of residual volatile and semi-volatile organic contaminants. Gas chromatography also used for chromatography of distribution by protein content.

### LC/MS SYSTEMS

Liquid chromatography with single or triple quadrupole mass spectrometer systems used for the analysis of residual volatile and semi-volatile organic contaminants. Characterization of PCE, TCE, ethylene, and ethylene oxide by liquid chromatography, and other contaminants related to their use in food, agriculture, and for other non medicinal weight organic acids.

### ICP-MS SYSTEMS

Inductively coupled plasma mass spectrometry systems used to characterization metal contaminants in wastewater. Characterization of ICP-MS to GC and LC to characterize contaminants is distinguished by protein interaction, e.g., bromate, chloride, fluorine.